

Avifauna Survey of Karima Hill Forest- a sacred forest within the eastern Afromontane biodiversity Hotspot.



By:

Edwin Gichohi Njuguna, Edson Mlamba, Dominic Chesire and Dr. Peter Njoroge
Ornithology Section, National Museums of Kenya, P.O. Box 40658 Nairobi;
(2014)

Correspondence: gichohi.njuguna@yahoo.com



Contents

Contents	i
Acknowledgements.....	iii
Executive Summary	iv
1.1. Introduction.....	1
1.2. Aims of the project.....	2
1.3. Study Area	2
2.0. Methodology	6
2.1. Reconnaissance	6
2.2. Opportunistic observation	6
2.3. Timed species count.....	6
2.4. Mist-netting.....	6
2.5. Point counts and vegetation surveys	7
2.6. Data analysis.	7
3.0. Results.....	8
3.1. Total Number of Species and species accumulation curves	8
3.2. Species accumulation curves	8
3.3. Species of Interest.....	9
3.3.1. Migrant Species.....	9
3.3.2. Biome Indicator Species	9
3.3.3. Forest dependency.....	11
3.3.4. Feeding Guilds	13
3.4. Encounter rates and Species distribution	14
3.4.1. Point counts.....	14
3.4.2. Mist netting	15
3.4.3. Commonness: Relative abundance	15
3.5. Comparing species recorded at the forest edge, inside the forest and in the neighboring farms.	16
3.6. Threats to The forest	17
3.7. Forest structure.....	18
4.0. Discussions	19
4.1. Bird species diversity and composition	19

4.2.	Threats facing the birds and their habitats in Karima hill forest.....	20
4.2.1.	Agricultural expansion & intensification.....	20
4.2.2.	Transportation & service corridors.....	21
4.2.3.	Over-exploitation of resources.....	22
4.2.4.	Invasive Species.....	23
4.2.5.	Poaching.....	24
4.3.	Conservation Issues and Recommendation.....	25
4.4.	Eradication, containment and control of Invasive Species.....	26
4.5.	Research and monitoring.....	26
4.6.	Capacity building.....	26
4.7.	Education and public awareness on the Importance of the forest.....	26
	Conclusion and Recommendations.....	26
	References.....	27
	Appendices.....	29
	Appendix 1.0. Table showing coordinates for future monitoring purposes.....	29
	Appendix 2.0.....	31

Acknowledgements

The team is grateful to Nyeri County council for granting us the permission to access Karima forest. We are also grateful for the support we received from Kenya forest service for granting us the permit required for conducting research in the forest. Special thanks to the National Museums of Kenya's Zoology department for granting us all the assistance and equipment needed for this work.

The team gained invaluable field ornithological experience with regards to bird survey methods, ringing and use of various equipments during the field and report writing phase of this project. This would not have been possible without the generous funding by the African Bird Club to whom we are very grateful.

Executive Summary

This is a report of findings of an avifaunal survey carried out in October 2013 in Karima Hill Forest, Nyeri County, Kenya. We aimed at assessing the bird species, composition and diversity as well as find out their conservation status. Similarly, we intended to identify the Afromontane biome species found in this forest and compare them to those found in the Mount Kenya and the Aberdare forests both of which are considered to be within the eastern Afromontane biodiversity hotspot. In order to ascertain if the forest was of any conservation importance, we set out to determine the presence or absence of bird species of conservation importance i.e. (endemics, IUCN red data List species, regionally threatened species etc).

To achieve the aforementioned objectives, Point counts, Timed species counts, Mist netting, and opportunistic observations were used to collect the data. Photographs were also taken where possible to document evidence of threats to the forest that were encountered.

A total of 109 Species were recorded of which 5 were afrotropical migrants and 8 were palaeartic migrants. Of the 109 species, 38% were forest visitors, 25% were forest generalists and 10% were forest specialists. It is estimated that over 50 percent of the forest is covered in exotic trees among them being eucalyptus sp. In addition, a total of 21 afrotropical highland biome species and 1 Somali- Maasai biome species were recorded in Karima hill forest.

The main threats to this forest are logging, poaching, invasive species as well as loss of indigenous trees to exotic trees mainly eucalyptus *sp*. Others include encroachment into the forest for agricultural expansion as well as clearing some parts of the forest for infrastructural development

1.1. Introduction

The Eastern Afromontane biodiversity hotspot is one of the biological wonders of the world, with globally significant levels of diversity and endemism (Noss, 1990). Its ecosystems provide tens of millions of people with freshwater and other ecosystem services that are essential to their survival. Despite its wealth in natural resources, the region is characterized by intense and pervasive poverty. The grip of poverty impedes sound, sustainable development as local people and governments adopt development models and initiatives with short-term unsustainable gains (Gordon et al 2012).

Karima Forest is located within Othaya Division of Nyeri County in Central Kenya and lies between Aberdare ranges and Mount Kenya forests which are considered to be key biodiversity areas within the eastern Afromontane biodiversity hotspot .The area enjoys the same weather conditions as Aberdare ranges and Mount Kenya forest.. It is a tapering dome-shaped volcanic hill with its highest point at an altitude of 2014m above sea level. It covers an area of about 265 acres (Kenya Forest service). This forest is of interest to ecologists as it may be a refuge or stop over for birds travelling between the two main ecosystems of Mount Kenya and the Aberdare forest.

An evaluation of diversity in East Africa has to deal with an extremely complex ecological, topographical and historical situation. The landscape composition features within them influence rainfall and temperature, and consequently the development of a great variety of natural vegetation types (Mittermeier et al. 2004).There is a relationship between elevation and species composition which can be represented as two gradients, one from high elevation and the other from lower elevation (Lovett 1996). This replacement of species with change in elevation contributes substantially to the diversity of this region (Mittermeier et al. 2004).

Due to its proximity to the known eastern Afromontane biodiversity hotspot and lying between Mount Kenya and the aberdare forest, Karima forest was suspected to have species with affinities to the afro-tropical highland biome similar to the two endemic bird areas. These areas are known to have rich species numbers. Other interesting endemic species that were suspected to occur in Karima forest which the survey sought to note were the Aberdare Cisticola (*Cisticola*

aberdare), Hinde's Babbler (*Turtoides hindei*) as well as Abbott's Starling (*Cinnyricinclus femoralis*). Njoroge & Bennun (2000) as well as Allan (1981) have shown that the ranges of this species could overlap and extend well into the other.

1.2. Aims of the project

The overall aim of this research was to carry out a comprehensive bird survey and prepare a checklist for the little known Karima forest. Documentation of this information is expected to enhance conservation efforts of the forest. The specific objectives of the study were to:-

1. Assess the bird species, diversity and composition and the conservation status of the birds found in Karima forest.
2. Identify the Afrotropical biome species found in this forest and compare them to those found in the Mount Kenya and the Aberdare forests.
3. Determine the presence or absence of bird species of conservation importance (endemics, IUCN red data List species, regionally threatened species etc)
4. Identify the threats facing the bird species in this forest and the forest in general.

1.3. Study Area

Karima Forest is located within Othaya Division of Nyeri District in Central Kenya. It is a tapering dome shaped volcanic hill with its highest point imposing at an altitude of 6000ft above sea level. As seen in figure 1.0. Karima hill forest appears to be between the sacred Kirinyaga Mountain [Mt. Kenya] and Nyandarua [Aberdare ranges], 150kms northeast of Nairobi. It covers an area of about 265 acres (Porini association 2011)

Rainfall is bimodal rainfall with the long rains occurring from March to May and the short rains from October to December. Between 1200 to 1600 mm rainfall is received during the long rains and between 600 to 1500 mm during the short rains ranging from due a normal season under normal conditions (Porini association 2011). Mean temperatures in the area range from 17° C

during the coldest months of June to August but can go as low as 8° C to 24° C and 29° C during the hottest months of the year (Porini association 2011).

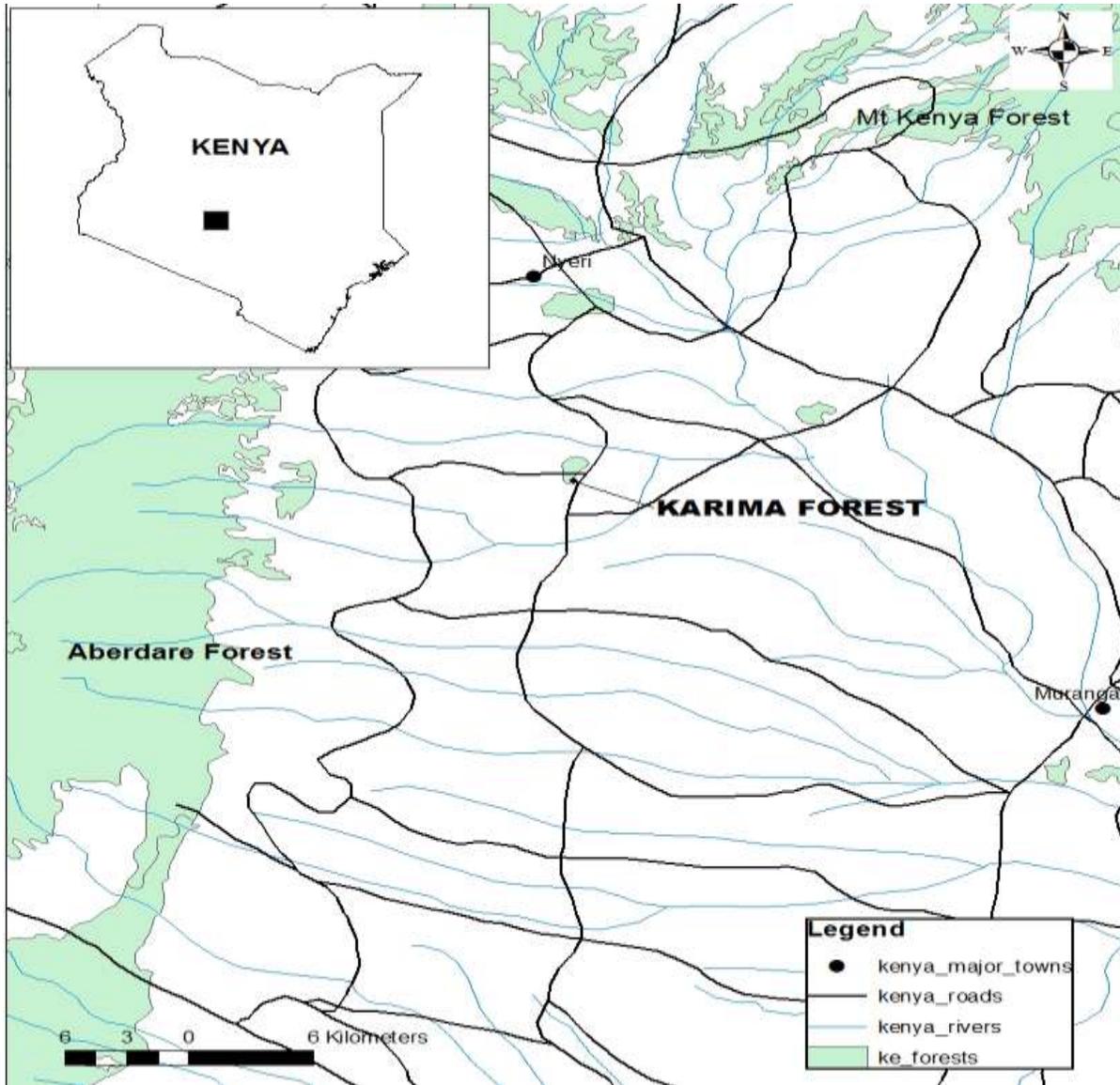


Figure 1.0. Map of the study area showing the position of Karima Forest Subject to Mount Kenya and Aberdare forest which are known Key biodiversity areas in the eastern Afromontane biodiversity hotspot.

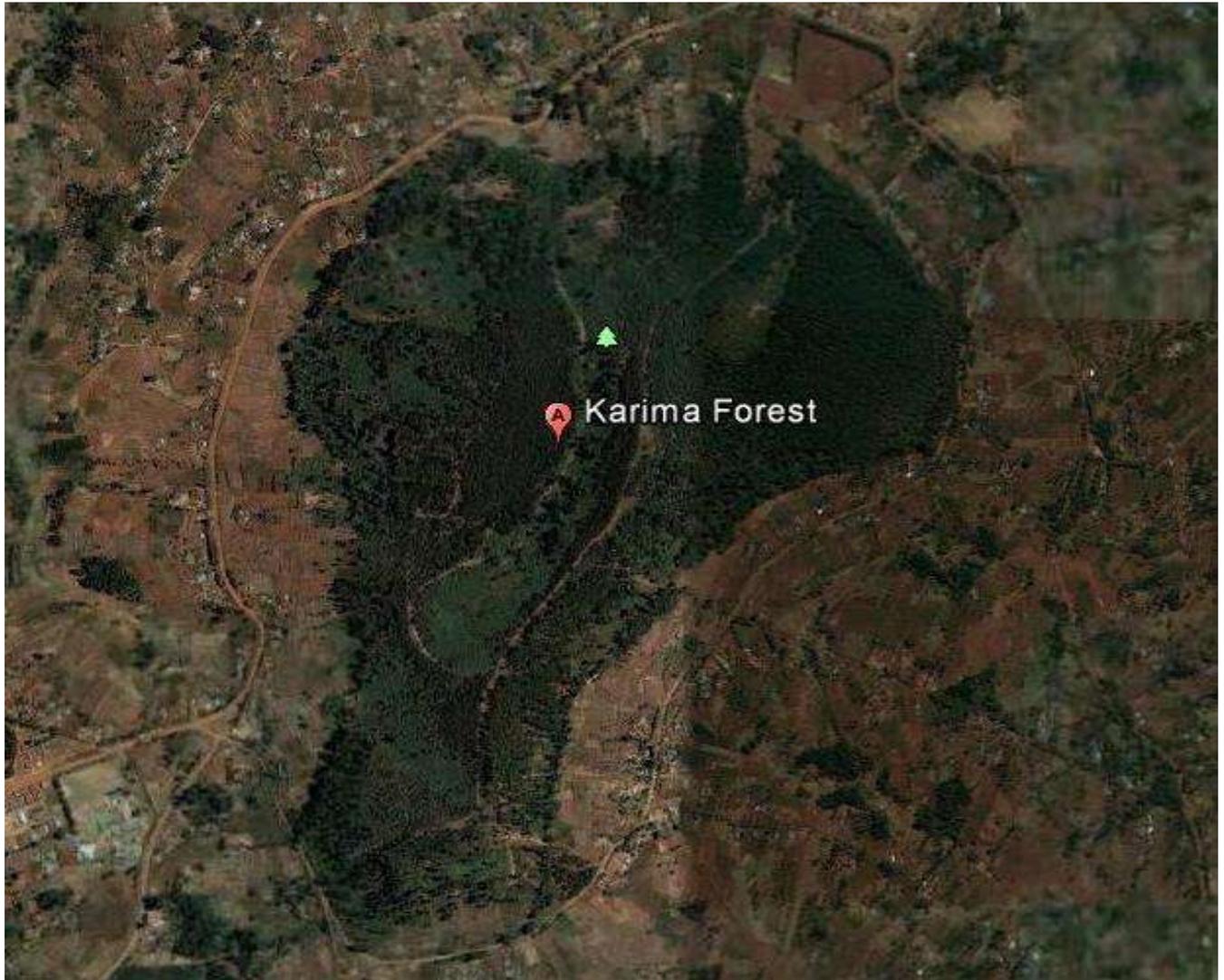


Figure 2.0. *Map of the study area showing the position of Karima Forest downloaded from Google earth*

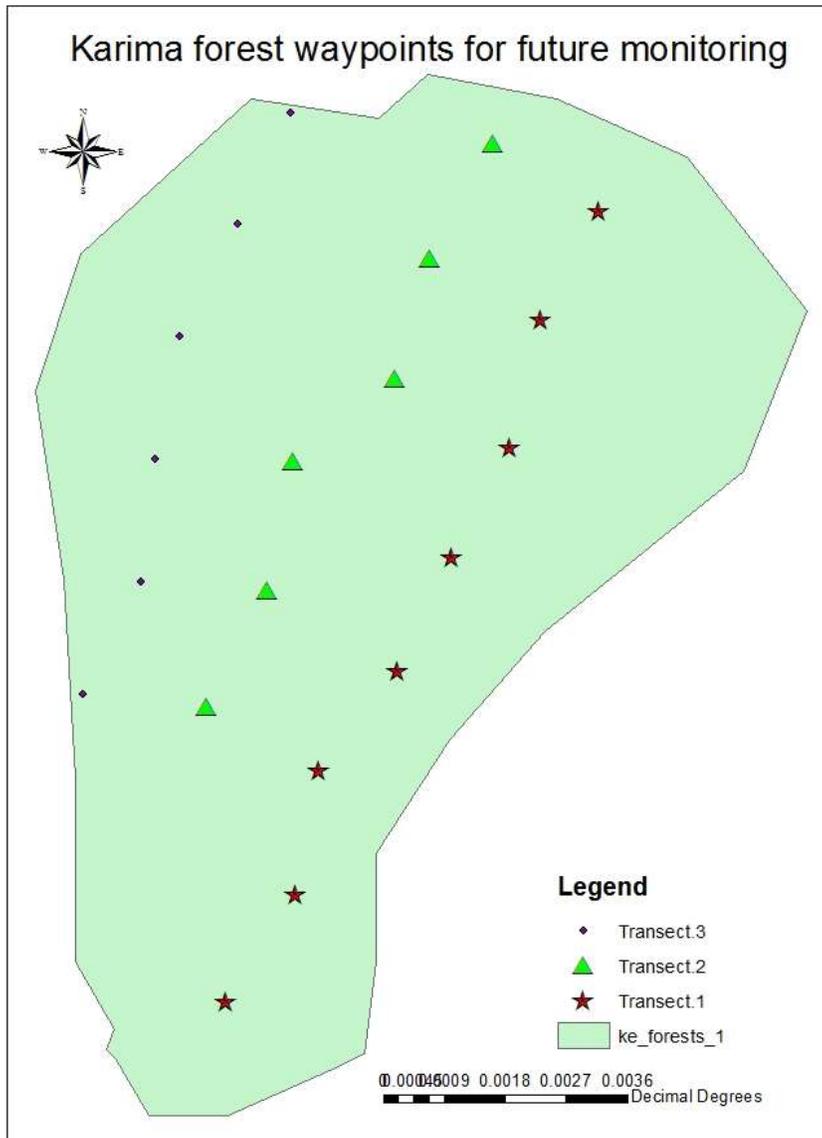


Figure 3.0. Map Of Karima forest showing the point count track that was used. Can be used for future monitoring activities as also shown in appendix 1

2.0. Methodology

2.1. Reconnaissance

One day was spent in and around the forest familiarizing with the terrain, vegetation, habitat types, identifying net lines, different foot paths and birds. The level of human disturbance was also assessed during this period.

2.2. Opportunistic observation

Each member of the team carried a pair of binoculars of not less than 8×42 magnification during the field work days and recorded any species seen or heard and positively identified using the Zimmerman *et al*, (1996) guide book. All sightings were recorded on a daily basis on note books. This aided in generating the species list for karima forest.

2.3. Timed species count

The Timed species-counts (TSCs) method is ideal for building complete species lists quickly, and to establish the relative abundance of canopy and mid-level bird species. TSC's also offers the freedom to investigate any microhabitats that may occur within the forest and surrounding areas. Each session lasted for 40 minutes, during which species lists were made every ten minutes i.e. each species was recorded every time it was positively identified either by sight or sound (Bennun & Howel, 2000). Each TSC was separated by at least 100 m or 10 min walk from the next. The TSC method involves essentially repeated species lists, on which each species is recorded the first time it is positively identified by either sight or sound (Bennun & Howell, 2000)

For each count, species were scored according to when they were first recorded to give a 'commonness index' (4 if in the first ten minutes, 3 if in the next ten minutes and so on). During the species counts pairs of binoculars, field guides and previous experience of the birds' calls were used to aid identification.

2.4. Mist-netting

Mist-nets were used to sample understory species and other skulking species. One 18m and two 12m standard mist-nets were laid in the forested area along small paths and trails that had already

been cleared to avoid further habitat destruction. The mist netting sessions ran daily from 0600hrs to 1000hrs during the morning. At each ringing station, all the birds species caught were identified, ringed and various biometric measurements taken before being released. The team used Zimmerman *et al* (1996) and Stevenson & Fanshawe (2002) for identification. For purposes of conservation, any bird caught was photographed.

2.5. Point counts and vegetation surveys

Census stations were systematically selected and marked with the help of a GPS at intervals of 200 meters along a 1 km transects. To ensure heterogeneity, the transects ran across the geographical gradient in the forest. At each point, 2 observers spent 10 minutes i.e. waited for one minute for any flushed birds to settle (settling in period) and then counted birds heard or seen within and beyond the circle of 25 m radius for the remaining 9 minutes.

At each point count station, the team measured the following vegetation variables:- visibility i.e. number of squares visible on a checkered board from 10 m, number of cut stems and the number of live stems of diameters at breast height (dbh) of various intervals i.e. dbh <10cm, 10-20cm, 20-60cm and >60cm; number of cut shrubs and number of seedling/saplings in a 1m x 1m plot. Any sign of human disturbance observed was also and recorded e.g. logging e.t.c.

2.6. Data analysis.

Most of the analysis done in this report was done using simple descriptive statistical tools in excel 2007.No inferential statistics have been done herein. This mainly used the data from the point counts (encounter rates), Mist netting data and the Tsc data for (commonness index). An overall checklist was prepared highlighting migrant species, biome species, forest dependency, and feeding guilds.

Species accumulation curves and species predictive curves

They were used to predict the probable total number of species that could be found in the forest had more days been used to survey the whole forest (Githiru et al., 2009)

3.0. Results

3.1. Total Number of Species and species accumulation curves

A total of 109 species were recorded in Karima hill forest during the survey period. 56 species were recorded using the point counts, 10 species using mist-net and 104 species using timed species counts. Only 5 species were recorded opportunistically. Of the sampling methods used, timed species counts recorded the highest number of individual birds (1453 individuals), followed by point counts (224 individuals) with mist-netting recording the lowest (22 birds). The total numbers of individual birds observed and recorded were (1678).

3.2. Species accumulation curves

Species accumulation curves and species predictive curves were used for only the species found inside the forest species accumulation curve based on the number of new birds recorded per day predicts the number of species expected for the forest to be between 80 and 90 species as shown in Figure 4.0

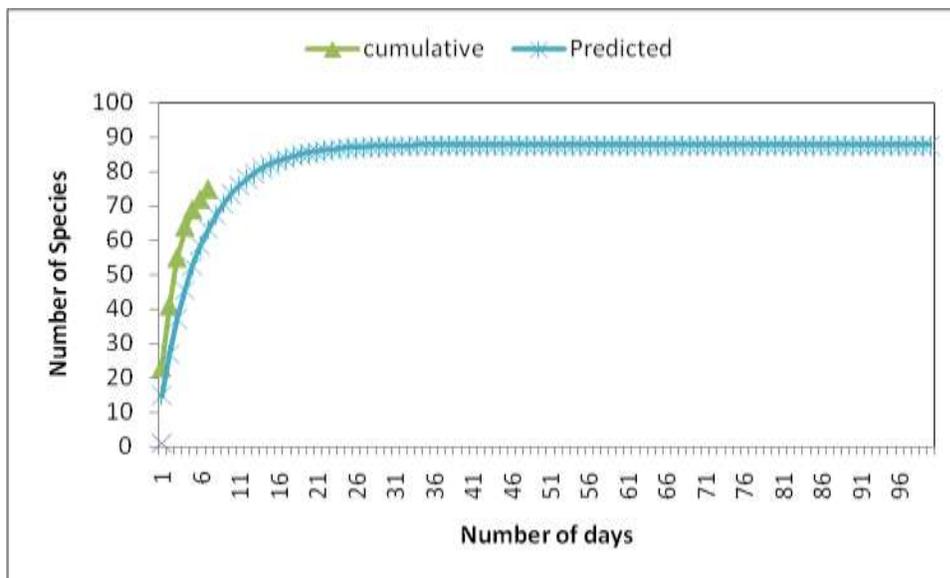


Figure 4.0. *Species accumulation curve based on an asymptotic model using non-linear regression procedure for successive days in Karima hill forest for species only found in the forest.*

3.3. Species of Interest

3.3.1. Migrant Species

A total of 5 afrotropical migrants (am) and 8 palaeartic migrants (PM) were recorded (inside the forest, at the forest edge and in the surrounding farmlands) as shown in table 1.0

Table 1.0. *Migrant species recorded in Karima forest during the survey*

Common Name	Scientific Name	Migratory status
Red-chested Cuckoo	<i>Cuculus solitarius</i>	am
Silvery-cheeked Hornbill	<i>Bycanistes brevis</i>	am
Black Cuckooshrike	<i>Campephaga flava</i>	am
African Paradise Flycatcher	<i>Terpsiphone viridis</i>	am
Chestnut Weaver	<i>Ploceus rubiginosus</i>	am
Common Buzzard	<i>Buteo buteo</i>	PM
Common Swift	<i>Apus apus</i>	PM
Eurasian Bee-eater	<i>Merops apiaster</i>	PM
Barn Swallow	<i>Hirundo rustica</i>	PM
Common House Martin	<i>Delichon urbicum</i>	PM
Willow Warbler	<i>Phylloscopus trochilus</i>	PM
Blackcap	<i>Sylvia atricapilla</i>	PM
Tree Pipit	<i>Anthus trivialis</i>	PM

3.3.2. Biome Indicator Species

A total of 21 afrotropical highlands biome and 1 Somali-Masai biome species were recorded in karima hill forest as shown in table 2.0. Among the 21 afrotropical highlands biome species was Hunter's Cisticola (*Cisticola hunteri*) a range restricted endemic to Kenyan mountains EBA (Stattersfield et al., 1998)

Table 2.0. *Biome indicator species recorded in Karima forest during the survey*

Common Name	Scientific Name	Biome
Mountain Buzzard	<i>Buteo oreophilus</i>	Afrotropical highlands
Hartlaub's Turaco	<i>Tauraco hartlaubi</i>	Afrotropical highlands
Montane Nightjar	<i>Caprimulgus poliocephalus</i>	Afrotropical highlands
Cinnamon-chested Bee-eater	<i>Merops oreobates</i>	Afrotropical highlands
Black-collared Apalis	<i>Apalis pulchra</i>	Afrotropical highlands
Hunter's Cisticola	<i>Cisticola hunteri</i>	Afrotropical highlands
Mountain Greenbul	<i>Andropadus nigriceps</i>	Afrotropical highlands
Brown Woodland Warbler	<i>Phylloscopus umbrovirens</i>	Afrotropical highlands
Cinnamon Bracken Warbler	<i>Bradypterus cinnamomeus</i>	Afrotropical highlands
African Hill Babbler	<i>Pseudoalcippe abyssinica</i>	Afrotropical highlands
Montane White-eye	<i>Zosterops poliogastrus</i>	Afrotropical highlands
Rüppell's Robin Chat	<i>Cossypha semirufa</i>	Afrotropical highlands
White-eyed Slaty Flycatcher	<i>Melaenornis fischeri</i>	Afrotropical highlands
White-starred Robin	<i>Pogonocichla stellata</i>	Afrotropical highlands
Bronze Sunbird	<i>Nectarinia kilimensis</i>	Afrotropical highlands
Golden-winged Sunbird	<i>Drepanorhynchus reichenowi</i>	Afrotropical highlands
Northern Double-collared Sunbird	<i>Cinnyris reichenowi</i>	Afrotropical highlands
Eastern Double-collared Sunbird	<i>Cinnyris mediocris</i>	Afrotropical highlands
Baglafecht Weaver	<i>Ploceus baglafecht</i>	Afrotropical highlands
African Citril	<i>Crithagra citrinelloides</i>	Afrotropical highlands

Streaky Seedeater	<i>Crithagra striolata</i>	highlands Afrotropical highlands
Northern Pied Babbler	<i>Turdoides hypoleuca</i>	Somali-Masai

3.3.3. Forest dependency

Bird species were classified as either forest-specialist (FF), forest generalist (F), or forest visitors (f) following Bennun *et al.*, (1996). Those that were not dependent on the forest were classified as non-F. Forest visitors (f) were the most commonly recorded bird species in the forest followed by non-forest species (Non-F), forest generalists (F) and the forest specialists (FF) as the least commonly recorded species.

Due the level of disturbance and exotic trees in Karima forest, there were more forest visitors as compared to non-forest species, forest generalist and True forest specialist in that order as shown in fig 5.0.

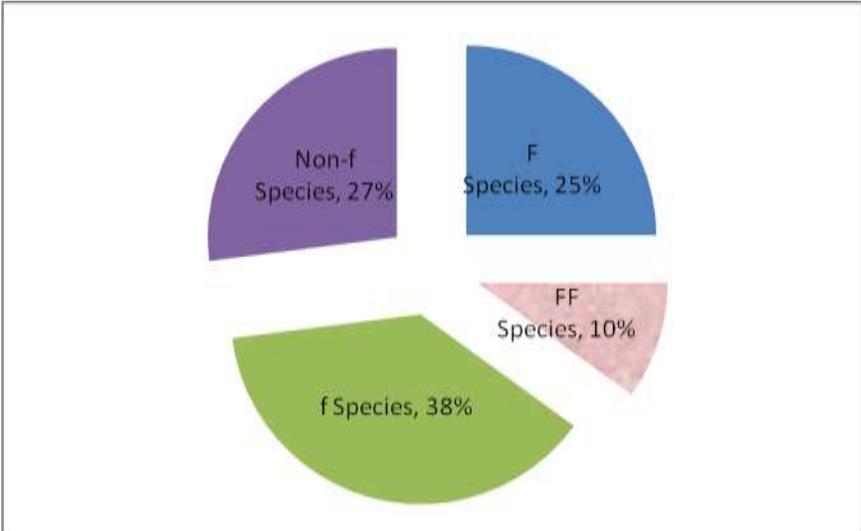


Figure 5.0. Proportion of forest dependent species found in Karima forest

3.3.3.1. Forest dependent Species Unique to Karima hill forest

A total of 39 true forest species were recorded with 28 being forest specialists (FF) and 11 being forest generalists (F) as shown in table 3.0.

Table 3.0. Forest dependent species found in Karima hill forest

Common Name	Scientific Name	forest dependency
Scaly Francolin	<i>Francolinus squamatus</i>	F
Common Buzzard	<i>Buteo buteo</i>	FF
African Goshawk	<i>Accipiter tachiro</i>	F
African Olive Pigeon	<i>Columba arquatrix</i>	FF
Tambourine Dove	<i>Turtur tympanistria</i>	F
Lemon Dove	<i>Aplopelia larvata</i>	FF
Eastern Bronze-naped Pigeon	<i>Columba delegorguei</i>	FF
Hartlaub's Turaco	<i>Tauraco hartlaubi</i>	FF
African Emerald Cuckoo	<i>Chrysococcyx cupreus</i>	F
Red-chested Cuckoo	<i>Cuculus solitarius</i>	F
African Wood Owl	<i>Strix woodfordii</i>	F
Montane Nightjar	<i>Caprimulgus poliocephalus</i>	F
Cinnamon-chested Bee-eater	<i>Merops oreobates</i>	F
Silvery-cheeked Hornbill	<i>Bycanistes brevis</i>	F
Yellow-rumped Tinkerbird	<i>Pogoniulus bilineatus</i>	F
Black-throated Wattle-eye	<i>Platysteira peltata</i>	F
Black-backed Puffback	<i>Dryoscopus cubla</i>	F
Black-collared Apalis	<i>Apalis pulchra</i>	F
Grey Apalis	<i>Apalis cinerea</i>	FF
Hunter's Cisticola	<i>Cisticola hunteri</i>	F
Mountain Greenbul	<i>Andropadus nigriceps</i>	FF

Yellow-whiskered Greenbul	<i>Andropadus latirostris</i>	F
Slender-billed Greenbul	<i>Andropadus gracilirostris</i>	FF
Cabanis's Greenbul	<i>Phyllastrephus cabanisi</i>	FF
Blackcap	<i>Sylvia atricapilla</i>	F
Brown Woodland Warbler	<i>Phylloscopus umbrovirens</i>	F
Cinnamon Bracken Warbler	<i>Bradypterus cinnamomeus</i>	F
African Hill Babbler	<i>Pseudoalcippe abyssinica</i>	FF
Montane White-eye	<i>Zosterops poliogastrus</i>	F
Olive Thrush	<i>Turdus olivaceus</i>	F
Rüppell's Robin Chat	<i>Cossypha semirufa</i>	F
White-eyed Slaty Flycatcher	<i>Melaenornis fischeri</i>	F
African Dusky Flycatcher	<i>Muscicapa adusta</i>	F
White-starred Robin	<i>Pogonocichla stellata</i>	F
Northern Double-collared Sunbird	<i>Cinnyris reichenowi</i>	F
Eastern Double-collared Sunbird	<i>Cinnyris mediocris</i>	F
Collared Sunbird	<i>Hedydipna collaris</i>	F
Grey-headed Negrofinch	<i>Nigrita canicapillus</i>	F
Thick-billed Seed eater	<i>Crithagra burtoni</i>	FF

3.3.4. Feeding Guilds

The overall proportion of birds based on their feeding guilds showed that insectivores formed the highest proportion with the least being the omnivores and the molluscivores as shown in Figure 6.0.

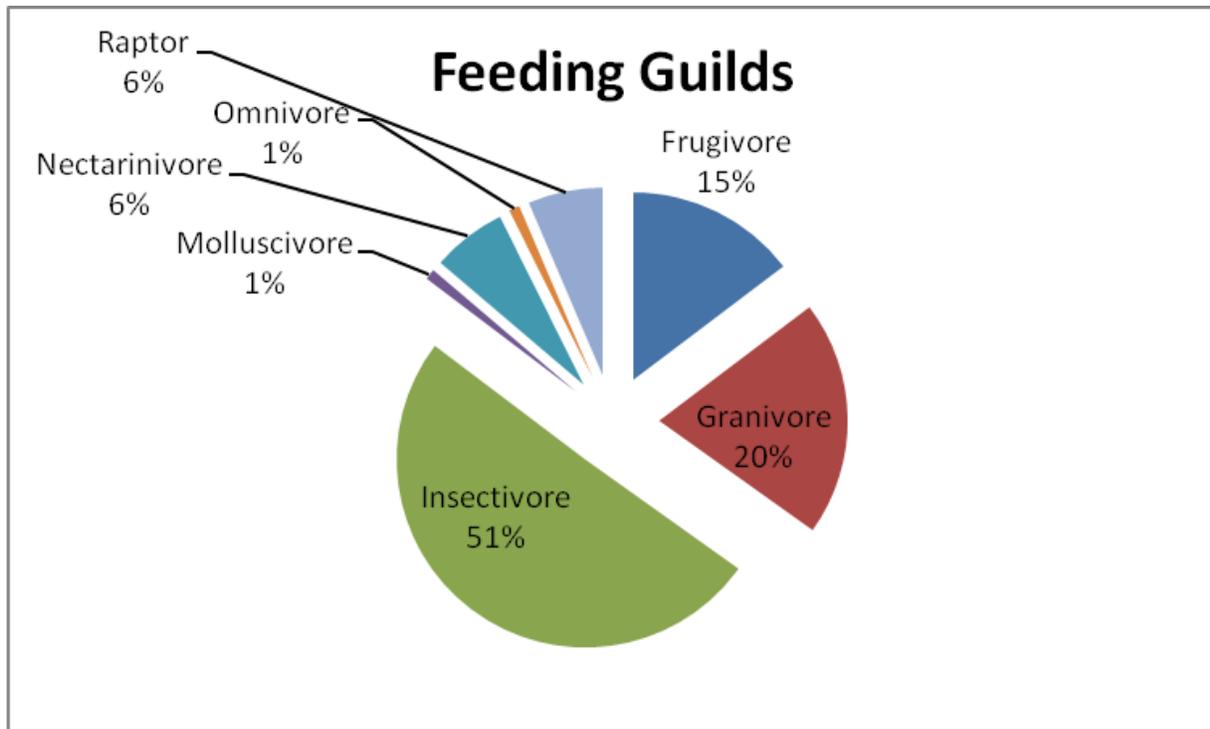


Figure 6.0. *Proportion of feeding assemblages of the bird species found in Karima hill forest.*

3.4. Encounter rates and Species distribution

3.4.1. Point counts

Yellow-whiskered Greenbul was the most common species encountered (recorded in 16 point count stations out of the 20) in Karima forest. 10 most common species encountered through the point counts are shown in table 4.0.

Table 4.0. *Top-ten commonest and most widespread species based on number of encounters by Point Count method at Karima hill forest forest (out of 20 point count stations)*

Common Name	encounter rate
Yellow-whiskered Greenbul	16
Yellow-rumped Tinkerbird	14
African Olive Pigeon	12
Chin-spot Batis	11
Grey-capped Warbler	11

Northern Double-collared Sunbird	11
Tropical Boubou	11
Cinnamon Bracken Warbler	10
Grey-backed Camaroptera	9
Red-eyed Dove	9

3.4.2. Mist netting

Overall, a total of 10 bird species were caught in the mist nets with 22 individuals. Of these, the Mountain Greenbul was the. The only species that were added to the species list using this method are the Lemon dove and the white-starred robin. The birds caught using the mist netting methods are shown in table 5.0.

Table 5.0. *Species recorded by mist-netting In Karima Hill forest*

Common name	Total Number of Species
Mountain Greenbul	5
White-starred Robin	4
Cabanis's Greenbul	3
Collared Sunbird	2
Grey-backed Camaroptera	2
Yellow-whiskered Greenbul	2
Cinnamon Bracken Warbler	1
Lemon Dove	1
Montane White-eye	1
Northern Double-collared Sunbird	1

3.4.3. Commonness: Relative abundance

For each TSC, each bird species was assigned an index ranging from 0 to 4, depending on whether it was recorded during the first 10 minutes (= 4), second ten minutes (= 3), third ten minutes (= 2), fourth ten minutes (= 1); species not recorded during that specific TSC scored a '0'. An average score (*TSC Index*) was then computed over all the counts across the entire study area, which is an index of relative abundance of the species. To establish distribution patterns, the *encounter rate* was also computed based on the proportion of all TSCs in which a species was recorded as shown in Figure 7.0. The computation was based on whether the species were discovered inside the forest, in the forest edge or in the farmlands.

3.4.3.1. 10 most common birds inside the forest

The most common bird species found inside Karima forest was the Montane White-eye (mean TSC-index 3.5) followed by the Yellow-whiskered Greenbul as shown in Figure 7.0.

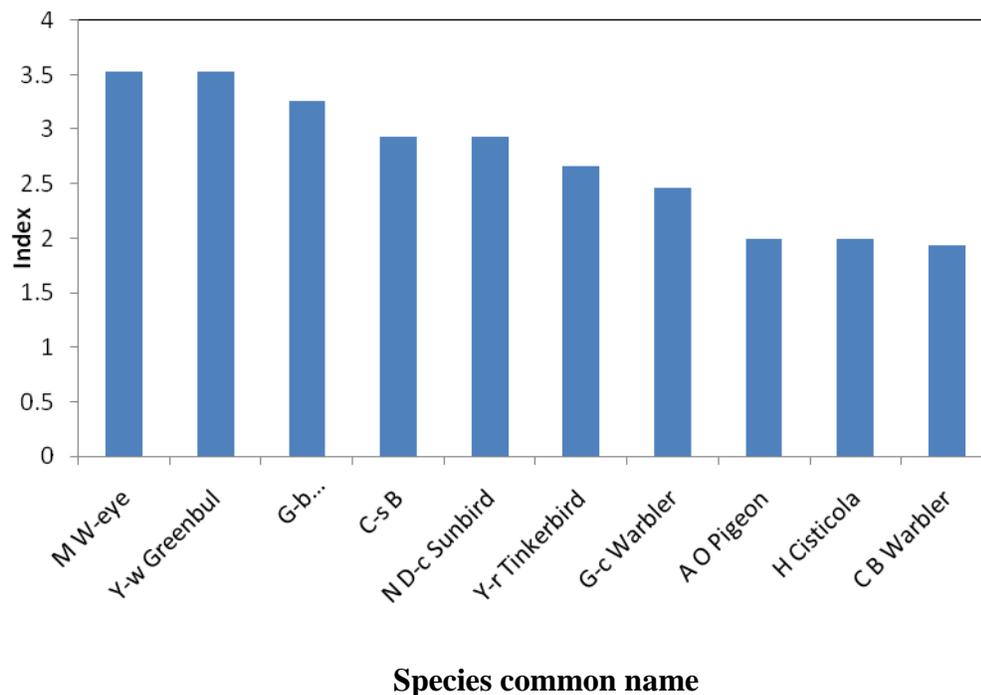


Figure 7.0. Mean Tsc Indices of species recorded inside Karima Hill Forest from the most common to the least common (Montane White-eye, Yellow-whiskered Greenbul, Grey-backed Camaroptera, Chin-spot Batis, Northern Double-collared Sunbird, Yellow-rumped Tinkerbird, Grey-capped Warbler, African Olive Pigeon, Hunter's Cisticola, Cinnamon Bracken Warbler)

3.5. Comparing species recorded at the forest edge, inside the forest and in the neighboring farms.

Forest edge had more species recorded than inside the forest based on TSC's in each habitat the forest edge had 75 species inside the forest 74 species had as 73 species as shown in Figure 8.0

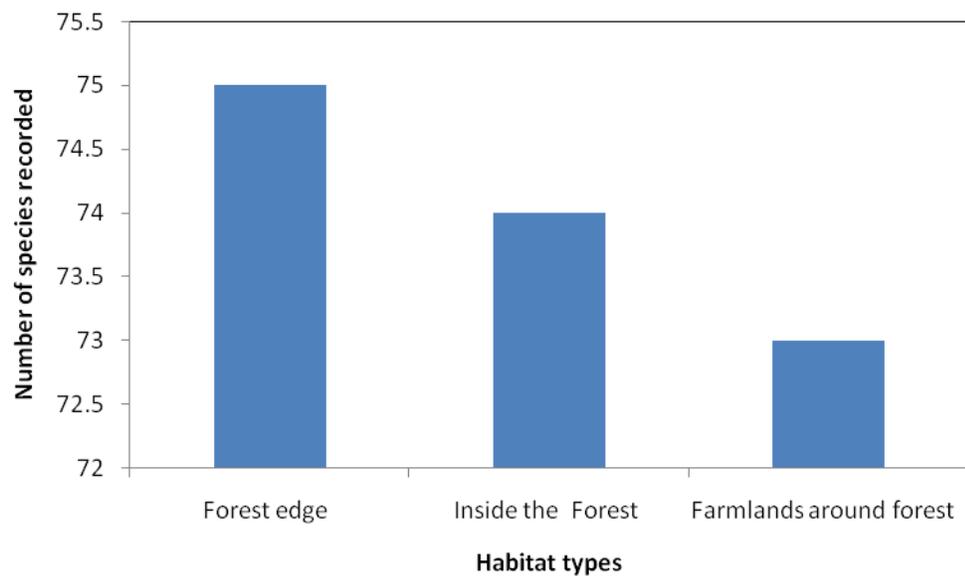


Figure 8.0. *Comparing the species recorded at the forest edge, inside the forest and in the farmlands during the survey in Karima hill forest*

3.6. Threats to The forest

Overall, the forest edge was more disturbed than the forest interior. However, the number of trees cut inside the forest was more than that at the forest edge. From figure 9.0. It is clearly evident that the forest is disturbed

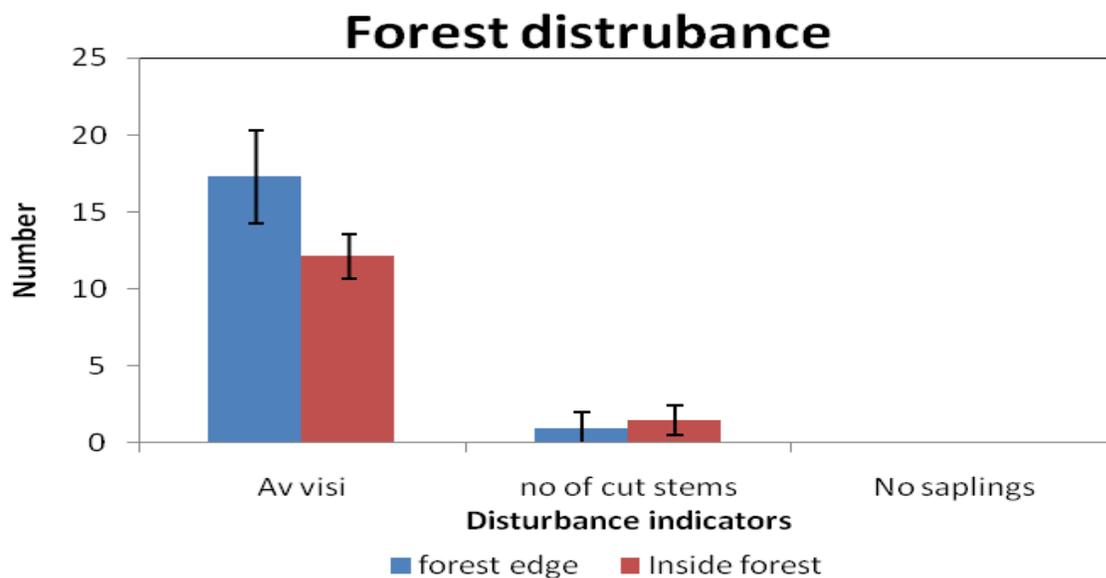


Figure 9.0. *Level of disturbance inside and outside the forest*

3.7. Forest structure

Overall, trees of dbh 5-10 were more considering that the mean of woody stems of dbh 5-10 averaged 7.8 (S.E=3.45, n=156) at each point count station as shown in figure 11.0. It is a fairly young forest.

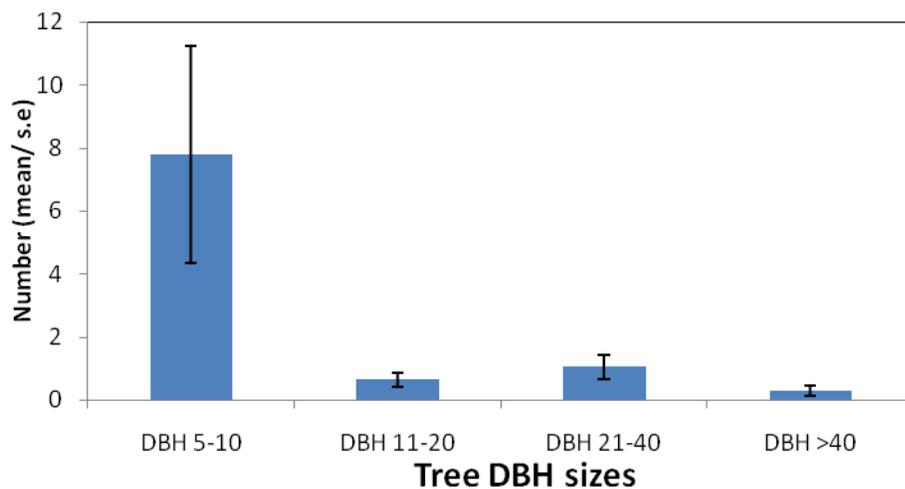


Figure 12.0. *Vegetation Variables recorded in Karima hill forest during the survey*

4.0. Discussions

4.1. Bird species diversity and composition

It can be seen from the data presented that the low number of forest specialists, and the low number of species encountered as a whole, was most likely due to the disturbance of the vegetation in the area. One of the threats to this forest as documented is disturbance. Birds are known to prefer undisturbed sites especially the forest specialists (Bennun et al., 1996). However, the large proportion of forest generalists and visitors indicate that some encroachment on what was formerly the habitat of specialists has occurred, the vegetation structure now being more suited to such species. Birds are very sensitive to habitat changes e.g. disturbance. Similarly, bird diversities are known to be affected by forest structure (MacArthur & MacArthur, 1961). Karima forest as shown by the results is a fairly young forest with most trees being of a dbh between 5-10 with very few saplings. If not much conservation efforts are put in place, more forest visitors could be recorded in the forest as open patches in the forest open up the forest to more birds which are forest visitors

Though the threshold of the number of species that a forest should have to be considered of conservation is not known, Karima forest had quite a high number of migratory bird species as well as biome indicator species. With 13 Migratory species being recorded, Karima forest could be a stopover for migratory birds. However this has to be confirmed through further research.

The proportion of insect eating birds is high as was hypothesized. Most forest birds feed on Insects if not berries from the trees and other vegetation found in the forest. Understanding the proportions of the forest dependencies is important for future monitoring purposes of Karima forest. A shift in the proportions of the dependencies recorded could be indicative of the ecosystems health as any effect is easily noticeable through this (Bennun et al., 1996). Birds are very sensitive to any slight change in their habitat (Padoa-Schioppa et al., 2006).

It was important to understand the species richness and diversity of Karima hill forest as it has been documented to be the simplest way to describe community of a given taxa as well as its

diversity (Magurran 1988).In addition, it forms the basis for generating many models of community structures (MacArthur & Wilson 1967; Stevens 1989).

4.2. Threats facing the birds and their habitats in Karima hill forest.

From our survey, it was observed that the forest is faced by a myriad of challenges. Karima forest is surrounded by small farms whose inhabitants depend on the forest directly or indirectly. However, it is the direct use benefits that have been documented to be the main cause of the threats to this forest by man as he tries to satisfy his needs.

4.2.1. Agricultural expansion & intensification

There are farms around Karima forest. Some of the farmers depend on the forest for fodder and fencing poles. It was observed that some farms seemed to have been curved out from the forest. It is likely that this will see the forests size reducing with an increase in demand for more food that will see the farmers curve out more land from the forest.





Pictures showing Farms neighboring the forest

4.2.2. Transportation & service corridors



*Power line cutting through the forest.
Supplies electricity to one of Kenya's
Mobile service providers; signal booster.*



A road cutting through the forest

4.2.3. Over-exploitation of resources

The forest is faced with logging instances (diagram). Though there are two forest guards in the forest, there are isolated cases of Logging within the forest. Restoration efforts are underway after most of the forest was cleared in the late 90's (diagram...). The forest is also faced with a challenge of commercialization where Eucalyptus sp. Have been planted in the forests which have contributed to the conservation value of the forest going down as the Eucalyptus species is known to be an enemy of conservation (Abelho & Graça, 1996; Moral & Muller, 1970).



Pictures showing level of Disturbance in karima hill forest top left shows an open patch of the forest. Top right shows a man carrying a pole from the forest. And above shows stumps to confirm that there is logging in the forest

4.2.4. Invasive Species

3 (three) invasive species were seen in Karima Forest and the neighboring farms. Of all of them the *Eucalyptus spp*, was the most common one followed *Solanum mauritanum* and then the *Mexican marigold* and *Lantana Camara*. Research has shown that biological invasions to a large extent can lead to large-scale alterations the functioning of any ecosystem functioning (Bergstrom, et al., 2009). Karima forest is not left out either and if the invasive species are not controlled, a competition for the resources in the forest with other plants is imminent (Roemer, Donlan & Courchamp 2002). Similarly, this could see the extinction of some plant species as well as bird species moving out of this forest to seek refuge elsewhere (Blackburn *et al.* 2004) as more and more resources e.g. soil and water will be depleted by the Invasive species as their population increases (Maron *et al.*, 2006).



Picture showing two Invasive *Species* in Karima Hill Forest. *Solanum mauritanium* (in the foreground right) and *Eucalyptus sp* (in the background)



Solanum incanum (showing signs of Disturbance in the forest (A species used to ecologists to infer for disturbance)) was also found in the forest.

4.2.5. Poaching

Though there were no direct signs of birds poaching, there was an evidence of a snare in the forest. It is suspected to be a snare used for catching porcupines.



A snare found inside the forest.

4.3. Conservation Issues and Recommendation

Strengthen the Indigenous Knowledge within Karima location relating to Karima hill forest forest. It has two shrine that existed in the past i.e. Gakina shrine and Kamwangi Shrine both of which are not severely destroyed like other parts in the forest showing that some those destroying the forest are aware of this fact

4.4. Eradication, containment and control of Invasive Species

Mechanical or biological control of the Invasive species (Lantana Camara, Solanum mauritanum, Eucalyptus spp, Tagetes minuta) found in and around the forest is highly recommended as they may take over the forest rendering its potential as a bird refuge futile or not successful.

4.5. Research and monitoring

Monitoring to ascertain which other biodiversity taxa exist in the forest. The areas that were marked and used as point count stations as shown in appendix 1.0. should be used for future monitoring purposes of the forest to ascertain whether the forests state is improving or is going down.

4.6. Capacity building

Training of staff has on how to monitor and improve the state of the forest should be undertaken soonest for purposes of managing the forest well.

4.7. Education and public awareness on the Importance of the forest

The locals within Karima forest and especially those living around the forest should be encouraged to sustainably use the resources in and around the forest. In addition the importance of the forest and the ecosystem services that the residents can gain from the forest should be addressed so that the residents can understand how they will benefit from this forest.

Conclusion and Recommendations

Indigenous vegetation has the potential to significantly increase the number of avifaunal diversity in any forest. Similarly heterogeneous landscapes also have the potential to be habitats for diverse bird species. Karima forest has large areas where exotic trees e.g. Eucalyptus have been planted. Eucalyptuses have been documented not to be good habitats for birds and other organisms because of their allelopathic nature of their leaves. Gradual replacements of the eucalyptus trees should be considered to be an option towards sustainable conservation of Karima Hill Forest if the Locals are to maximally benefit from ecosystem services from the forest.

References

- Abelho, M., Graça, M. a. S., 1996. Effects of eucalyptus afforestation on leaf litter dynamics and macro-invertebrate community structure of streams in Central Portugal. *Hydrobiologia* 324, 195–204.
- Aberdare, Henry Austin Bruce, 1st Baron (1815-95)', in [Magnus Magnusson](#) and Rosemary Goring, eds., [Chambers Biographical Dictionary](#) (5th edition, 1990), p. 5
- Attiwill, P.M., 1994. The disturbance of forest ecosystems: the ecological basis for conservative management. *Forest Ecology and Management* 63, 247–300.
- Bennun L, Dranzoa C., Pomeroy D., (1996). The Forest Birds of Kenya and Uganda *Journal of East African Natural History*, 85(1):23-48.
- Bennun L, Howell K. 2002. Birds. In: *African forest biodiversity; a field survey manual for vertebrates*, pp. 121-161 (Ed. Davis G.). Earthwatch Europe, Oxford, UK.
- Bergstrom, D.M., Lucieer, A., Kiefer, K., Wasley, J., Belbin, L., Pedersen, T.K., Chown, S.L., 2009. Indirect effects of invasive species removal devastate World Heritage Island. *Journal of Applied Ecology* 46, 73–81.
- Blackburn, T.M., Cassey, P., Duncan, R.P., Evans, K.L. & Gaston, K.J. (2004) Avian extinction and mammalian introductions on oceanic islands. *Science*, 305, 1955– 1958.
- Githiru, M., Karimi, S. & Imboma, T. 2009. Unilever Kenya Ltd. (Kericho): Avifaunal Assessment Report. Unilever Tea Kenya Ltd., Nairobi.
- Gordon I. *et al* (2012) Ecosystem Profile: Eastern Afromontane Biodiversity Hotspot, Critical ecosystems partnership fund.
- Lovett JC (1996) Elevational and latitudinal changes in tree associations and diversity in the Eastern Arc mountains of Tanzania. *J Trop Ecol* 12:629–650
- Magurran, A.E. (1988). *Ecological Diversity and its Measurement*. Princeton University Press, Princeton, U.S.A.
- MacArthur, R. H., MacArthur, J. W., 1961. On bird species diversity. *Ecology*, 42, pp. 594-598.
- MacArthur, R.H. & Wilson, E.O. (1967). *The Theory of Island Biogeography*. Princeton University Press, Princeton, U.S.A.
- Mittermeier RA, *et al* (2004) Hotspots revisited: Earth's biologically richest and most threatened terrestrial ecoregions. *Connex*, Mexico City
- Moral, R. del, Muller, C.H., 1970. The allelopathic effects of *Eucalyptus camaldulensis*. *American Midland Naturalist* 83, 254–82.
- Njoroge, P. and Bennun, L. 2000. Status and conservation of Hinde's Babbler (*Turdoides hindei*), a threatened Kenya endemic, in an agricultural landscape. *Ostrich* 71: 69- 72
- Noss, R.F., 1990. Indicators for Monitoring Biodiversity: A Hierarchical Approach. *Conservation Biology* 4, 355–364.
- Padoa-Schioppa, E., Baietto, M., Massa, R., Bottoni, L., 2006. Bird communities as bioindicators: The focal species concept in agricultural landscapes. *Ecological Indicators* 6, 83–93.
- Roemer, G.W., Donlan, C.J. & Courchamp, F. (2002) Golden eagles, feral pigs and insular carnivores, how exotic species turn native predators into prey. *Proceedings of the National Academy of Sciences of the United States of America*, 99, 791–796.
- Stattersfield A.J., Crosby M.J., Long A.J. and Wege D.C. 1998. Endemic Bird Areas of the

- world. Priorities for Conservation. BirdLife Conservation Series No. 7. BirdLife International, Cambridge, UK
- Stevens, G.C. (1989). The latitudinal gradient in geographical range: how so many species coexist in the tropics. *Am. Naturalist*, 133, 240–256.
- Stevenson T. & Fanshawe J. (2002) *Field Guide to the Birds of East Africa – Kenya, Tanzania, Uganda, Rwanda and Burundi*. Christopher Helm London
- United Nations Environment Programme (1998). "Protected Areas and World Heritage". Archived from the original on 2007-02-12. Retrieved 2008-02-23.
- Zimmerman, D. A., Turner, D.A. and Pearson D, J. (1996). *Birds of Kenya and Northern Tanzania*. Halfway House: Russel Friedman Books. pp 575

¹<http://porini.or.ke/2011/11/the-karima-hill-sacred-forest-story/> Retrieved on 02/2/2013

Appendices

Appendix 1.0. Table showing coordinates for future monitoring purposes

TYPE	IDENT	LAT	LONG	ALTITUDE	Date
WAYPOINT	kir pc1,1	- 0.52588900	36.97589400	1941.38	15/10/2013
WAYPOINT	kir pc1,2	- 0.52749800	36.97504600	1949.86	15/10/2013
WAYPOINT	kip pc1,3	- 0.52936600	36.97458000	1983.83	15/10/2013
WAYPOINT	kir pc1,4	- 0.53099300	36.97372700	1987.65	15/10/2013
WAYPOINT	kir pc1,5	- 0.53267300	36.97293100	1978.43	15/10/2013
WAYPOINT	kir pc1,6	- 0.53413100	36.97176600	1994.94	15/10/2013
WAYPOINT	kir pc1,7	- 0.53596100	36.97142200	1991.94	15/10/2013
WAYPOINT	kir pc1,8	- 0.53754500	36.97040400	1999.42	15/10/2013
WAYPOINT	kir pc2,9	- 0.52491000	36.97433800	1921.25	16/10/2013
WAYPOINT	kir pc2,10	- 0.52659100	36.97339700	1982.94	16/10/2013
WAYPOINT	kir pc2,11	- 0.52835700	36.97288700	1974.07	16/10/2013
WAYPOINT	kir pc2,12	- 0.52958700	36.97139300	1989.87	16/10/2013
WAYPOINT	kir pc2,13	- 0.52958700	36.97099800	1989.69	16/10/2013

		0.53149100			
WAYPOINT	kir pc2,14	- 0.53319900	36.97011800	1988.60	16/10/2013
WAYPOINT	kir pc 3,15	- 0.52444200	36.97135600	1891.58	17/10/2013
WAYPOINT	kir pc3,16	- 0.52608800	36.97055900	1969.75	17/10/2013
WAYPOINT	kir pc 3,17	- 0.52773500	36.96971300	1987.63	17/10/2013
WAYPOINT	kir pc 3,18	- 0.52954600	36.96935400	1987.79	17/10/2013
WAYPOINT	kir pc 3,19	- 0.53135300	36.96914100	1988.76	17/10/2013
WAYPOINT	kir pc 3,20	- 0.53300800	36.96828600	1934.60	17/10/2013

Appendix 2.0.

Checklist of all bird species seen (n=109) during the study. It shows their Biome-characteristic species, migratory status (AM = Afrotropical migrant; PM = Palearctic migrant) forest dependency category (as forest-specialist (FF), forest generalist (F), forest visitors (f), or non-forest species (Non-F)), feeding guild, and their threat status (X = Nationally scarce; LC least concern)

Common Name	Scientific Name	Biome	Migrant Status	forest dependency	Feeding Guild	Threat Status
Phasianidae: quails, francolins, spurfowl and allies						
Scaly Francolin	<i>Francolinus squamatus</i>			F	Granivore	LC
Threskiornithidae: ibises and spoonbills						
Hadada Ibis	<i>Bostrychia hagedash</i>			non-f	Molluscivore	LC
Accipitridae: diurnal birds of prey other than falcons						
Common Buzzard	<i>Buteo buteo</i>		PM	FF	Raptor	LC
Mountain Buzzard	<i>Buteo oreophilus</i>	Afrotropical		non-f	Raptor	LC

		highlands				
Augur Buzzard	<i>Buteo augur</i>			non-f	Raptor	LC
Long-crested Eagle	<i>Lophaetus occipitalis</i>			non-f	Raptor	LC
African Harrier Hawk	<i>Polyboroides typus</i>			f	Raptor	LC
African Goshawk	<i>Accipiter tachiro</i>			F	Raptor	LC
Columbidae: pigeons and doves						
Red-eyed Dove	<i>Streptopelia semitorquata</i>			f	Frugivore	LC
Emerald-spotted Wood Dove	<i>Turtur chalcospilos</i>			f	Frugivore	LC
African Olive Pigeon	<i>Columba arquatrix</i>			FF	Frugivore	LC
Tambourine Dove	<i>Turtur tympanistria</i>			F	Frugivore	LC
Lemon Dove	<i>Aplopelia larvata</i>			FF	Frugivore	LC
Eastern Bronze-naped Pigeon	<i>Columba delegorguei</i>			FF	Frugivore	LC

Musophagidae: turacos						
Hartlaub's Turaco	<i>Tauraco hartlaubi</i>	Afrotropical highlands		FF	Frugivore	LC
Cuculidae: cuckoos and coucals						
Klaas's Cuckoo	<i>Chrysococcyx klaas</i>			f	Insectivore	LC
African Emerald Cuckoo	<i>Chrysococcyx cupreus</i>			F	Insectivore	LC
White-browed Coucal	<i>Centropus superciliosus</i>			non-f	Insectivore	LC
Red-chested Cuckoo	<i>Cuculus solitarius</i>		am	F	Insectivore	LC
Strigidae: typical owls						
African Wood Owl	<i>Strix woodfordii</i>			F	Raptor	LC
Caprimulgidae: nightjars						
Montane Nightjar	<i>Caprimulgus poliocephalus</i>	Afrotropical highlands		F	Insectivore	LC

Apodidae: swifts						
Alpine Swift	<i>Tachymarptis melba</i>			non-f	Insectivore	LC
Mottled Swift	<i>Tachymarptis aequatorialis</i>			non-f	Insectivore	LC
African Black Swift	<i>Apus barbatus</i>			non-f	Insectivore	LC
White-rumped Swift	<i>Apus caffer</i>			non-f	Insectivore	LC
Little Swift	<i>Apus affinis</i>			non-f	Insectivore	LC
Plain Martin	<i>Riparia paludicola</i>			non-f	Insectivore	LC
Common Swift	<i>Apus apus</i>		PM	non-f	Insectivore	LC
Coliidae: mousebirds						
Speckled Mousebird	<i>Colius striatus</i>			non-f	Frugivore	LC
Meropidae: bee-eaters						
Cinnamon-chested Bee-eater	<i>Merops oreobates</i>	Afrotropical highlands		F	Insectivore	LC
Eurasian Bee-eater	<i>Merops apiaster</i>		PM	f	Insectivore	LC

Bucerotidae: hornbills						
Silvery-cheeked Hornbill	<i>Bycanistes brevis</i>		am	F	Frugivore	LC
Capitonidae: barbets and tinkerbirds						
Yellow-rumped Tinkerbird	<i>Pogoniulus bilineatus</i>			F	Frugivore	LC
Indicatoridae: honeyguides						
Lesser Honeyguide	<i>Indicator minor</i>			f	Insectivore	LC
Picidae: wrynecks and woodpeckers						
Cardinal Woodpecker	<i>Dendropicos fuscescens</i>			f	Insectivore	LC
Platysteiridae: batises, wattle-eyes and relatives						
Chin-spot Batis	<i>Batis molitor</i>			non-f	Insectivore	LC
Black-throated Wattle-eye	<i>Platysteira peltata</i>			F	Insectivore	LC

Malaconotidae: helmetsrikes, bushshrikes, tchagras and puffbacks						
Brown-crowned Tchagra	<i>Tchagra australis</i>			non-f	Insectivore	LC
Black-backed Puffback	<i>Dryoscopus cubla</i>			F	Insectivore	LC
Tropical Boubou	<i>Laniarius aethopicus</i>			f	Insectivore	LC
Campephagidae: cuckooshrikes						
Black Cuckooshrike	<i>Campephaga flava</i>		am	f	Insectivore	LC
Laniidae: shrikes						
Common Fiscal	<i>Lanius collaris</i>			non-f	Insectivore	LC
Monarchidae: monarch flycatchers						
African Paradise Flycatcher	<i>Terpsiphone viridis</i>		am	f	Insectivore	LC
Corvidae: crows and allies						

Pied Crow	<i>Corvus albus</i>			non-f	Omnivore	LC
Paridae: tits						
White-bellied Tit	<i>Parus albiventris</i>			f	Insectivore	LC
Hirundinidae: saw-wings, swallows and martins						
Black Saw-wing	<i>Psalidoprocne pristopectera</i>			f	Insectivore	LC
Barn Swallow	<i>Hirundo rustica</i>		PM	non-f	Insectivore	LC
Common House Martin	<i>Delichon urbicum</i>		PM	non-f	Insectivore	LC
Red-rumped Swallow	<i>Cecropis daurica</i>			non-f	Insectivore	LC
Lesser Striped Swallow	<i>Cecropis abyssinica</i>			non-f	Insectivore	LC
Cisticolidae: cisticolas and allies						
Red-faced Cisticola	<i>Cisticola erythrope</i>			non-f	Insectivore	LC
Singing Cisticola	<i>Cisticola cantans</i>			non-f	Insectivore	LC
Tawny-flanked Prinia	<i>Prinia subflava</i>			f	Insectivore	LC

Black-collared Apalis	<i>Apalis pulchra</i>	Afrotropical highlands		F	Insectivore	LC
Grey Apalis	<i>Apalis cinerea</i>			FF	Insectivore	LC
Grey-capped Warbler	<i>Eminia lepida</i>			f	Insectivore	LC
Grey-backed Camaroptera	<i>Camaroptera brachyura</i>			f	Insectivore	LC
Hunter's Cisticola	<i>Cisticola hunteri</i>	Afrotropical highlands		F	Insectivore	LC
Pycnonotidae: bulbuls						
Common Bulbul	<i>Pycnonotus barbatus</i>			f	Frugivore	LC
Mountain Greenbul	<i>Andropadus nigriceps</i>	Afrotropical highlands		FF	Frugivore	LC
Yellow-whiskered Greenbul	<i>Andropadus latirostris</i>			F	Frugivore	LC
Slender-billed Greenbul	<i>Andropadus gracilirostris</i>			FF	Frugivore	LC
Cabanis's Greenbul	<i>Phyllastrephus cabanisi</i>			FF	Frugivore	LC

Sylviidae: Old World warblers						
Dark-capped Yellow Warbler	<i>Chloropeta natalensis</i>			non-f	Insectivore	LC
Willow Warbler	<i>Phylloscopus trochilus</i>		PM	f	Insectivore	LC
Blackcap	<i>Sylvia atricapilla</i>		PM	F	Insectivore	LC
Brown Woodland Warbler	<i>Phylloscopus umbrovirens</i>	Afrotropical highlands		F	Insectivore	LC
Cinnamon Bracken Warbler	<i>Bradypterus cinnamomeus</i>	Afrotropical highlands		F	Insectivore	LC
Moustached Grass Warbler	<i>Melocichla mentalis</i>			non-f	Insectivore	LC
Timaliidae: illadopses, babblers and chatterers						
Northern Pied Babbler	<i>Turdoides hypoleuca</i>	Somali-Masai		non-f	Insectivore	LC
African Hill Babbler	<i>Pseudoalcippe abyssinica</i>	Afrotropical highlands		FF	Insectivore	LC

Zosteropidae: white-eyes						
Montane White-eye	<i>Zosterops poliogastrus</i>	Afrotropical highlands		F	Frugivore	LC
Turdidae: thrushes						
Olive Thrush	<i>Turdus olivaceus</i>			F	Insectivore	LC
Muscicapidae: chats, wheatears and Old World flycatchers						
Cape Robin Chat	<i>Cossypha caffra</i>			f	Insectivore	LC
Rüppell's Robin Chat	<i>Cossypha semirufa</i>	Afrotropical highlands		F	Insectivore	LC
Common Stonechat	<i>Saxicola torquatus</i>			non-f	Insectivore	LC
White-eyed Slaty Flycatcher	<i>Melaenornis fischeri</i>	Afrotropical highlands		F	Insectivore	LC
African Dusky Flycatcher	<i>Muscicapa adusta</i>			F	Insectivore	LC
White-starred Robin	<i>Pogonocichla stellata</i>	Afrotropical highlands		F	Insectivore	LC
Nectariniidae: sunbirds						
Amethyst Sunbird	<i>Chalcomitra</i>			f	Nectarinivore	LC

	<i>amethystina</i>					
Bronze Sunbird	<i>Nectarinia kilimensis</i>	Afrotropical highlands		f	Nectarinivore	LC
Golden-winged Sunbird	<i>Drepanorhynchus reichenowi</i>	Afrotropical highlands		f	Nectarinivore	LC
Northern Double-collared Sunbird	<i>Cinnyris reichenowi</i>	Afrotropical highlands		F	Nectarinivore	LC
Eastern Double-collared Sunbird	<i>Cinnyris mediocris</i>	Afrotropical highlands		F	Nectarinivore	LC
Variable Sunbird	<i>Cinnyris venustus</i>			f	Nectarinivore	LC
Collared Sunbird	<i>Hedydipna collaris</i>			F	Nectarinivore	LC
Passeridae: sparrow weavers, Old World sparrows and petronias						
House Sparrow	<i>Passer domesticus</i>			non-f	Granivore	LC
Kenya Rufous Sparrow	<i>Passer rufocinctus</i>			non-f	Granivore	LC
Grey-headed Sparrow	<i>Passer griseus</i>			non-f	Granivore	LC

Ploceidae: weavers, bishops and widowbirds						
Baglafaecht Weaver	<i>Ploceus baglafaecht</i>	Afrotropical highlands		f	Granivore	LC
Holub's Golden Weaver	<i>Ploceus xanthops</i>			non-f	Granivore	LC
Village Weaver	<i>Ploceus cucullatus</i>			non-f	Granivore	LC
Spectacled Weaver	<i>Ploceus ocularis</i>			f	Granivore	LC
Chestnut Weaver	<i>Ploceus rubiginosus</i>		am	non-f	Granivore	LC
Speke's Weaver	<i>Ploceus spekei</i>			non-f	Granivore	LC
Estrildidae: waxbills						
Grey-headed Negrofinch	<i>Nigrita canicapillus</i>			F	Granivore	LC
Common Waxbill	<i>Estrilda astrild</i>			non-f	Granivore	LC
Red-billed Firefinch	<i>Lagonosticta senegala</i>			non-f	Granivore	LC
Bronze Mannikin	<i>Spermestes</i>			non-f	Granivore	LC

	<i>cuculatus</i>					
Black-and-white Mannikin	<i>Spermestes bicolor</i>			f	Granivore	LC
Yellow-bellied Waxbill	<i>Coccygia quartinia</i>			f	Granivore	LC
Red-cheeked Cordon-bleu	<i>Uraeginthus bengalus</i>			non-f	Granivore	LC
Viduidae: Parasitic Weaver, indigobirds and whydahs						
Pin-tailed Whydah	<i>Vidua macroura</i>			non-f	Granivore	LC
Motacillidae: wagtails, longclaws and pipits						
African Pied Wagtail	<i>Motacilla aguimp</i>			non-f	Insectivore	LC
Tree Pipit	<i>Anthus trivialis</i>		PM	f	Insectivore	LC
Fringillidae: canaries, citrils, seedeaters and relatives						
African Citril	<i>Crithagra</i>	Afrotropical		f	Granivore	LC

	<i>citrinelloides</i>	highlands				
Streaky Seedeater	<i>Crithagra striolata</i>	Afrotropical highlands		f	Granivore	LC
Thick-billed Seedeater	<i>Crithagra burtoni</i>			FF	Granivore	LC
Emberizidae: Old World buntings						
Golden-breasted Bunting	<i>Emberiza flaviventris</i>			non-f	Granivore	LC