FINAL PROJECT REPORT

Avifaunal survey of Lake Kenyatta ecosystem, Kenya

Submitted to:

AFRICAN BIRD CLUB (ABC)
United Kingdom
www.africanbirdclub.org

Prepared by:

Maurice Ogoma
Fisheries Department, Ministry of Fisheries Development, P.O. Box 47, Lamu OR
C/O Ornithology section, National Museums of Kenya, P.O. Box 40658-00100 GPO, Nairobi.
E-mail: luleogoma@gmail.com

Table of Contents

Background information

Lake Kenyatta is a fresh water lake located in Mpeketoni Division of Lamu County at the Kenyan north coast. It is adjacent to Kipini Conservancy and lies 60km across from Lamu Island on the mainland, an area that initially composed of pristine forest and rich in wildlife. The lake is one of the few expansive fresh water sources in coastal Kenya and is rich in aquatic and other related terrestrial birds, with a large population of hippos. Other animals present include zebra, monkeys, waterbuck, buffalo, warthog and other seasonal game. The lake is located in a remote area with little infrastructure development. Prior to this study, its avifaunal composition and other biodiversity were hardly known. This is so despite the lake's rich ecosystem history.

The area around Lake Kenyatta was actively settled in the 1970s when the then government of Kenya moved landless people mainly the Kikuyu community to settle in the Lake Kenyatta area, which later became a settlement scheme (WRMA, 2010). The scheme has since accommodated many landless people from different parts of the country. Threats related to agricultural activities and fishing operations have been experienced in the area as a result of the influx of settlers. Today, the area is highly populated especially around Mpeketoni town due to availability of social and infrastructural facilities. There are makeshift settlements mainly in search of agricultural lands that are coming up in the trust lands and forests around the settlement scheme. The area is characterised by poor weather-roads and accessibility is limited during rainy season.

This report gives the results of an avifaunal survey that was executed by engaging local people, Fisheries department and the local Beach Management Unit (BMU) members who have an interest in resource conservation.

Project objectives

The overall aim of the project was to assess the conservation status of the L. Kenyatta ecosystem using birds as indicators to provide baseline scientific information for future scientific work.

The specific objectives of the project were:

1. To document the birds of Lake Kenyatta and its related habitats, with emphasis on species with conservation concern;
2. To assess the current threats to the site, with emphasis on the intensity of its catchment encroachment;
3. To train community guides on basic bird identification techniques to promote technological skills transfer.

Methods

Location of study area

Lake Kenyatta is situated in Mpeketoni Division of Lamu County in Kenya (**Fig. 1**). It is located on the northern Coast of Kenya, 230 km north of Malindi town and 60km from Lamu Island. The entire Lake Kenyatta sub-catchment covers an area of 432km^2 and traverses six administrative locations in Mpeketoni Division: Baharini, Central, Hongwe, Ndambwe, Mkunumbi and Mapenya. It stretches from Pangani to the North West, Koruna River to the East and extends to Indian Ocean to the South East (WRMA, 2010). The lake's upper sub-catchment area borders Ijara District to the north from which its main inlet called River Mukuru originates.

Reconnaissance study

A one week pilot study was conducted in the Lake Kenyatta area to select study location and arrange for survey logistics. During this visit, we briefed the local community about the project and selected guides through the local Lake Kenyatta Beach Management Unit (BMU).

Water bird counts

We counted waterbirds and other aquatic dependant birds in the Lake Kenyatta ecosystem. The birds were identified within the vicinity of the lake with the aid of a telescope (with stand) and three pairs of binoculars. For species identification during the survey, we used Zimmerman *et. al* (1999) bird guide.

Timed species counts (TSC)

Terrestrial bird species were recorded using TSC method following Bennun and Waiyaki (1993). During TSC counts, we recorded bird species in intervals of ten minutes with each count lasting 40 minutes. Species were recorded after positive identification either by sight or sound, each receiving a score of 4 to 1 depending on the first time it was recorded. The counts concentrated on the riparian vegetation and adjacent agricultural and grazing areas around L. Kenyatta.

Vegetation and disturbance surveys

We identified and recorded dominant vegetation types in the study area. Human disturbances around the lake were also recorded. Some disturbance types were captured by a digital camera. Opportunistic interviews were used to get an insight into the perception of local people about the general condition of the lake.

Results and Discussion

Bird species composition

We recorded a total of 142 bird species using the three bird survey methods: waterbird counts, TSCs and opportunistic observations. The species were recorded in 51 families. **Fig. 2** shows the most dominant bird families based on species numbers recorded at Lake Kenyatta. Accipitridae was the most dominant with 12 species followed by Ardeidae with 10 species while Ploceidae and Melaconidae recorded seven species each. This reveals that even though Lake Kenyatta

recorded many waterbird species it is as well important for terrestrial birds especially raptors (family Accipitridae).

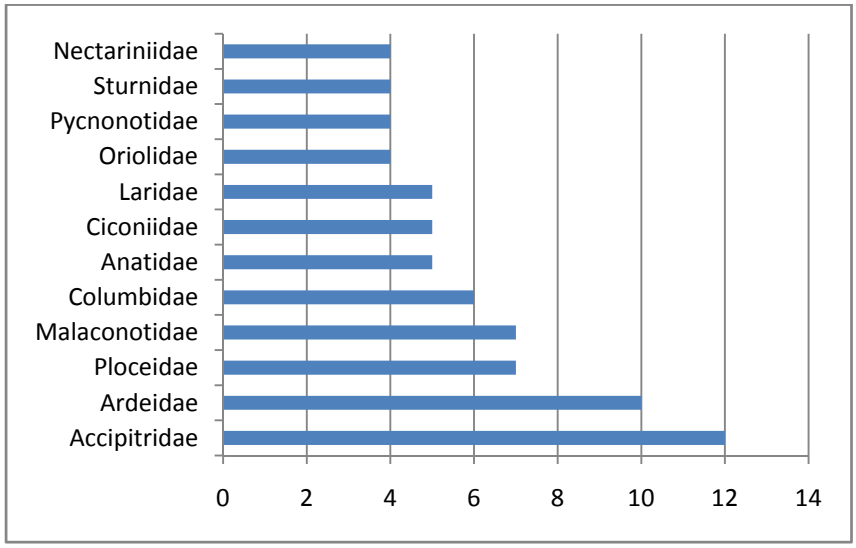

Fig. 2: Most dominant bird families (y-axis) by species numbers (x-axis) recorded at Lake Kenyatta

Among the waterbirds counted, Spur-winged Goose was the most abundant followed by Cattle Egret, Sacred Ibis and African Open-billed Stork in that order **(Fig.3)**. Of notable presence was the globally Vulnerable Madagascar Pranticole recorded at the nearby Lumshi wetland, where we counted 15 individuals. Additionally, we recorded three other species of global conservation importance, i.e globally Endangered Egyptian Vulture, Near-threatened Fischer's Turaco and Bateleur.

A total of 29 Palaearctic, Malagasy and Afrotropical migrant bird species (OS–c, EANHS, 2009) were recorded in the study area. Four regionally threatened species (Vulnerable) were also recorded here. These included African Darter, Great White Egret, Saddle-billed Stork and Little Yellow Flycatcher. We also recorded eight East Africa Coast Biome species: Fischer's Turaco, Mangrove Kingfisher, Brown-breasted Barbet, Mombasa Woodpecker, Northern Brownbul, Scaly Babbler, Little Yellow Flycatcher and Zanzibar Red Bishop.

The presence of these globally threatened, East Africa Coast Biome, regionally threatened and migratory species puts Lake Kenyatta and the adjacent habitats in a conservation limelight however small in size the Lake is.

Greater Cormorants (left) and Yellow-billed Stork (right) at L. Kenyatta (*photos:* M. Ogoma)

TSC data analysis revealed that Zanzibar Sombre Greenbull, Red-eyed Dove and African Palm Swift were the most common terrestrial bird species recorded during the survey. They recorded TSC indices of 3.23, 2.50 and 2.23 respectively. They were followed closely by Emerald-spotted Wood Dove (2.23), Collared Sunbird (2.18), Grey-headed Kingfisher (2.18), African Golden Palm Weaver (2.00) and Tawny-flanked Prinia (1.95) in that order.

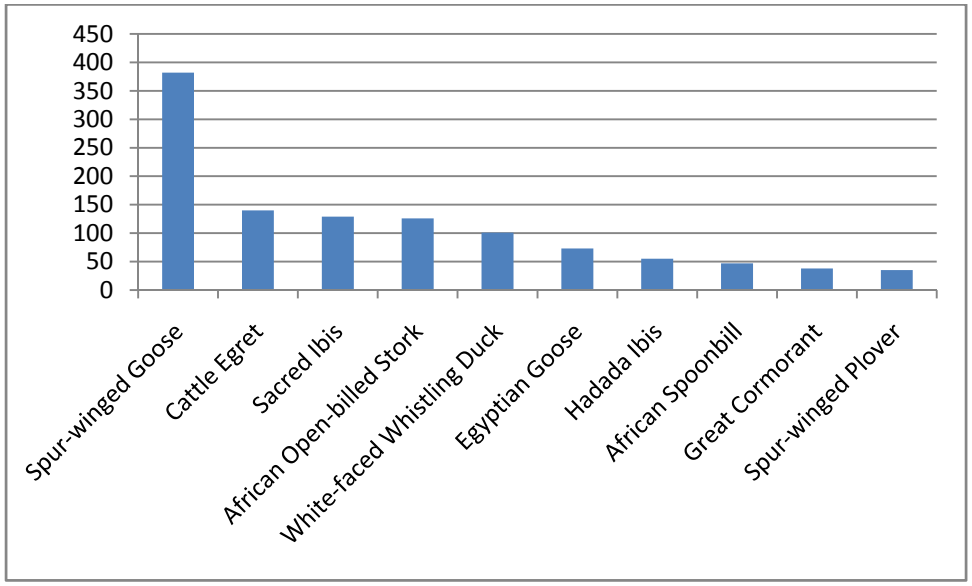

Fig. 3: Top ten most abundant waterbird species (x-axis) with corresponding individual numbers (y-axis) at Lake Kenyatta

Vegetation survey

Lake Kenyatta is characterized by a variety of vegetation types including indigenous trees and shrubs. **Appendix 2** gives the scientific names of trees and shrubs we recorded at L. Kenyatta during the survey. The trees and shrubs are used by the local community for various purposes

e.g. *Azadracter indica* for medicinal purposes*, Kingeli Africana* for making traditional liquor known locally as 'muratina', etc. Indigenous hard wood trees e.g. *Sytrichonis madagascarensis, Afzelia quenzensis, Garcinia livingstonei and Ficus bussai* among others were also recorded.

Kingeli Africana (left) and *Ficus bussai* (right) at L. Kenyatta's riparian area (*Photos:* M. Ogoma)

Current threats and disturbance

The local community views Lake Kenyatta as a common resource hence it is currently facing a number of challenges ranging from encroachment, selective felling of trees, overgrazing, impact of invasive aquatic weeds and other invasive species and soil harvesting. Indirect threats to the site include excessive abstraction of underground water as a result of numerous shallow wells and boreholes sunk by surrounding local community to draw underground water for domestic use and irrigation agriculture. Some of these threats were recorded by photo captions (as shown below) and general observations during data collection.

Sand harvesting (left) and selective tree cutting (right) at the study area (*Photos:* J. Mwachongo)

Harvesting of sand was a great threat to the lake and some local inhabitants blame it for the reduction in volume of water entering L. Kenyatta from its River Mukuru inlet. According to community members interviewed, there existed intensive sand harvesting along R. Mukuru in the recent past that altered the speed and natural flow of water along its channel into the lake hence this has since led to diversion of water into the abandoned excavated areas. Some community members blame the reducing water volume in the lake on the changing weather patterns that has been witnessed in the recent past and vegetation destruction in the water catchment areas for settlement and agricultural production.

Aquatic weeds have invaded the lake especially the Nile Cabbage. The cabbage is now covering many parts of the lake interfering with the activities of fishermen especially along the boat docking areas. This could also probably be a sign of the reducing depth of the lake perhaps as a result of siltation. However, aquatic weeds can also contribute to fish production because they provide breeding and hiding grounds for fish and fingerlings. The presence of invasive weeds such as *Prosopis juliflora* around the lake could limit the lake's accessibility unless control measures are put into place urgently.

Aquatic weeds invasion (left) and invasive *Prosopis juliflora* (right) at L. Kenyatta (*Photos:* M. Ogoma)

Lake Kenyatta provides both livestock grazing and watering grounds for the local livestock farmers. The lake is also the permanent watering ground for pastoral groups from communities bordering Lamu County during prolonged dry spells because the lake is a permanent water source. As a result there is occasional occurrence of water-use conflicts among crop farmers and pastoral communities on grazing areas and livestock watering grounds. Livestock watering paths are clearly evident around the lake hence contributing to increased effect of soil erosion and by extension increased siltation in the lake.


Herds of cattle watering (left) and livestock watering paths (right) at Lake Kenyatta (*Photos:* M. Ogoma)

Other Wildlife

Fishing is the major economic activity practiced by the local riparian communities around the lake. Community groups engaged in fishing include the Luo, Pokomo and Kikuyu. The most dominant and commercial fish groups are Tilapia, Clarias and Protopterus. Other seasonally abundant species are also fished here. The fish catches are marketed locally at the Mpeketoni market while the surplus is marketed at distant markets. The importance of this lake for fishing has led to formation of the Lake Kenyatta Beach Management Unit (BMU) that strives to promote co-management of fisheries resources in Lake Kenyatta, Lake Amu and Maji Glas.


Examples of fish species found at Lake Kenyatta as displayed by a fish monger (left) and field assistant (right) (*Photos:* M. Ogoma)

The lake is infested by large population of hippos. This has led to constant hippos-fishermen conflict in Lake Kenyatta and several casualties have since been reported. The presence of Kenya Wildlife Service (KWS) camp at the site has helped a little to contain the situation. The entire ecosystem provides grazing, browsing and watering grounds for other wildlife including buffaloes, antelopes, zebras, elephants most of which we recorded at the adjacent Lake Amu and Maji Glas wetlands.

Conclusion

Lake Kenyatta ecosystem is rich in avifauna and other biodiversity. Bird diversity here could be higher than the results of the current study especially when bird surveys could be conducted entirely during the migratory season of birds. This study was conducted from the end of July when most of the species could have started leaving their wintering grounds. However, a considerable number (n=29) of migratory species were recorded during the survey, which indicates that the lake's ecosystem offers important feeding and roosting grounds for most species. Despite the importance of Lake Kenyatta for biodiversity, little has been done to raise the profile of the area for conservation-related activities. There is need to conduct additional studies targeting the globally endangered birds, East Africa coast biome endemics and migratory species. Activities that seek to involve local communities in conservation such as eco-tourism initiatives ought to be promoted alongside building the capacity of local conservation groups on biodiversity conservation.

Acknowledgement

We are indebted to the financial support provided by the African Bird Club (ABC) Conservation Grant to conduct the survey. Jonathan Mwachongo of Arabuko Sokoke Forest Guides Association (ASFGA) participated actively as a knowledgeable field assistant and was the key personnel for birds and plants identification. Theophillus Kasoso of Fisheries Department provided valuable information about fisheries activities within the lake. The Lake Kenyatta BMU members participated in the project actively while KWS offered security around the lake during the survey.

Literature Cited

Bennun, L. A. and Waiyaki, E. 1993. Using Time-Species Counts to compare avifauna in Mau forest, South-west Kenya. *Proceedings of the VIII Pan-African Ornithological Congress 366.*

OS–c, EANHS. 2009. *Check-list of the birds of Kenya.* 4th Edition. Ornithological Sub-committee, Nature Kenya—the East Africa Natural History Society.

WRMA (Eds.). 2010. *Lake Kenyatta Sub Catchment Management Plan.* WRMA, Garissa.

Zimmerman, D. A., Turner, D. A. and Pearson, D. J. 1999. *Birds of Kenya & Northern Tanzania.* A & C Black Publishers Ltd. London.

Appendix 1: Bird species recorded at Lake Kenyatta with corresponding family and scientific names (OS–c, EANHS, 2009; Zimmerman *et al*., 1996)

Family	Common name	*Scientific name*
Anatidae	Fulvous Whistling Duck	*Dendrocygna bicolor*
	Spur-winged Goose	*Plectropterus gambensis*
	White-faced Whistling Duck	*Dendrocygna viduata*
	Egyptian Goose	*Alopochen aegyptiaca*
	Knob-billed Duck	*Sarkidiornis melanotos*
Podicipedidae	Little Grebe	*Tachybaptus ruficollis*
Ciconiidae	Saddle-billed Stork	*Ephippiorhynchus senegalensis*
	Woolly-necked Stork	*Ciconia episcopus*
	Marabou Stork	*Leptoptilos crumeniferus*
	Yellow-billed Stork	*Mycteria ibis*
	African Open-billed Stork	*Anastomus lamelligerus*
Threskiornithidae	African Spoonbill	*Platalea alba*
	Hadada Ibis	*Bostrychia hagedash*
	Sacred Ibis	*Threskiornis aethiopicus*
	Glossy Ibis	*Plegadis falcinellus*
Ardeidae	Black-headed Heron	*Ardea melanocephala*
	Goliath Heron	*Ardea goliath*
	Great White Egret	*Ardea alba*
	Striated Heron (formerly Green-backed Heron)	*Butorides striata*
	Grey Heron	*Ardea cinerea*
	Yellow-billed Egret	*Egretta intermedia*
	Little Egret	*Egretta garzetta*
	Purple Heron	*Ardea purpurea*
	Squacco Heron	*Ardeola ralloides*
	Yellow-billed Egret	*Egretta intermedia*
	Cattle Egret	*Bubulcus ibis*
Scopidae	Hamerkop	*Scopus umbretta*
Pelecanidae	Pink-backed Pelican	*Pelecanus rufescens*
Phalacrocoracidae	Reed Cormorant	*Phalacrocorax africanus*
	Great Cormorant	*Phalacrocorax carbo*
Anhingidae	African Darter	*Anhinga rufa*
Accipitridae	African Fish Eagle	*Haliaeetus vocifer*
	Egyptian Vulture	*Neophron percnopterus*
	Hooded Vulture	*Necrosyrtes monachus*
	Brown Snake Eagle	*Circaetus cinereus*
	Bateleur	*Terathopius ecaudatus*
	African Harrier Hawk	*Polyboroides typus*
	African Goshawk	*Accipiter tachiro*
	Little Sparrowhawk	*Accipiter minullus*

	Great Sparrowhawk	*Accipiter melanoleucus*
	Lizard Buzzard	*Kaupifalco monogrammicus*
	Tawny Eagle	*Aquila rapax*
	Wahlberg's Eagle	*Aquila wahlbergi*
Recurvirostridae	Black-winged Stilt	*Himantopus himantopus*
Charadriidae	Longtoed Plover	*Vanellus crassirostris*
	Three-banded Plover	*Charadrius tricollaris*
	Spurwinged Plover	*Vanellus spinosus*
Jacanidae	African Jacana	*Actophilornis africanus*
Scolopacidae	Common Sandpiper	*Actitis hypoleucos*
	Wood Sandpiper	*Tringa glareola*
	Common Greenshank	*Tringa nebularia*
Glareolidae	Madagascar Pranticole	*Glareola ocularis*
Laridae	White-winged Black Tern	*Chlidonias leucopterus*
	Common Tern	*Sterna hirundo*
	Swift Tern	*Sterna bergii*
	Sandwich Tern	*Sterna sandvicensis*
	Caspian Tern	*Hydroprogne caspia*
Alcedinidae	Grey-headed Kingfisher	*Halcyon leucocephala*
	Malachite Kingfisher	*Alcedo cristata*
	Pied Kingfisher	*Ceryle rudis*
Phasianidae	Crested Francolin	*Francolinus sephaena*
Falconidae	Red-necked Falcon	*Falco chiquera*
Columbidae	Red-eyed Dove	*Streptopelia semitorquata*
	Ring-necked Dove	*Streptopelia capicola*
	Emerald-spotted Wood Dove	*Turtur chalcospilos*
	Tambourine Dove	*Turtur tympanistria*
	Namaqua Dove	*Oena capensis*
	African Green Pigeon	*Treron calvus*
Musophagidae	Fischer's Turaco	*Tauraco fischeri*
Cuculidae	Yellowbill	*Ceuthmochares aereus*
	White-browed Coucal	*Centropus superciliosus*
Caprimulgidae	Gabon Nightjar	*Caprimulgus fossii*
Apodidae	African Palm Swift	*Cypsiurus parvus*
	Little Swift	*Apus affinis*
Coliidae	Speckled Mousebird	*Colius striatus*
Coraciidae	Lilac-breasted Roller	*Coracias caudatus*
	Broad-billed Roller	*Eurystomus glaucurus*
Meropidae	Northern Carmine Bee-eater	*Merops nubicus*
Phoeniculidae	Green Wood-hoopoe	*Phoeniculus purpureus*
	Common Scimitarbill	*Rhinopomastus cyanomelas*
Bucerotidae	Crowned Hornbill	*Tockus alboterminatus*
	African Grey Hornbill	*Tockus nasutus*

	Trumpeter Hornbill	*Bycanistes bucinator*
Capitonidae	Yellow-rumped Tinkerbird	*Pogoniulus bilineatus*
	Red-fronted Tinkerbird	*Pogoniulus pusillus*
	Brown-breasted Barbet	*Lybius melanopterus*
Indicatoridae	Lesser Honeyguide	*Indicator minor*
Picidae	Nubian Woodpecker	*Campethera nubica*
	Cardinal Woodpecker	*Dendropicos fuscescens*
	Mombasa Woodpecker	*Campethera mombassica*
Malaconotidae	Retz's Helmet Shrike	*Prionops retzii*
	Grey-headed Bushshrike	*Malaconotus blanchoti*
	Sulphur-breasted Bush-shrike	*Chlorophoneus sulfureopectus*
	Black-crowned Tchagra	*Tchagra senegalus*
	Black-backed Puffback	*Dryoscopus cubla*
	Slate-coloured Boubou	*Laniarius funebris*
	Tropical Boubou	*Laniarius aethiopicus*
Laniidae	Long-tailed Fiscal	*Lanius cabanisi*
Oriolidae	African Golden Oriole	*Oriolus auratus*
	Black-headed Oriole	*Oriolus larvatus*
	Square-tailed Drongo	*Dicrurus ludwigii*
	Common Drongo	*Dicrurus adsimilis*
Monarchidae	Little Yellow Flycatcher	*Erythrocercus holochlorus*
	African Paradise Flycatcher	*Terpsiphone viridis*
Hirundinidae	Sand Martin	*Riparia riparia Riparia riparia*
	Ethiopian Swallow	*Hirundo aethiopica*
Alaudidae	Flappet Lark	*Mirafra rufocinnamomea*
Cisticolidae	Coastal Cisticola	*Cisticola haematocephalus*
	Tawny-flanked Prinia	*Prinia subflava*
	Grey-backed Camaroptera	*Camaroptera brachyura*
Pycnonotidae	Common Bulbul	*Pycnonotus barbatus*
	Yellow-bellied Greenbull	*Chlorocichla flaviventris*
	Northern Brownbul	*Phyllastrephus strepitans*
	Eastern Nicator	*Nicator gularis*
Timaliidae	Scaly Babbler	*Turdoides squamulata*
	Zanzibar Greenbull	*Andropadus importunus*
Sturnidae	Greater Blue-eared Starling	*Lamprotornis chalybaeus*
	Ruppel's Starling	*Lamprotornis purpuroptera*
	Black-bellied Starling	*Lamprotornis corruscus*
	Violet-backed Starling	*Cinnyricinclus leucogaster*
Turdidae	African Bare-eyed Thrush	*Turdus tephronotus*
Muscicapidae	Bearded Scrub Robin	*Cercotrichas quadrivirgata*
	Red-capped Robinchat	*Cossypha natalensis*
	Pale Flycatcher	*Bradornis pallidus*
Nectariniidae	Collared Sunbird	*Hedydipna collaris*

	Olive Sunbird	*Cyanomitra olivacea*
	Mouse-coloured Sunbird	*Cyanomitra veroxii*
	Amethyst Sunbird	*Chalcomitra amethystina*
Passeridae	Grey-headed Sparrow	*Passer griseus*
Ploceidae	Red-billed Buffallo Weaver	*Bubalornis niger*
	Grosbeak Weaver	*Amblyospiza albifrons*
	Village Weaver	*Ploceus cucullatus*
	Golden Palm Weaver	*Ploceus bojeri*
	Red-billed Quellea	*Quelea quelea*
	Zanzibar Red Bishop	*Euplectes nigroventris*
	Dark-backed Weaver	*Ploceus bicolor*
Estrildidae	Red-cheeked Cordon Blue	*Uraeginthus bengalus*
	Red-billed Frirefinch	*Lagonosticta senegala*
	Bronze Mannikin	*Spermestes cucullatus*
Motacillidae	African Pied Wagtail	*Motacilla aguimp*
	Yellow-throated Longclaw	*Macronyx croceus*
Fringillidae	Yellow-fronted Canary	*Crithagra mozambica*
Emberizidae	Somali Bunting	*Emberiza poliopleura*

Appendix 2: Scientific names of trees and shrubs recorded at Lake Kenyatta.

Azadracter indica
Hyphaene compressa
Solanum inacanum
Hoslundia opposita
Ficus bussai
Kingeli africana
Tamarindas indica
Deimbolia mbombonica
Phoenix canariensis
Lannea schweinfurthii
Garcinia livingstonei
Luciana lanciophala
Afzelia quenzensis
Cyber bombas
Acacia robusta
Adansonia digitata
Grewia phalagiophyla
Cassia afrofistula
Albizia grandibracteata
Sytrichonis madagascarensis
Dalbergia vaccinifolia
Milicia excelsa
Prosopis juliflora
Bridellia Cathartica
Flueggea Virosa
Lecaniodiscus Fraxinifotuis
Thespesia danis
Catunaregam nilotica
Ricinus communis
Senna siamea
Acacia drepanolobium
Ziziphus mauritiana
Sterculia apendiculata