

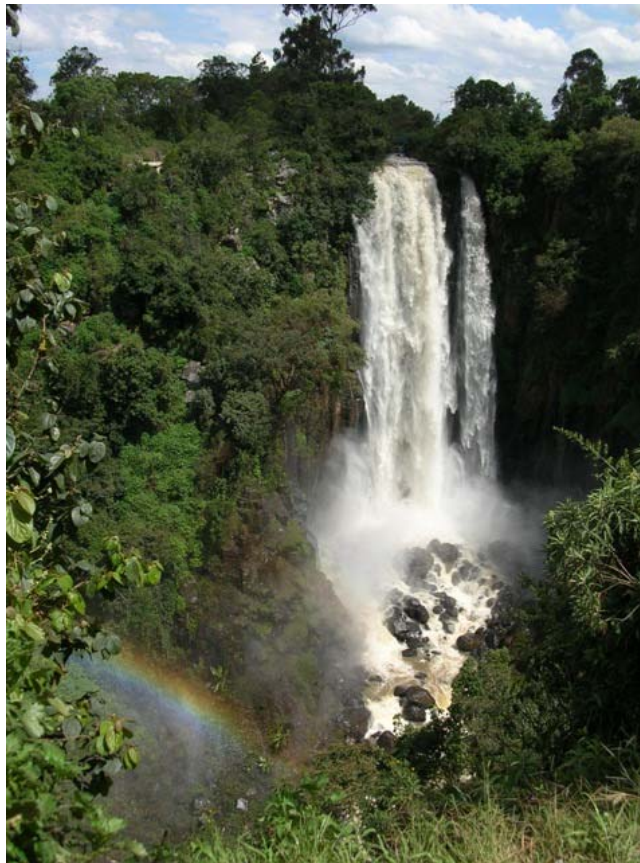
Bird ringing as an opportunity for research and training of rural community bird guides at Nyahururu, Kenya

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June 2008 – May 2009

Supported by



Executive Summary

This project will focus avifauna surveys at two little-known localities in Nyandarua North District, Central Province of Kenya at Lake Ol' Bolossat (Kenya's 61st Important Bird Area) and the Satima Escarpment of the Aberdare Mountains, as well as Marmanet Forest Reserve in Laikipia District in the Rift Valley Province. The broad objective is to conduct bird research in the forest, wetlands, scrubland and farmlands, and to empower local youth with skills to guide bird watching tourists and monitor wild bird populations in the future. The area is rich in avifauna being a home to one of Kenya's eight endemic bird species, Sharpe's Longclaw *Macronyx sharpei*, among other species of global conservation concern. As an area's native, I am taking it as a backyard challenge to use this research opportunity to recruit and empower about ten local youth with marketable skills and knowledge that can help advance their lives while assisting with biodiversity research, monitoring and conservation. They will be trained in area's conservation challenges, basic scientific data collection, bird identification, low-impact bird watching techniques, visitor handling and interpretation of cultural and natural history. The area, although in a busy tourist circuit, has unexploited potentials. Spending a monthly weeklong time in a bush camp is perhaps the best way of dispensing and utilising available skills, knowledge and resources (funding). Local communities, once well informed, can play a strong role in environmental conservation. The youth is probably the most strategic group whose impact can have a great multiplier effect in the community at large. Bird watching is also inclining rapidly in Kenya and community-driven eco-tourism is highly encouraged. Fieldwork opportunities will collect data on birds and other environmental variables for publications. The accumulated and past bird records will be used to produce a Checklist of the Birds of Nyahururu, a product that can promote the area as a bird watching destination in the tourism industry. We will mist-net and mark birds with metal rings in all forest's major blocks as well as in the escarpment vegetation, do some guided bird walks complimented by opportunistic observations, and hold indoor and outdoor classes to expeditiously deliver and receive knowledge. Offering a hands-on experience in bird identification is a good way to make a long-lasting relationship with nature, hence making of 'nature's guardians'. Besides, the project implements one of Lake Ol' Bolossat management plan's recommendations on education, training and biodiversity research.

Kenya's Ornithological Diversity and Bird Conservation

Kenya is one of the richest countries ornithologically in the world with over 1,090 species recorded to date. She is a small country (586,600km²) that is 4½ times larger than England and slightly smaller than the State of Texas, USA. Despite her size, it is one of birdwatcher's paradise where habitats and birds change rapidly as does wildlife, culture and landscapes. This list makes Kenya the second highest in Africa at only four species short of the vast Democratic Republic of Congo, a country 4 times larger. Eight of these species are national endemics; 859 are residents; 170 described as Palaearctic migrants from Europe and Asia; 60 are Afrotropical migrants; 335 are found in forests; 40 are of global conservation concern with four of them being critically-endangered, 2 endangered, 16 vulnerable and 1 is data deficient. The country holds some restricted-range species, 9 of them from the Kenya Mountains Endemic Bird Areas (EBA) and 7 in the East African Coastal Forests EBA. There are also three smaller portions of other EBAs i.e. Taita Hills, Serengeti Plains and Jubba Shebeelle Valleys. Significant biomes are Somali-Masai, East African Coast, Afrotropical Highlands, Lake Victoria Basin, Guinea-Congo Forest and Sudan-Guinea Savanna biomes (Stattersfield *et al* 1998). Each of these biomes has her characteristic avifauna. The country lies on one of Eurasian-Africa major migration flyways, the best time to see the Palaearctic migrants (mostly from Eastern Europe and western Asia) being Sept-Oct to February-March. The Afrotropical migrants from southern Africa and Madagascar Island move northwards in June-July during the southern winter.

Lying astride the equator on the eastern coast of Africa, we have one of the most diverse topographical diversity in the world: glaciated mountains with snow-capped peaks e.g. Mt Kenya standing an elevation of 5,199 meters (17,057 feet); the Great Rift Valley with her scarps, volcanoes and both alkaline and freshwater Lakes; flat deserts landscapes covered in scrub vegetation and stones; a 550km coastline with coral reefs, white sand beaches, coral cliffs, creeks; and a series of ancient granitic mountains whose formation is as diverse as is their life forms. The inland wetlands covers an approximate 10,700 km² and comes in all different varieties such as swamps, salt marshes, open water, rivers, streams, falls, seasonal and permanent flood plains, alpine moorlands, constructed wetlands and waste water treatment areas, not forgetting numerous irrigation schemes. The forests too come in a great diversity, vegetation structure and are distributed all over the country including in the northern frontier dry districts.

Bird conservation in Kenya is also at its height especially with the coming of BirdLife International's Important Bird Areas program that not only aims at conserving birds and their habitats but also other biodiversity (Fishpool & Evans, 2001). Kenya has had sixty such sites of global bird conservation significance until March 2008 when Lake Ol' Bolossat was added to the list.

Biological, Social and Economic aspects of birds

Birds are important to humanity in many ways. They have considerable tangible and intangible values in our day-to-day lives. Birds fill material needs for food, clothing, tools, and enjoyment (direct benefits). They also perform services useful to humans, without which the world would be less healthy (indirect benefits). We are therefore supposed to have a sense of stewardship and responsibility to protect the wild birds in return for their financial, food, physical, aesthetic, spiritual, religious, symbolic and sports service we receive in return. Many of these benefits are widely recognized already, but others certainly remain to be identified by future generations. Therefore, protecting birds and their habitats today ensures that we will not sacrifice future benefits before they can be realized.

Birdwatching and Ecotourism Development

One of the most recent entries in the tourism industry, birding or birdwatching is a hobby that is concerned with the observation and study of birds. It is rapidly growing in the world today. Most birdwatchers pursue this activity for recreational or social reasons, unlike ornithologists (scientists),

who do it for research purpose as well as for recreation. Though sometimes done for recreation, the data collected by birdwatchers is acceptable in science and conservation since methods used in birdwatching do conform to science. Increasing (seasonal) bird populations can be a good indicator of the health of the environment and biodiversity in general or the quality of different habitats in a given area. Disappearance or appearance of some characteristic species for instance can be an early warning of things gone or about to go wrong.

This growth of watching birds is also catching up well in the tourism industry all over the world. Kenya is well known for the comparative ease with which so many birds can be seen in a relatively short time in a stimulating environment setup, and is among the countries that attracts most visiting birdwatchers in Africa, Asia and South America. There are many local tour companies and private bird guides offering these services at a professional level. As a backbone to our economy, tour operators are also increasingly seeking information on where and when to watch certain species of birds in the country. Some tourists are also in 'demand' of knowledgeable guides who can identify birds for them with ease to increase the joy. It therefore follows that those with bird identification skills are finding an opportunity to earn an income. The monetary value from such pleasure to tourism industry is immense.

Because of its nature, watching birds requires one to observe silence (principle being '*be silent to be welcome*'), in order to increase appreciation and satisfaction hence this activity is often cited as the finest form of ecotourism as is a passive consumption way utilisation of natural resources. It has been suggested as a form of expression of the innate need for human connection to the environment. Birds also provide spiritual, religious experiences and material well-being for millions of people. Humans have a philosophical or spiritual obligation to protect the natural and evolutionary heritage of the earth. By this view, nonhuman life forms such as birds have "rights to exist" that are equal to those of humans.

Study Areas - Background Information

Lake Ol' Bolossat, Kenya's Central Province only natural lake, is an internal drainage basin whose swamps have a high salt content possibly due to high evaporation rate and partly to nature of sediments that constitute the area (Krhoda 1992). The altitude ranges from 2,340 – 2,400 meters ASL receiving an average precipitation of 975 – 1,100 mm pa. The Lake covers an area of 43.3 km² of which open water is c.4km². It offers a variety of habitats ranging from open water through floating marsh/swamps, open grasslands and riverine forests along rivers and springs that feed the Lake.

The area around Lake Ol' Bolossat holds a significant area (c.39km²) of unique montane highland grasslands. These grasslands of central Kenya contain a suite of restricted-range bird species, forming part of Kenyan Mountains Endemic Bird Area (Stattersfield *et al* 1998). These grasslands: have received virtually no conservation attention from authorities, are largely unprotected and are vanishing at an alarming rate (Bennun & Njoroge 2001) despite being habitats for globally-threatened bird species as well as other biodiversity. BirdLife International (2000) has described grasslands as the most important habitats for the world's threatened birds. Sharpe's Longclaw *Macronyx sharpei*, a globally-threatened and Kenyan high-altitude grassland endemic bird (BirdLife International 2000, 2006, Muchai *et al* 2002, Muchai 1997), has been previously recorded in the Lake's open grasslands during waterfowl census e.g. Mungai & Manegene (1998), and confirmed by Wamiti *et al* (2007).

The survey by Wamiti *et al* (2007) also recorded Jackson's Widowbird *Euplectes jacksoni*, a restricted-range species and described as near-threatened (NT) by BirdLife International (2000). Long-tailed Widowbird *E. progne*, regionally-threatened species and described as vulnerable (VU) by Bennun & Njoroge (1999) and of least concern (LC) by BirdLife International (2006) was also observed as was Hunter's Cisticola *Cisticola hunteri* (LC). Aberdare Cisticola *C. aberdare* and Corncrake *Crex crex*, a NT Palearctic migrant, were however not recorded though expected. The proposed project will carry out surveys during training programs in the grasslands in search

of all key species. The Lake is important for Palaearctic migrant waterbirds and has a resident breeding population of several species.

The confirmation of Sharpe's Longclaw and Jackson's Widowbird, among other key species as listed above, and has made the site to qualify as Kenya's 61st Important Bird Area. This elevates its status as a site of global biodiversity conservation by putting it on the global map. It also brings a new challenge, to the Government of Kenya and partners in conservation, of addressing the present conservation challenges (see below) to save this fragile ecosystem.

According to Lake's management plan of 2003-08 (currently under revision), the main threats facing this fragile ecosystem comes from land use practices in the area primarily urban development, small and large-scale intensive agriculture, ranching, forestry and wildlife conservation. These activities results to deforestation, disruption of hydrological balance, pollution, waste disposal, land degradation, soil erosion and siltation.

The presence of grassland, farmlands and waterfowls in this wetland makes it an ideal site for offering fundamentals of ornithology course. The natural forest of Marmanet and the urban (built) environment of Nyahururu Municipality further enhance diversity of bird species.

Marmanet Forest Reserve is a gazetted forest covering an area of 22, 648 ha (Wass 1995). This wet, highland montane and closed-canopy natural forest lies immediate north of Lake Ol Bolossat and south of the open and expansive semi-arid region of Laikipia District. A national indigenous forest surveys (Kenya Indigenous Forests Conservation Programme - KIFCON) carried out in the early 1990s reported that Marmanet forest fragments were under serious threats (KIFCON 1994). The Ewaso Narok River from Lake Ol' Bolossat goes through part of this forest at Nyahururu (Thomson) Falls. It is a source of several streams and rivers that feed the dry region of Laikipia and Eastern Kenya all the way to Somalia after Lorian Swamp. As an 'island' forest, it is constantly under pressure from surrounding communities and urban development. Despite its pristine location and biological value, little research, if any, has been carried out on its avifauna. The Forest is expected to harbour bird species characteristic of Afrotropical highland montane biome (See appendix 1 for a list of some previously observed species). It is hoped that by conducting bird surveys during the proposed project, a more comprehensive annotated checklist of birds of Marmanet Forest Reserve and Nyahururu area will be developed.

Project's Objectives

Broad objective

Conduct forest and wetlands bird research and empower local youth with skills to guide bird watching tourists and monitor wild bird populations.

Specific Objectives

1. Undertake ornithological surveys at Marmanet forest reserve and Lake Ol Bolossat to build area's bird species checklist and publish "*Checklist of the Birds of Nyahururu*" – a tool to market Nyahururu as a birdwatching destination.
2. Facilitate trainees understand the economic and cultural values of their natural resources, threats facing them and promote desire and stewardship for conservation awareness.
3. Train 10+ local youth in fundamentals of ornithology - bird identification, low-impact bird-watching techniques and handling and care of field equipment.
4. Level the progress of accomplices' cultivation of interest and enthusiasm in nature for leisure and economic gains.

5. Purchase basic ringing gear as part of the author's long-term career field equipment for research and education.
6. Assess possibilities of establishing a ringing station and constant effort site in the forest.

Why target the community youth for capacity building

Empowering people with marketable skills and knowledge to advance their lives is one of the most rewarding enterprises. Training a core group from the local community in bird identification and visitor handling skills will improve services as future tour guides not only in birds but also in natural and cultural history. Perhaps what is needed to avert negative attitudes towards conservation among local people and leaders is to let them realise what resources they have, how to economically utilise them, and most important, protecting them from malicious exploitation. My first step is to offer training to youth as the most strategic group whose impact can have a multiplier effect in the community. It therefore follows that offering such an intensive and involving yearlong training is the best way of dispensing and utilising available skills, knowledge and resources (funding). I will help them identify role of community in addressing issues of environmental degradation. The data so collected supplements what is already known about the sites.

Study Design, Materials and Methods

Various methods exist for ornithological surveys. The choice of method(s) however largely depends on study objectives and availability of personnel, equipment and material. The study will be conducted within a period of 12 months starting June 2008. We hope to study bird communities in as many forest vegetation types as possible and make observations in the entire area of Nyahururu for the final checklist. In order to satisfy the study objectives, the following methods shall be employed.

a) Mist Netting

Mist nets are an effective means of detecting secretive, cryptic and skulking under storey species in closed habitats where sampling by visual observations or voice identification is rather difficult. It is also effective for sampling small-bodied non-vocal species that are difficult to identify visually e.g. in tall grass habitats. The primary objective of trapping birds is to determine their species or sub-species, age and sex composition, and to ring them for the study of local movement, migration, mortality, longevity and fluctuation in population size (Davis, 1981). Net lines will be cleared and nets operated in different habitat types. Mist nets are available in different lengths: 18m, 12m, and 9m. The length of net lines in each habitat type will depend on the percentage representation of each habitat in the study area. Since the objective of this study is to list as many birds as possible, standard effort will not be applicable i.e. each sub-set of study area will not be given an equal effort in terms of net hours (number of hours nets will remain open). Birds caught in mist nets will be extracted carefully by experienced ringers, carried to a ringing station inside cotton cloth bird bags where they will be identified using Zimmermann *et al* (1996) before being marked with a numbered metal ring. They will then be aged and sexed (if possible), and different morphological measurements taken such as wing length, tarsus length, weight, condition of feathers (moulting) and breeding status then released back to the wild. This data helps in understanding e.g. health status of populations. In future, marked individuals may be recaptured and data used to estimate population sizes as described by Bibby *et al* 1992, 1998. We shall run nets between from as early as 06:30 and close them from 10:30 hrs each sampling day. Only experienced and qualified ringers will be required to handle birds. However, with the assistance of the trainers, the trainees shall be allowed to release birds and perhaps process them much later in their training.

b) Point Counts (PCs)

This method is also sometimes called variable-circular plot. Census stations are marked along a pre-determined line transect at intervals of e.g. 200 meters. The observer stands at the centre of the circle and records all birds seen and heard during a set period (10-15 minutes) allocating each observation to a distance band i.e. as either within or beyond a given radius from a census station e.g. 30 m. Habitat data shall also be collected at each census point. The number of PCs in each habitat sub-set will depend on percentage of its representation in the study area. This kind of data helps in calculating absolute densities as described by Bibby *et al* (1992). Further, it helps to relate birds' occurrence to habitat features since bird's presence or absence is directly related to habitat structure. There are several theoretical assumptions which are made and should be fulfilled in order for the results to be valid. Point counts are very effective in 'closed' habitats e.g. woodland where birds are often located by sound rather than sight.

c) Timed Species Counts (TSCs)

This method is very close to Point Counts in that it provides a simple method of comparing the avifaunas of extensive areas by sampling representative habitats and assessing relative abundance/densities in each representative habitat. It involves essentially repeated species list, on which species are recorded the first time when each species is positively identified by either sight or sound. The search is done randomly in each habitat type on an hourly basis where species are recorded in bands of ten minutes. Species in each column are assigned a score from 6 (1-10 minutes) to 1 (51-60 minutes). An average score for each species is obtained from a minimum of six TSC. The higher the average score the more common the species is assumed to be. It is built on the assumption that the most common species are seen early than those with few individuals. Bennun & Howell (2000) and Bibby *et al* (1998) give a detailed account of how this method works including data analysis.

d) Opportunistic Observations

The field crew will always carry 8 x 42 or bigger pairs of binoculars during the fieldwork and record any species seen or heard and identified positively using Zimmermann *et al* (1996) guidebook. An x15 - x60 zoom telescope will be used to observe birds at a distance and those requiring detailed notes for identification. This method will be supplemented by organised bird walks both in early mornings and afternoons to exhaustively search the study area. We shall also make observations in target areas such as fruiting and flowering trees besides recognition of calls. Observers shall also use vantage points to watch sky for raptors and other passing over species. All new sightings will be recorded daily. A curve will be plotted from cumulative total number of species seen daily against number of days spent. This linear regression approach, also called species incidence or accumulation curve, helps to provide an area's species list with a rough assessment of abundance. Different people have described this curve and its application e.g. Sutherland (1996). This curve gives an indication as to whether continued searching would increase the number of species recorded besides showing a near exhaustion of all species. The final species list will be compared with known species from this atlas square after Lewis & Pomeroy (1989) and other records available from the National Museums of Kenya Ornithology Section's database and other sources. This shall contribute data for publishing the "Checklist of the Birds of Nyahururu".

e) Vegetation Sampling

Vegetation will be sampled using centre of net line positions as points of reference. The data to be collected will include, but not limited to, % canopy cover, % ground cover, forest floor litter depth, fruiting/flowering conditions, diameter at breast height etc in a 5x5 sq meters quadrat. Vegetation data will help to relate occurrence or absence of some species in a given location. Besides this data on vegetation, **anthropogenic factors** shall be recorded such as evidence of human interference either current or previous e.g. number of cut stems, charcoal burning etc. this

will have level of past disturbance and recovery potential (reflects effects of management intervention).

Data Analysis

Data will be keyed and stored as **Microsoft Excel** files. This software will also be used to analyse some of the data.

Jaccard's similarity index will be used to analyse the similarity indices of bird communities from different habitat types while the diversity index will be used to compare species compositions of the different habitat types from the bird walks and the mist netting data.

Species will be categorized ecologically following Bennun & Fanshawe (1997). These categories are as follows: FF - Forest specialists (requires an intact forest), F - forest generalists and f - forest visitors. Bird communities e.g. the FF in case of forests, are good indicators of changes that are taking place in the environment and are therefore an important tool for conservation (Bennun & Fanshawe 1997).

Statistica 6.0 software will be used for data analyses.

Equipment and Materials

The following are some of the equipment and materials that will enable completion of this survey.

- Hand held G.P.S. unit (1) and set of size AA dry batteries (2).
- Pairs of 8 x 42 binoculars (for each participant and trainers).
- x15 – x60 telescope & tripod (1).
- Bird guidebooks (4+) and other nature guidebooks.
- Topographical map of the study area and surroundings (1).
- Standard mesh size mist nets (10).
- Aluminium and steel bird rings (assorted sizes & quantities).
- Ringing databook (1).
- Basic ringing kit:
 - weighing balances (assorted sizes),
 - weighing cones (2),
 - wing rulers (2),
 - plastic dial callipers (2),
 - ringing pliers (2),
 - assorted sizes of bird bags (30+) etc.
- Bamboo poles (15).
- Digital camera and accessories (1+).
- Data sheets as might be required.
- Clipboards (1).
- Panga/Matchets (2).
- Stationary:
 - A6 field note books (10),
 - biro pens (10),
 - realm of printing paper (2),
 - CD-R/RW (10) etc.
 - Overall species records black book (1).

- Personal affects e.g. gumboots, strong boots, raincoat, clothing, etc.
- Comprehensive camping gear.
- Transport (vehicle).

Proposed Activities

	Activity	Why this activity is needed/important - objectives
1	Mist-netting and bird ringing	<ul style="list-style-type: none"> ○ Forest under storey bird communities study. ○ Training in bird ringing and fundamentals of ornithology (bird identification) using live birds. ○ Safe handling of birds and bio-data collection. ○ Exposure to forest birds of Kenya and need for keeping forest habitats intact.
2	Lecture – basic ecology	<ul style="list-style-type: none"> ○ Impart knowledge on basic functioning of wetlands and forest as examples of ecological systems. ○ Help trainees appreciate links and relationships between organisms and their environments.
3	Bird watching and opportunistic observations, organised bird walks	<ul style="list-style-type: none"> ○ Development of sites' species lists. ○ Demonstration of other ornithological research techniques. ○ Training on bird identification. ○ User-friendly and safe handling of optical field equipment. ○ Techniques of low-impact bird watching.
4	Waterfowl Census Techniques	<ul style="list-style-type: none"> ○ Waterbirds identification and counting techniques - monitoring.
5	Lecture 'visitor handling' by a guest speaker	<ul style="list-style-type: none"> ○ Impart skills on visitor handling and professional guiding.
6	African Waterfowl Census	<ul style="list-style-type: none"> ○ Conduct and/or participate at counting of waterbirds at Lake Ol Bolossat and Marura Swamp. ○ Enhance skills in counting techniques.
7	Exchange visit to community-based conservation group	<ul style="list-style-type: none"> ○ Exposure to what other successful community groups are doing and benefiting from ecotourism and/or income generating activities. ○ Group organisation, running of activities and performance. ○ Additional grassland and forest bird watching.
8	Field trip – Lake Nakuru National Park	<ul style="list-style-type: none"> ○ Exposure to alkaline waterfowls and rift valley bird species. ○ Additional bird watching and polishing of identification skills.

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Appendix 1: Checklist of birds recorded during a three hours walk at the South Marmaret Forest on 9 Aug 2007 from 08:30 to 12:00hrs.

Family	Osc. #	Species Common Name	Species Sci. Name	Cat.	AFH
Accipitridae: Vultures, Eagles, Hawks, Kites & Allies					
	157	African Crowned Eagle	<i>Stephanoaetus coronatus</i>	FF	
Columbidae: Pigeons & Doves					
	376	Dusky Turtle Dove	<i>Streptopelia lugens</i>	f	
Psittacidae: Parrots & Lovebirds					
	380	Red-fronted Parrot	<i>Poicephalus gulielmi</i>	FF	
Musophagidae: Turacos					
	398	Hartlaub's Turaco	<i>Tauraco hartlaubi</i>	FF	†
Cuculidae: Cuckoos & Coucals					
	417	African Emerald Cuckoo	<i>Chrysococcyx cupreus</i>	F	
	420	Diederik Cuckoo	<i>Chrysococcyx caprius</i>		
Coliidae: Mousebirds					
	480	Speckled Mousebird	<i>Colius striatus</i>		
Bucerotidae: Hornbills					
	543	Crowned Hornbill	<i>Tockus albeterminatus</i>	f	
	549	Silvery-cheeked Hornbill	<i>Bycanistes brevis</i>	F	
Capitonidae: Barbets & Tinkerbirds					
	563	Yellow-rumped Tinkerbird	<i>Pogoniulus bilineatus</i>	F	
Pycnonotidae: Bulbuls					
	702	Yellow-whiskered Greenbul	<i>Andropadus latirostris</i>	F	
	713	Cabanis' Greenbul	<i>Phyllastrephus cabanisi</i>	FF	
	729	Common Bulbul	<i>Pycnonotus barbatus</i>	f	
Timaliidae: Babblers, Chatterers & Illadopses					
	737	African Hill Babbler	<i>Pseudoalcippe abyssinica</i>	FF	†
Turdidae: Thrushes, Chats & Relatives					
	769	Cape Robin-Chat	<i>Cossypha caffra</i>	f	
	816	Olive Thrush	<i>Turdus olivaceus</i>	F	
Muscicapidae: Old World Flycatchers					
	831	African Dusky Flycatcher	<i>Muscicapa adusta</i>	F	
	840	White-eyed Slaty Flycatcher	<i>Melaenornis fischeri</i>	F	†
Sylviidae: Old World Warblers					

	884	Cinnamon Bracken Warbler	<i>Bradypterus cinnamomeus</i>	F	†
	933	Grey-backed Camaroptera	<i>Camaroptera brachyura</i>	f	
	940	Chestnut-throated Apalis	<i>Apalis porphyrolaema</i>	F	†
	945	Grey Apalis	<i>Apalis cinerea</i>	FF	
Zosteropidae: White-eyes					
	982	Montane White-eye	<i>Zosterops poliogaster</i>	F	†
Paridae: Tits					
	990	White-bellied Tit	<i>Parus albiventris</i>	f	
Monarchidae: Monarch Flycatchers					
	1007	African Paradise Flycatcher	<i>Terpsiphone viridis</i>	f	
Platysteiridae: Batises, Wattle-eyes & Relatives					
	1020	Black-throated Wattle-eye	<i>Platysteira peltata</i>	F	
Malaconotidae: Bush-Shrikes					
	1064	Tropical Boubou	<i>Laniarius aethiopicus</i>	f	
	1072	Black-backed Puffback	<i>Dryoscopus cubla</i>	F	
Campephagidae: Cuckoo-Shrikes					
	1080	Grey Cuckoo-shrike	<i>Coracina caesia</i>	FF	†
Corvidae: Crows & Allies					
	1095	Pied Crow	<i>Corvus albus</i>		
Nectariniidae: Sunbirds					
	1152	Variable Sunbird	<i>Nectarinia venusta</i>	f	
	1159	Northern Double-collared Sunbird	<i>Nectarinia preussi</i>	F	†
	1177	Tacazze Sunbird	<i>Nectarinia tacazze</i>	f	†
	1179	Bronze Sunbird	<i>Nectarinia kilimensis</i>	f	†
Ploceidae: Weavers & Relatives					
	1205	Baglafaecht Weaver	<i>Ploceus baglafaecht</i>	f	†
Fringillidae: Seedeaters, Canaries & Relatives					
	1333	African Citril	<i>Serinus citrinelloides</i>	f	†
	1344	Thick-billed Seedeater	<i>Serinus burtoni</i>	FF	†
Total species: FF = 8 ; F = 13; f = 13; others = 2					
Key: AFH = Afro-tropical highland biome indicator species = 13 (see Njoroge & Bennun 1999)					
Cat. – forest dependence category: FF = forest-specialists; F = forest generalists; f = forest visitor - after Bennun <i>et al</i> (1998)					
OSc#: Number after EANHS Ornithological Sub-committee. (1996). <i>Checklist of the Birds of Kenya</i> . Nature Kenya.					

Appendix 2: List of all species recorded during the **02-10 August 2007** bird survey at Lake Ol' Bolossat grasslands and environs (incl. farmlands and wetlands). Classification follows O.Sc (1986).

Family	OS-c #	Species Common Name	Species Scientific Name	Listed by AEWB	Threat Category	Scarcity	Migration Status
Podicipedidae: Grebes							
	5	Little Grebe	<i>Tachybaptus ruficollis</i>				
Pelecanidae: Pelicans							
	20	Great White Pelican	<i>Pelecanus onocrotalus</i>	†			
Phalacrocoracidae: Cormorants							
	27	Long-tailed Cormorant	<i>Phalacrocorax africanus</i>				
Ardeidae: Heron, Egrets & Bitterns							
	37	Cattle Egret	<i>Bubulcus ibis</i>				am
	42	Common Squacco Heron	<i>Ardeola ralloides</i>				am, pm
	47	Great Egret	<i>Casmerodius alba</i>	†	VU		
	48	Grey Heron	<i>Ardea cinerea</i>		NT		am, pm
	49	Purple Heron	<i>Ardea purpurea</i>	†	NT		
	51	Black-headed Heron	<i>Ardea melanocephala</i>				
Scopidae: Hamerkop							
	52	Hamerkop	<i>Scopus umbretta</i>				
Ciconiidae: Storks							
	60	Yellow-billed Stork	<i>Mycteria ibis</i>	†			
Threskionithidae: Ibises & Spoonbills							
	61	Sacred Ibis	<i>Threskiornis aethiopicus</i>	†			
	62	Hadada Ibis	<i>Bostrychia hagedash</i>				
	67	African Spoonbill	<i>Platalea alba</i>	†			
Anatidae: Ducks & Geese							
	71	White-faced Whistling Duck	<i>Dendrocygna viduata</i>	†			
	74	Egyptian Goose	<i>Alopochen aegyptiacus</i>	†			
	85	Yellow-billed Duck	<i>Anas undulata</i>	†			am
	87	Red-billed Teal	<i>Anas erythrorhynchos</i>	†			
	88	Hottentot Teal	<i>Anas hottentota</i>	†			
Accipitridae: Vultures, Eagles, Hawks, Kites & Allies							
	100	Black-shouldered Kite	<i>Elanus caeruleus</i>				
	120	African Marsh Harrier	<i>Circus ranivorus</i>		NT	X	
	122	Gabar Goshawk	<i>Micronisus gabar</i>				
	142	Augur Buzzard	<i>Buteo augur</i>				
	143	African Fish Eagle	<i>Haliaeetus vocifer</i>				

Phasianidae: Quails & Francolins							
	178	Common Quail	<i>Coturnix coturnix</i>			X	pm
Rallidae: Rails & Relatives							
	222 224 227	Black Crake Purple Swamphen Red-knobbed Coot	<i>Amaurornis flavirostra</i> <i>Porphyrio porphyrio</i> <i>Fulica cristata</i>				
Gruidae: Cranes							
	230	Grey Crowned Crane	<i>Balearica regulorum</i>			NT	
Otididae: Bustards							
	239	Black-bellied Bustard	<i>Eupodotis melanogaster</i>				
Charadriidae: Plovers							
	278 283 284	Blacksmith Plover Black-winged Plover Crowned Plover	<i>Vanellus armatus</i> <i>Vanellus melanopterus</i> <i>Vanellus coronatus</i>	† †			
Scolopacidae: Sandpipers & Relatives							
	287 301 313 314	Little Stint African Snipe Wood Sandpiper Common Sandpiper	<i>Calidris minuta</i> <i>Gallinago nigripennis</i> <i>Tringa glareola</i> <i>Actitis hypoleucos</i>	† † †			
Laridae: Gulls & Terns							
	326 340	Grey-headed Gull Little Tern	<i>Larus cirrocephalus</i> <i>Sterna albifrons</i>	†			
Columbidae: Pigeons & Doves							
	366 370 373 377	Speckled Pigeon Red-eyed Dove Ring-necked Dove Laughing Dove	<i>Columba guinea</i> <i>Streptopelia semitorquata</i> <i>Streptopelia capicola</i> <i>Streptopelia senegalensis</i>				
Cuculidae: Cuckoos & Coucals							
	409	Red-chested Cuckoo	<i>Cuculus solitarius</i>				
Apodidae: Swifts							
	479	Little Swift	<i>Apus affinis</i>				
Coliidae: Mousebirds							
	480	Speckled Mousebird	<i>Colius striatus</i>				
Alcedinidae: Kingfishers							
	495 500	Malachite Kingfisher Pied Kingfisher	<i>Alcedo cristata</i> <i>Ceryle rudis</i>				
Coraciidae: Rollers							
	519	Lilac-breasted Roller	<i>Coracias caudata</i>				

Picidae: Wrynecks & Woodpeckers							
	616	Grey Woodpecker	<i>Mesopicos goertae</i>				
Alaididae: Larks							
	628	Rufous-naped Lark	<i>Mirafra africana</i>				
	640	Red-capped Lark	<i>Calandrella cinerea</i>				
Hirundinidae: Swallows & Martins							
	652	Sand Martin	<i>Riparia riparia</i>				
	660	Barn Swallow	<i>Hirundo rustica</i>				
	668	Rock Martin	<i>Hirundo fuligula</i>				
	672	Black Saw-wing	<i>Psaldoprocne holomelas</i>				
Motacillidae: Wagtails, Pipits & Longclaws							
	676	Mountain Wagtail	<i>Motacilla clara</i>				
	681	Grassland Pipit	<i>Anthus cinnamomeus</i>				
	693	Sharpe's Longclaw	<i>Macronyx sharpei</i>		EN		
	694	Yellow-throated Longclaw	<i>Macronyx croceus</i>				
Pycnonotidae: Bulbuls							
	729	Common Bulbul	<i>Pycnonotus barbatus</i>				
Turdidae: Thrushes, Chats & Relatives							
	769	Cape Robin-Chat	<i>Cossypha caffra</i>				
	794	Common Stonechat	<i>Saxicola torquata</i>				
	803	Capped Wheatear	<i>Oenanthe pileata</i>				
	807	Northern Anteater Chat	<i>Myrmecocichla aethiops</i>				
	816	Olive Thrush	<i>Turdus olivaceus</i>				
Muscicapidae: Old World Flycatchers							
	840	White-eyed Slaty Flycatcher	<i>Melaenornis fischeri</i>				
Sylviidae: Old World Warblers							
	898	Hunter's Cisticola	<i>Cisticola hunteri</i>				
	905	Levaillant's Cisticola	<i>Cisticola tinniens</i>				
	906	Winding Cisticola	<i>Cisticola galactotes</i>				
	923	Wing-snapping Cisticola	<i>Cisticola ayresii</i>				
Zosteropidae: White-eyes							
	982	Montane White-eye	<i>Zosterops poliogaster</i>				
Laniidae: Shrikes							
	1043	Common Fiscal	<i>Lanius collaris</i>				
Malaconotidae: Bush-Shrikes							
	1064	Tropical Boubou	<i>Laniarius aethiopicus</i>				
Corvidae: Crows & Allies							
	1095	Pied Crow	<i>Corvus albus</i>				
	1098	Cape Rook	<i>Corvus capensis</i>				
Sturnidae: Starlings & Oxpeckers							
	1103	Red-winged Starling	<i>Onychognathus morio</i>				

	1118	Superb Starling	<i>Lamprotornis superbus</i>				
Nectariniidae: Sunbirds							
	1179	Bronze Sunbird	<i>Nectarinia kilimensis</i>				
Passeridae: Sparrows & Petronias							
	1185	Rufous Sparrow	<i>Passer motitensis</i>				
Ploceidae: Weavers & Relatives							
	1205	Baglafaecht Weaver	<i>Ploceus baglafaecht</i>				
	1230	Speke's Weaver	<i>Ploceus spekei</i>				
	1248	Red-billed Quelea	<i>Quelea quelea</i>				
	1262	Red-collared Widowbird	<i>Euplectes ardens</i>				
	1265	Long-tailed Widowbird	<i>Euplectes progne</i>				
	1266	Jackson's Widowbird	<i>Euplectes jacksoni</i>		NT		
Estrildidae: Waxbills							
	1303	Common Waxbill	<i>Estrilda astrild</i>				
	1309	Red-cheeked Cordon-bleu	<i>Uraeginthus bengalus</i>				
Estrildidae: Sub-family Viduinae: Indigobirds & Whydahs							
	1328	Pin-tailed Whydah	<i>Vidua macroura</i>				
Fringillidae: Seedeaters, Canaries & Relatives							
	1332	Yellow-crowned Canary	<i>Serinus canicollis</i>				
	1343	Streaky Seedeater	<i>Serinus striolatus</i>				
Total				17			
<p>Key: *† = recorded on a private farm X = very rare records that should be submitted to Bird Committee at EANHS NT = Near-threatened; VU = Vulnerable; EN = Endangered</p>							