FIFTH BIODIVERSITY ASSESSMENT

OF OL ARI NYIRO, LAIKIPIA NATURE CONSERVANCY, NORTHERN KENYA

(Amphibians, Reptiles, Birds, Invertebrates and Plants)

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A Technical Report Submitted to the Gallmann Memorial Foundation (GMF)

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Executive Summary

The National Museums of Kenya biodiversity team conducted yet another wet season biodiversity assessment of Ol Ari Nyiro (OAN), Laikipia Nature Conservancy from 4^{th}–10^{th} August, 2015. This is the 5^{th} major survey in a series of documentation and monitoring exercise supported by Gallmann Memorial Foundation (GMF). The team included four thematic areas namely: - herpetofauna (reptiles and amphibians), invertebrates, birds and plants. The detailed results of each component are presented in chapters 1–4 in this report.

OAN has a combination of unique biogeographical features, offering one of the best savannah habitats for ecological study in northern Kenya. Both the lowest and highest points in Laikipia County are found within the conservancy. Engelesha Hill rises to 2400m while the mouth of the Mukutan Gorge drops to 1260m. This sharp altitudinal gradient (1140m), proximity to the eastern wall of the Great Rift Valley, expansive land cover and unique vegetation composition are perhaps the reasons behind Ol Ari Nyiro's species richness. OAN covers 400 km^2, all of which has been dedicated to nature conservation for the last 17 years since cattle ranching was abolished. This management approach and spatial variability of habitats contributes positively to OAN's biological richness. The spatial variability of species richness has traditionally been based on data obtained from sparse point samples. According to Oindo & Skidmore (2002), ecologists have hypothesized that net primary productivity (NPP) and actual evapotranspiration (AET) can be used as indirect measures of species richness. Therefore, local spatial variability of NPP and AET, translating to habitat heterogeneity, are the major factors influencing species richness in OAN.

A total of 29 new records species records were documented in the current survey including one (1) snake, seven (7) invertebtes and 21 plants. The East African Shovel Snout (*Prosymna stuhlmanni*) occurs predominantly in the African coastline from Somalia to the Republic of South Africa (0–5500 ft.). In Kenya the species occurs inland upto Chyulu Hills with an isolated population in the hinterland on the eastern brink the Rift Valley at OAN. The new plant species recorded as new to the existing plant list include *Cayratia ibuensis* being recorded for the first time in the K3 floral region. Other species such as *Bowiea volubilis* and *Aristea abyssinica* were re-discovered after nearly 50 years.

Currently, more 2100 different species of plants and animals are known from OAN. These include 14 amphibians (i.e. frogs and toads), 56 reptiles, 477 birds, more than 800 vascular plants, and 762 macro-invertebrates. These findings make OAN one of the richest ecological units in Kenya.

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The following people from the National Museums of Kenya participated in the 2015 biodiversity survey:-

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2) Ms. Felista Kasyoka – Assistant Herpetologist
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Background

Introduction

A multidisciplinary team from the National Museums of Kenya (NMK) carried out the fifth multi-disciplinary biodiversity assessment of Ol Ari Nyiro-Laikipia Nature Conservancy (OAN-LNC) from 4th – 10th Aug, 2015. This is part of a series of annual biodiversity assessments at OAN-LNC since 2008 with the support of Gallmann Memorial Foundation (GMF). The thematic components included in this study were amphibians, reptiles, birds, plants, terrestrial and aquatic macro invertebrates. The current sampling was carried out at Engelesha Forest (including Loileber Dam and surrounding woodland), Kutwa, Mlima Kisu, Sambara area, Lugga Tunkuri and Ngobitu Dam.

OAN has a combination of unique biogeographical features, offering one of the best savannah habitats for ecological study in northern Kenya. Both the lowest and highest points in Laikipia County are found within the conservancy. Engelesha Hill rises to 2400m while the mouth of the Mukutan Gorge drops to 1260m. This sharp altitudinal gradient (1140m), proximity to the eastern wall of the Great Rift Valley, expansive land cover and unique vegetation composition are perhaps the reasons behind Ol Ari Nyiro's species richness. OAN covers 400 km^2, all of which has been dedicated to nature conservation for the last 17 years since cattle ranching was abolished. This management approach and spatial variability of habitats contributes positively to OAN's biological richness. The spatial variability of species richness has traditionally been based on data obtained from sparse point samples. According to Oindo & Skidmore (2002), ecologists have hypothesized that net primary productivity (NPP) and actual evapotranspiration (AET) can be used as indirect measures of species richness. Therefore, local spatial variability of NPP and AET, translating to habitat heterogeneity, are the major factors influencing species richness in OAN.

The species documented in OAN from previous studies have indicated a mixture of both forest, and savannah assemblages. Both plants and animals have shown some isolated distribution records, perhaps an indication that in deed there has been a historical gap in sampling in the intervening areas (Wasonga *et. al*. 2013). This report gives an account of the results of a survey carried out during the wet season (August) in 2015.

Goal and objectives

The long term goal is to improve the conservation and management of OAN-LNC in terms of its unique biodiversity. Specifically, the objective of this assessment was to carry out further inventory work of amphibians, reptiles, birds, terrestrial and aquatic macro-invertebrates. The study also seeks to monitor any changes in seasonal species richness and assess possible detection of new species records for the conservancy.

CHAPTER 1: REPTILES AND AMPHIBIANS

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Abstract

New species records are still being detected at Ol Ari Nyiro, Laikipia Nature Conservancy (OAN-LNC) in Laikipia County. The checklist now reaches 70 (including 56 reptiles and 14 amphibians), following our first record of the East African Shovel-snout (*Prosymna stuhlmanni*) during the current study. A total number of 274 individuals comprising 21 species (i.e.15 reptiles and 6 amphibians) were observed. Only one snake was recorded from Sambara, and none from Kutwa and Mlima Kisu - all three sites having been totally razed down by fire. Cattle grazing was noted throughout the areas sampled. This is certainly the cause of a relatively low species richness reported now compared to previous samples. The East African Shovel-snout is yet another isolated population, prompting an in-depth analysis of the biogeographical affinities of other taxa in OAN-LNC. Rampant forest fires and illegal grazing by the neighbouring Pokot, Turkana and Samburu pastoralists present serious threats to biodiversity and overall conservation goal for this hitherto pristine environment.

Introduction

Monitoring species trends and their habitats offer the best chance for ecologists to understand the impacts of certain environmental pressures. Since 1998 when cattle-ranching was eradicated in Ol Ari Nyiro, vegetation cover has highly improved and recent surveys have documented an increased number of species. However, species with limited dispersal ability, like reptiles and amphibians, are more prone to decimation by threats such as forest fires. It has been predicted by some studies that reptiles are threatened with extinction by increased fire frequency among other threats (Davies and Doherty, 2015). Other pressures that have caused serious ecological perturbations in OAN-LNC include illegal cattle grazing and poaching mainly targeted at Elephants.

Recent studies have focused on identifying and understanding the causes of species richness patterns in the tropics including threats caused by human activities (e.g. Sanders *et al.,* 2003;

Smith *et al*., 2007). We carried out a regular survey of reptiles and amphibians in the wet season in OAN-LNC in order to: (i) update the species checklist and (ii) assess the possible impact of forest fires on the distribution and occurrence of these species. This will contribute to the overall understanding of the biota and their possible ecological interactions.

Methods

Field work was carried out at OAN-LNC from 5th – 9th Aug, 2015. Sampling was done from the following six sites (and dates): - Engelesha Forest (5th Aug), Kutwa (6th Aug), Mlima Kisu (7th Aug), Sambara (8th Aug), Lugga Tunkuri and Ngobitu Dam (9th Aug). Three of these sites (Engelesha, Lugga Tunkuri and Ngobitu Dam) had remained unburnt for some years, but the other sites were affected by recent wildfire. Cattle grazing was recorded in all the sites visited.

General search and seize methods or visual and acoustic encounter surveys (VES/AES) were used for qualitative and semi-qualitative data mainly for presence or absence of species (Rödel & Ernst, 2004, Veith *et al*., 2004). All possible amphibian and reptile microhabitats such as wetlands, under leaves debris, on trees, decomposing tree stumps and logs, including digging for fossorial species were intensively searched between 7.00–13.00hrs in each sampling location.

Intensive searches were carried out within the aforementioned localities. Two people walking at an average speed of 3km/hr searched for presence of all reptiles and amphibians. Species were identified following Channing and Howell (2006) for amphibians and Spawls *et. al*. (2002) for reptiles. Where necessary, samples were euthanized, preserved in alcohol, and deposited at the National Museums of Kenya.

Results

Seventy (70) species are now known from OAN-LNC including 56 reptiles and 14 amphibians (Tables 1&2). The number of species expected from the conservancy is still increasing with the latest record being the East African Shovel-snout (*Prosymna stuhlmanni;* Figure 1A). In the current study, 21 species were recorded comprising 15 reptiles and six amphibians (Table 2). The Rhombic Egg-eater (*Dasypeltis scabra*) is re-discovered at OAN in the present study after 36 years when the last record was made by the late Emmanuele Pirri Gallmann (Figure 1B). Only one Olive Sand Snake was seen in Sambara that had been burnt in a recent fire. The other two

recently burnt areas, Kutwa and Mlima Kisu did not reveal any reptile or amphibian life by the time of the study.

Table 1. Species richness observations between 2008 and 2015

Time	July 2008	July 2009	July 2011	April 2012	June/July 2013	Aug 2015
Duration of survey (Days)	12	11	7	7	12	6
Species observed Per Survey	45	37	33	20	31	20
Overall species richness	66	67	67	68	69	70
Number of new records	18	1	0	1	1	1

Table 2. Updated Checklist of Amphibians and Reptiles of Ol Ari Nyiro, Laikipia Nature Conservancy, with data from 2008 - 2015. "N" = species newly added to OAN inventory during the respective sampling periods

Species	Common Name	IUCN Status	Pre-2008	July 2008	July 2009	Aug 2011	April 2012	June/July 2013	August 2015
I. AMPHIBIANS									
FAMILY: PIPIDAE									
1. Xenopus borealis	Northern clawed frog	LC		N	X	X		X	
FAMILY HYPEROLIIDAE									
2. Hyperolius viridiflavus pantherinus	Leopard reed frog	LC		N		X		X	
3. Hyperolius viridiflavus ferniquei	Ferniquei's Reed frog	LC		N	X		X	X	X
4. Kassina senegalensis	Senegal Kassina	LC		N			X	X	X
FAMILY PTYCHADENIDAE									
5. Ptychadena anchietae	Anchieta's ridged frog	LC		N	X	X	X	X	X
6. Ptychadena mascareniensis	Mascarene ridged frog	LC	X	X	X	X	X	X	
FAMILY RANIDAE									
7. Cacosternum kinangopensis	Kinangop Dainty frog	LC		N					
8. Hoplobatrachus occipitalis	Eastern crown-grooved bullfrog	LC					N	X	
FAMILY PHRYNOBATRACHIDAE									
9. Phrynobatrachus natalensis	Natal puddle frog	LC	X	X	X				
10. Phrynobatrachus keniensis	Upland puddle frog	LC	X	X	X	X	X	X	X
FAMILY BUFONIDAE									
11. Amietophrynus kerinyagae	Kerinyaga toad	LC	X	X		X			

12. Amietophrynus regularis	Common toad	LC		N		X			
13. Amietophrynus garmani	Garman's toad	LC	X	X	X			X	X
Pyxicephalidae									
14. Tomopterna gallmanni	Gallmann's sand frog	LC		N	X	X		X	X
II. REPTILES									
Tortoises & Terrapins									
FAMILY TETUDINIDAE									
15. Stigmochelys pardalis	Leopard tortoise	LC	X	X	X	X	X	X	
*16. Kinyxis belliana**	Bell's hinged tortoise	LC	X						
FAMILY PELOMEDUSIDAE									
17. Pelomedusa subrufa	Helmeted Terrapin	LC	X	X	X	X	X	X	
Lizards									
FAMILY LACERTIDAE									
18. Adolfus jacksoni	Jackson's Forest Lizard			N	X	X	X	X	X
FAMILY AGAMIDAE									
19. Agama agama	Red-headed rock agama		X	X	X	X	X	X	X
20. Agama caudospina	Elementaita rock agama		X	X	X	X		X	X
21. Acanthocerus atricolis	Blue-headed tree agama		X						
FAMILY GEKKONIDAE									
22. Cnemaspis sp.	Forest Gecko			N	X	X	X		
23. Hemidactylus mabouia	Tropical house gecko		X		X				X
24. Hemidactylus brooki	Brook's gecko		X	X	X	X			
25. Lygodactylus sp.	Dwarf gecko			N	X	X			
26. Lygodactylus keniensis	Kenya dwarf gecko		X	X	X	X		X	X
27. Lygodactylus manni	Mann's dwarf gecko		X	X					
FAMILY SCINCIDAE									
28. Trachylepis striata	Striped skink		X	X	X	X	X	X	X
29. Trachylepis varia	Variable skink		X	X	X	X	X	X	X
30. Trachylepis megalura	Grass-top skink			N	X	X		X	
31. Lygosoma sundevalli	Sundevall's writhing skink			N		X			
32. Panaspis wahlbergii	Wahlberg's snake-eyed skink			N	X	X	X		X
33. Leptosiaphos kilimensis	Kilimanjaro five-toed skink			N					
FAMILY CHAMAELEONIDAE									
34. Chamaeleo bitaeniatus	Side-striped chameleon		X	X				X	X
*35. Chamaeleo jacksoni**	Jackson's chameleon		X						
FAMILY GERRHOSAURIDAE									
36. Gerrhosauraus flavigularis	Yellow-throated plated lizard		X	X			X	X	
Family Varanidae									
37. Varanus niloticus	Nile monitor lizard			N	X	X	X	X	
Snakes									
FAMILY TYPHLOPIDAE									
38. Typhlops lineolatus	Lineolate blind snake		X	X	X	X		X	
39. Rhinotyphlops brevis	Angle-snouted blind			N	X				

		snake						
FAMILY LEPTOTYPHLOPIDAE								
40.	*Leptotyphlops scutifrons*	Peter's worm snake		N	X	X	X	X	
Family Boidae								
41.	*Python sebae*	Central African rock python	X	X	X	X	X	X	
FAMILY COLUBRIDAE								
42.	*Boaedon fuliginosus*	House snake	X						X
43.	*Prosymna ambigua*	Angolan Shovel-snout	X						
44.	*Philothamnus battersbyi*	Battersby's green snake	X	X	X	X	X	X	
45.	*Philothamnus semivariegatus*	Spotted bush snake			N	X			
46.	*Crotaphopeltis hotamboeia*	Herald/ White-lipped snake	X	X	X	X		X	X
47.	*Lycophidion capense*	Cape wolf snake	X	X	X	X	X	X	
48.	*Coluber keniensis*	Kenya flower snake						N	
49.	*Psammophis sudanensis*	Northern stripe-bellied sand snake	X	X					
50.	*Psammophis biseriatus*	Link-marked sand snake	X		X				
51.	*Psammophis mossambicus*	Olive sand snake	X	X	X	X		X	X
52.	*Psammophis punctatus*	Speckled sand snake	X						
53.	*Psammophylax variabilis**	Striped sand snake	X						
54.	*Rhamphiophis rostratus*	Rufous-beaked Snake	X						
55.	*Rhamphiophis rubropunctatus*	Red-spotted beaked snake	X						
56.	*Dyspholidus typus*	Boomslang	X		X				
57.	*Duberria lutrix*	Abyssinian Slug-eater	X						
58.	*Dasypeltis scabra*	Rhombic egg-eater	X						X
59.	*Telescopus semiannulatus*	Tiger snake	X			X			
FAMILY ATRACTASPIDIDAE								
60.	*Aparallactlus jacksoni*	Jackson's centipede-eater	X	X	X	X			
61.	*Atractapis microlepidota*	Small-scaled burrowing asp	X			X			
62.	*Aparallactus lunulatus*	Plumbeous centipede-eater	X		X				
63.	*Micrelaps bicoloratus*	Two-coloured snake	X	X					
64.	*Elapsoidea loveridgei*	East African Garter Snake	X						
FAMILY LAMPROHIIDAE								
65.	*Prosymna stuhlmanni*	East African Shovel-snout							N
FAMILY ELAPIDAE								
66.	*Dendroaspis polylepis*	Black mamba	X						
67.	*Naja melanoleuca*	Forest cobra	X		X			X	
68.	*Naja nigricollis*	Black-necked spitting cobra	X	X	X	X			
FAMILY VIPERIDAE								
69.	*Causus rhombeatus*	Rhombic night adder	X						
70.	*Bitis arietans*	Puff adder	X	X				X	
Total observations per visit				45	37	33	20 $	31	21

KEY/NOTES:

N = New species record for Ol Ari Nyiro
[$]= 2012 sampling only covered two sites in the Conservancy (Engelesha Forest & Mukutan Gorge)
*= Records that require further verification
LC= Least Concern

Figure 1. A) East African Shovel-snout (*Prosymna stuhlmanni*) and B) Rhombic Egg-eater (*Dasypeltis scabra*)

Discussion

Recovery of reptile and amphibian populations following unplanned disturbances such as wildfires is not only challenging but also species dependent. Davis and Doherty (2015) found out that reptile community recovered rapidly following a wildfire in Western Australia. Unburnt areas initially had higher species richness and total abundance, but burnt sites recorded similar abundance within two years and a similar richness in three years. Leaf-litter inhabiting species, commonly associated with prolonged vegetation regeneration period, are often found in longer unburnt sites. Our current results, showing very poor to no recovery in some sites, within one year of burning at Sambara, Kutwa and Mlima Kisu are therefore supported by these results.

Another comparative study in the tropical savannah of Australia established that the occurrence of fire, regardless of its intensity, was a major factor influencing fire-sensitive species but with notable exceptions e.g. most invertebrates that recolonized almost immediately (Andersen *et. al.,* 2005). In general, it was noted that key components of the savannah biota tend to favour habitats that have remained unburnt for at least several years. This is a big challenge to fulfill in OAN-LNC where the fires, happening virtually annually, are as a result of arsonist attacks (Kuki Gallmann, pers. com.).

The detection rate of reptiles and amphibians is generally slow and unpredictable. Apart from the initial survey under this programme when 18 new records were added to the checklist, each of the subsequent samples has only added 0–1new record. Such success is usually determined by factors such as seasonality, behaviour and sampling effort in terms of time and space. The re-discovery of Rhombic Egg-eater in a span of 36 years is a classic example of how elusive reptiles are, even over repeated surveys. This is a nocturnal and burrowing species, but climbs bushes and trees hunting for birds' eggs at night (Spawls *et. al*., 2002). The authors also noted that this snake can go for long periods without food under aestivation.

Conclusion and Recommendations

It is evident that OAN-LNC is truly and ecological island with remnant populations of some widely distributed as well as range restricted species.

Control measures against frequent wildfires in OAN-LNC should be put in place. Fire breaks should be placed at appropriate intervals to mitigate the outbreaks in the future to allow adequate time for species recovery in most of the burnt areas. Further sampling is recommended to examine possible occurrence of additional species.

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CHAPTER 2: BIRDS

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Abstract

Avifaunal surveys were conducted for 5 days between 5th and 9th, August 2015 in Ol Ari Nyiro Conservancy, currently designated as an Important Bird Area. Areas surveyed for birds included Engelesha forest, Loileber Dam at Engelesha and the surrounding woodland, Mlima Kisu, Kutwa, Sambara, LuggaTunkuri and a quick assessment of Ngobitu Dam. Opportunistic observations were also made along the roads leading to different survey sites. The sites comprised of different habitats including forest, woodlands, grasslands and wetlands. Surveys were conducted between 08:00-13:00hrs and in some occasions extensions between 15:00-18:00hrs were included. Distance sampling point count method was applied for determining species abundance in all sites and additional records made through opportunistic observations of areas that did not fall directly along the transects. A total of 109 bird species comprising 44 different families were detected during the current assessment. Loileber Dam and the surrounding woodlands scored highest in terms of species diversity (33 species) followed by Engelesha forest (31 species) with least diversity detected in Sambara with 17 species. Only three species of raptors were recorded, this low number could be attributed to the current state of recovery of vegetation and other taxa within the conservancy following an intensive fire outbreak in the ranch that may have affected microhabitats suitable for prey species such as rodents.

Introduction

Ol Ari Nyiro (Laikipia Nature Conservancy) is currently designated as an Important Bird Area (IBA) and known to support 43.5% of all bird species recorded in Kenya with the current list reaching 477 species. This high number of bird species is attributive to the diversity of habitats that range from wetlands (dams, permanent and seasonal rivers), wooded grasslands, open short grasslands, rocky outcrops, riverine valleys to montane highland forest at Engelesha as well as varied altitudinal gradient in the conservancy. The Conservancy covers 400 km^2 (Imboma, 2011) with sharp altitudinal gradient (lowest at Mukutan Gorge, 1260m and highest at Engelesha Hill, 2400m).

Methods

The survey was conducted over a period of five (5) days between 5th and 9th of August 2015. Data was collected following the standard timed fixed radius point counts methodology as described by Bibby et al. (2000). We conducted 10 minutes point counts in a 50meter radius. For each bird observed, we recorded species, flock size, time, and distance (recorded as either <50 or >50m) and activity of the birds. The nomenclature used for list of birds provided follows the 4th edition of the Checklist of the Birds of Kenya, which is the latest version revised by the Bird Committee of East African Natural History of Society. Reference is also made in Zimmerman *et al*. (1996).

Additional records were obtained from road counts and opportunistic observations to supplement the checklist .

Results and Discussion

The current survey recorded more than 100 bird species (Appendix 1). This was lower compared to previous surveys of 208 species recorded by Imboma (2011) and 169 species recorded by Chesire and Gitiri (2013) mainly due to a shorter survey period. In contrast to past studies the current survey was carried out after the conservancy had experienced intensive fires that reduced most of the biomass and food for birds. This could have attributed to the low number of raptors due to absence of prey items that include reptiles and rodents. The vegetation structure and floristic composition are key factors that affect the habitat selection of the birds and indicate where and how the birds used the resources. The fires could have affected the original floristic composition and structure thus impacting on the population dynamics of prey items that these raptors and other species depend on. However with full recovery, the status of raptors and other species would still return to original state.

The current survey did not record any new species. However with the varied and unique landscapes in the conservancy, there is a great potential of recording new species with provision of more time and putting into consideration seasonality in the survey design. For instance, sampling should be planned to coincide with migration and breeding seasons when bird detection is quite high. Despite this observation, there were interesting records of breeding birds at different stages with several species observed feeding young ones. Among the species observed in different breeding status included Common bulbul, laughing dove, Superb Starling, Olive Thrush and Helmeted Guineafowls which had several young chicks. Interesting records of forest-dependent species indicating undisturbed forests were recorded including Hartlaub's Turaco (*Tauraco hartlaubi)*, Brown Woodland Warbler *(Phylloscopus umbrovirens)*, Grey Apalis (*Apalis cinerea)* and Crowned Eagle *(Stephanoaetus coronatus)*. These true forest species indicates that the status of the forest is healthy making it an important 'Island' in the area.

The areas surveyed included Mukutan, Kisu, Lugga ya Tunkuri, Rhino spring and Engelesha forest. Start time was determined by the arrival at the sampling site. Number of species detected differed between the different sites with Loileber Dam recording highest diversity (Figure 1). Some of the previous baseline surveys that contributed to the LNC bird checklist include Horne & Short (1990,1999), Imboma (2005), Roberts & Wamiti (2008), Imboma (2011) and Wamiti & Wangui (2012), Cherire and Gitiri (2013). Studies in 2008, 2011 and 2010 were all carried out in the month of July. Current survey was however carried out in August.

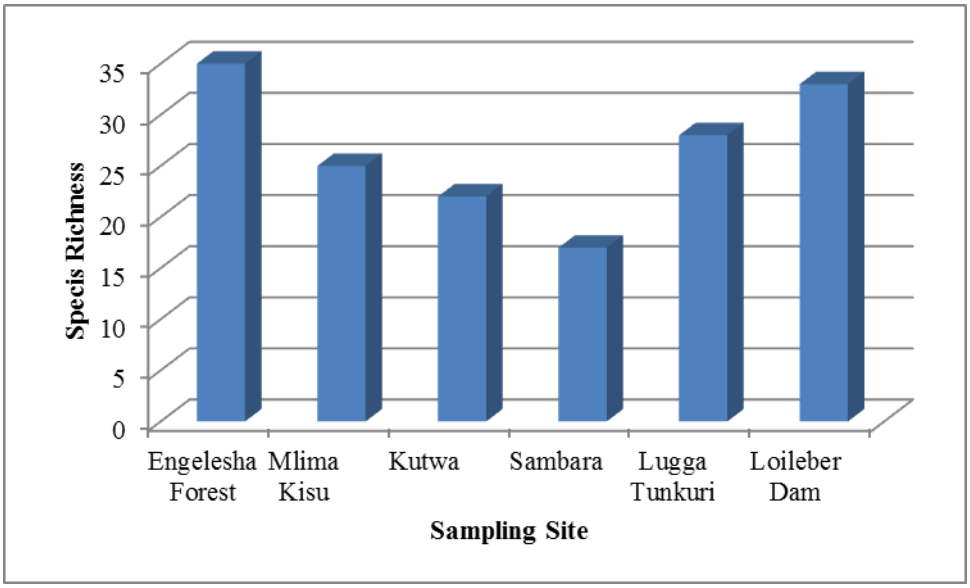

Figure 1: Relative Species richness across various habitats sampled.

Forest dependency categories

To investigate forest-dependency, bird species were classified either as forest-specialists (FF), forest generalist (F), or forest visitors (f) following Bennun *et al*., (1996). The FF and F are dependent on forests, while f does not require forests for their survival (Appendix 1).

Feeding guilds

To explore species composition in terms of their feeding guilds, bird species were classified according to the main food type based on literature by Mwangi 2009. Eight (8) categories of feeding guilds were identified including insectivore (invertebrate feeder), frugivore (fruit-eater), gramnivore (seed-eater) raptor (birds of prey – carnivore), nectarinivore (nectar-feeder), piscivore (fisheater), and omnivore (non-specialized feeder). The results are presented in Appendix 1. More than 50% of the birds recorded were insectivores. The least represented guild was the omnivores.

Breeding records

Breeding activities were observed during the survey. Such activities (Plate 1) taken as confirmed breeding records included adult birds seen feeding dependent young ones out of nest, male displaying, adult carrying nesting materials or food to unknown nest, juveniles and immature out of the nest and nests with or without contents.

Nest of Grey-backed Cameroptera

Helmeted Guineafowl with young Chicks

A Hamerkop Nest

Sacred Ibis at Gobito Dam

Yellow-throated Longclaw **Laughing Dove**

Plate1. Photos of Birds observed in LNC

Conclusion

The list of 109 species identified in this study is not exhaustive. LNC has unique and varied landscapes (Plate 2) including pristine habitats with potential of documenting new species. Future surveys should be planned during bird migration season which peaks in November-December and March-April to capture the array of migrating raptors especially along the valleys and cliffs observed in Mlima Kisu and Kutwa; these areas have high potential habitats for both resident and migrating raptors. In addition, more sampling is recommended in the current survey sites due to the uniqueness of the microhabitats. The management of LNC should consider establishing a migratory raptor watch within this areas, this will provide opportunity to monitor the site both as an IBA and an important migratory corridor for raptors.

Plate 2: Beautiful scenery and landscape at Sambara, high potential habitats for resident and migrating raptors.

Appendix 1: Checklist of all bird species recorded during the current study, showing their forest dependency category (as FF, F, small-f, and others), feeding guild and status (LC, Least concern, am afrotropical migrant, PM, Palaearctic Migrant)

No.	Common Name	*Scientific Name*	Family Name	Status forest category	feeding guild
1.	Helmeted Guineafowl	*Numida meleagris*	**Numididae**	f, LC	Omnivorous
2.	Hildebrandt's Francolin	*Francolinus hildebrandti*	**Phasianidae**	F, LC	Omnivorous
3.	Yellow-necked Spurfowl	*Francolinus leucoscepus*	**Phasianidae**	F, LC	Omnivorous
4.	Egyptian Goose	*Alopochen aegyptiaca*	**Anatidae**	F, LC	Omnivorous
5.	Yellow-billed Duck	*Anas undulata*	**Anatidae**	F, am	Insectivorous
6.	Little Grebe	*Tachybaptus ruficollis*	**Anatidae**	F, LC	Insectivorous
7.	Yellow-billed Stork	*Mycteria ibis*	**Ciconiidae**	F, am	Piscivorous
8.	Sacred Ibis	*Threskiornis aethiopicus*	**Threskiornithidae**	F, LC	Insectivorous
9.	Hadada Ibis	*Bostrychia hagedash*	**Threskiornithidae**	F, LC	Insectivorous
10.	Cattle Egret	*Bubulcus ibis*	**Threskiornithidae**	F, am	Insectivorous
11.	Black-headed Heron	*Ardea melanocephala*	**Ardeidae**	F, LC	Piscivorous
12.	Hamerkop	*Scopus umbretta*	**Scopidae**	F, LC	Insectivorous
13.	Reed Cormorant	*Phalacrocorax africanus*	**Phalacrocoracidae**	F, LC	Piscivorous
14.	Black-chested Snake Eagle	*Circaetus pectoralis*	**Accipitridae**	F, LC	Canivorous
15.	Little Sparrowhawk	*Accipiter minullus*	**Accipitridae**	f	Canivorous
16.	Augur Buzzard	*Buteo augur*	**Accipitridae**	f	Canivorous
17.	Crowned Eagle	*Stephanoaetus coronatus*	**Accipitridae**	FF	Canivorous
18.	White-bellied Bustard	*Eupodotis senegalensis*	**Otididae**	f	Insectivorous
19.	Three-banded Plover	*Charadrius tricollaris*	**Charadriidae**	f	Insectivorous
20.	Common Sandpiper	*Actitis hypoleucos*	**Scolopacidae**	F, PM	Insectivorous
21.	Dusky Turtle Dove	*Streptopelia lugens*	**Columbidae**	F	Granivorous

22.	African Mourning Dove	*Streptopelia decipiens*	**Columbidae**	f	Granivorous
23.	Red-eyed Dove	*Streptopelia semitorquata*	**Columbidae**	f	Granivorous
24.	Ring-necked Dove	*Streptopelia capicola*	**Columbidae**	f	Granivorous
25.	Laughing Dove	*Streptopelia senegalensis*	**Columbidae**	f	Granivorous
26.	Emerald-spotted Wood Dove	*Turtur chalcospilos*	**Columbidae**	f	Granivorous
27.	Tambourine Dove	*Turtur tympanistria*	**Columbidae**	FF	Granivorous
28.	Namaqua Dove	*Oena capensis*	**Columbidae**	f	Granivorous
29.	Fischer's Lovebird	*Agapornis fischeri*	**Psittacidae**	F, NT	Insectivorous
30.	Hartlaub's Turaco	*Tauraco hartlaubi*	**Musophagidae**	FF	Frugovore
31.	White-bellied Go-away-bird	*Corythaixoides leucogaster*	**Musophagidae**	f	Frugovore
32.	Red-chested Cuckoo	*Cuculus solitarius*	**Cuculidae**	F, am	Insectivorous
33.	Black Cuckoo	*Cuculus clamosus*	**Cuculidae**	F, am	Insectivorous
34.	White-browed Coucal	*Centropus superciliosus*	**Cuculidae**	f	Insectivorous
35.	Montane Nightjar	*Caprimulgus poliocephalus*	**Caprimulgidae**	f	Insectivorous
36.	Speckled Mousebird	*Colius striatus*	**Coliidae**	f	Frugovore
37.	White-headed Mousebird	*Colius leucocephalus*	**Coliidae**	f	Frugovore
38.	Little Bee-eater	*Merops pusillus*	**Meropidae**	f	Insectivorous
39.	Cinnamon-chested Bee-eater	*Merops oreobates*	**Meropidae**	f	Insectivorous
40.	Yellow-rumped Tinkerbird	*Pogoniulus bilineatus*	**Capitonidae**	F	Frugovore
41.	Spot-flanked Barbet	*Tricholaema lacrymosa*	**Capitonidae**	f	Frugovore
42.	Nubian Woodpecker	*Campethera nubica*	**Picidae**	f	Insectivorous
43.	Chin-spot Batis	*Batis molitor*	**Platysteiridae**	f	Insectivorous
44.	White-crested Helmetshrike	*Prionops plumatus*	**Malaconotidae**	f	Insectivorous
45.	Brown-crowned Tchagra	*Tchagra australis*	**Malaconotidae**	f	Insectivorous
46.	Slate-coloured Boubou	*Laniarius funebris*	**Malaconotidae**	f	Insectivorous
47.	Tropical Boubou	*Laniarius aethopicus*	**Malaconotidae**	f	Insectivorous
48.	Grey-backed Fiscal	*Lanius excubitoroides*	**Malaconotidae**	f	Insectivorous

49.	Common Fiscal	*Lanius collaris*	**Malaconotidae**	f	Insectivorous
50.	Black-headed Oriole	*Oriolus larvatus*	**Oriolidae**	f	Insectivorous
51.	Common Drongo	*Dicrurus adsimilis*	**Oriolidae**	f	Insectivorous
52.	African Paradise Flycatcher	*Terpsiphone viridis*	**Monarchidae**	F, am	Insectivorous
53.	Pied Crow	*Corvus albus*	**Corvidae**	f	Omnivorous
54.	Fan-tailed Raven	*Corvus rhipidurus*	**Corvidae**	f	Omnivorous
55.	White-bellied Tit	*Parus albiventris*	**Paridae**	f	Insectivorous
56.	Black Saw-wing	*Psalidoprocne pristoptera*	**Hirundinidae**	f	Insectivorous
57.	Barn Swallow	*Hirundo rustica*	**Hirundinidae**	F, PM	Insectivorous
58.	Rock Martin	*Ptyonoprogne fuligula*	**Hirundinidae**	f	Insectivorous
59.	Red-rumped Swallow	*Cecropis daurica*	**Hirundinidae**	f	Insectivorous
60.	Singing Bush Lark	*Mirafra cantillans*	**Alaudidae**	f	Insectivorous
61.	Zitting Cisticola	*Cisticola juncidis*	**Cisticolidae**	f	Insectivorous
62.	Tawny-flanked Prinia	*Prinia subflava*	**Cisticolidae**	f	Insectivorous
63.	Yellow-breasted Apalis	*Apalis flavida*	**Cisticolidae**	f	Insectivorous
64.	Grey Apalis	*Apalis cinerea*	**Cisticolidae**	f	Insectivorous
65.	Grey-backed Camaroptera	*Camaroptera brachyura*	**Cisticolidae**	f	Insectivorous
66.	Common Bulbul	*Pycnonotus barbatus*	**Pycnonotidae**	f	Omnivorous
67.	Brown Woodland Warbler	*Phylloscopus umbrovirens*	**Sylviidae**	F	Insectivorous
68.	Black-lored Babbler	*Turdoides sharpei*	**Timaliidae**	f	Insectivorous
69.	Greater Blue-eared Starling	*Lamprotornis chalybaeus*	**Sturnidae**	f	Insectivorous
70.	Superb Starling	*Lamprotornis superbus*	**Sturnidae**	f	Insectivorous
71.	Hildebrandt's Starling	*Lamprotornis hildebrandti*	**Sturnidae**	f	Insectivorous
72.	Violet-backed Starling	*Cynniricinclus leucogaster*	**Sturnidae**	F, AM	Insectivorous
73.	Red-billed Oxpecker	*Buphagus erythrorhynchus*	**Sturnidae**	f	Insectivorous
74.	Yellow-billed Oxpecker	*Buphagus africanus*	**Sturnidae**	f	Insectivorous
75.	Olive Thrush	*Turdus olivaceus*	**Turdidae**	f	Insectivorous

76.	Cape Robin Chat	*Cossypha caffra*	**Muscicapidae**	f	Insectivorous
77.	Rüppell's Robin Chat	*Cossypha semirufa*	**Muscicapidae**	f	Insectivorous
78.	Spotted Palm Thrush	*Cichladusa guttata*	**Muscicapidae**	f	Insectivorous
79.	Common Stonechat	*Saxicola torquatus*	**Muscicapidae**	f	Insectivorous
80.	Northern Anteater Chat	*Myrmecocichla aethiops*	**Muscicapidae**	f	Insectivorous
81.	White-eyed Slaty Flycatcher	*Melaenornis fischeri*	**Muscicapidae**	f	Insectivorous
82.	African Dusky Flycatcher	*Muscicapa adusta*	**Muscicapidae**	f	Insectivorous
83.	Amethyst Sunbird	*Chalcomitra amethystina*	**Nectariniidae**	f	Nectivorous
84.	Bronze Sunbird	*Nectarinia kilimensis*	**Nectariniidae**	f	Insectivorous
85.	Red-chested Sunbird	*Cinnyris erythrocercus*	**Nectariniidae**	f	Insectivorous
86.	Variable Sunbird	*Cinnyris venustus*	**Nectariniidae**	f	Insectivorous
87.	White-browed Sparrow Weaver	*Plocepasser mahali*	**Passeridae**	f	Insectivorous
88.	Kenya Rufous Sparrow	*Passer rufocinctus*	**Passeridae**	f	Granivorous
89.	Grey-headed Sparrow	*Passer griseus*	**Passeridae**	f	Granivorous
90.	Grosbeak Weaver	*Amblyospiza albifrons*	**Ploceidae**	f	Omnivorous
91.	Baglafecht Weaver	*Ploceus baglafecht*	**Ploceidae**	f	Omnivorous
92.	Northern Masked Weaver	*Ploceus taeniopterus*	**Ploceidae**	f	Omnivorous
93.	Yellow Bishop	*Euplectes capensis*	**Ploceidae**	f	Granivorous
94.	Long-tailed Widowbird	*Euplectes progne*	**Ploceidae**	f	Granivorous
95.	Common Waxbill	*Estrilda astrild*	**Estrildidae**	f	Granivorous
96.	Red-cheeked Cordon-bleu	*Uraeginthus bengalus*	**Estrildidae**	f	Granivorous
97.	Purple Grenadier	*Granatina ianthinogaster*	**Estrildidae**	f	Granivorous
98.	Red-billed Firefinch	*Lagonosticta senegala*	**Estrildidae**	f	Granivorous
99.	African Firefinch	*Lagonosticta rubricata*	**Estrildidae**	f	Granivorous
100	Bronze Mannikin	*Spermestes cucculatus*	**Estrildidae**	f	Granivorous
101	Pin-tailed Whydah	*Vidua macroura*	**Viduidae**	f	Granivorous

102	Eastern Paradise Whydah	*Vidua paradisaea*	**Viduidae**	f	Granivorous
103	African Pied Wagtail	*Motacilla aguimp*	**Motacillidae**	f	Insectivorous
104	Yellow-throated Longclaw	*Macronyx croceus*	**Motacillidae**	f	Insectivorous
105	Reichenow's Seedeater	*Crithagra reichenowi*	**Fringillidae**	f	Granivorous
106	White-bellied Canary	*Crithagra dorsostriata*	**Fringillidae**	f	Granivorous
107	Brimstone Canary	*Crithagra sulphurata*	**Fringillidae**	f	Granivorous
108	Streaky Seedeater	*Crithagra striolata*	**Fringillidae**	f	Granivorous
109	Cinnamon-breasted Bunting	*Emberiza tahapisi*	**Emberizidae**	f	Granivorous

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CHAPTER 3: PLANTS

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Abstract

A Botanical survey was conducted from 5th to 9th, August 2015 at Ol Ari Nyiro, Laikipia Nature Conservancy. The sites studied were Engelesha forest, Mlima Kisu, Kutwa, Sambara, LuggaTunkuri. A total of 21 species were recorded as new to the existing plant list with *Cayratia ibuensis* being recorded for the first time in the K3 floral region. Other species such as *Bowiea volubilis* and *Aristea abyssinica* were recorded in the area for the first time in near half a century.

In spite of the widespread cattle invasion in the conservancy as a result of illegal grazing, the area is emerging as a biodiversity hotspot considering it's the only known home to the endemic *Aloe francombei* and now the first place in K3 floral region to record species such as *C. ibuensis* (Aug., 2015) and *Raphionacme flanaganii* (Nov., 2014).

Methods

A plot-less method as developed by Hall and Swaine (1981) and used in modification by Mwachala, *et al.* (2004) was used to record the plant species.

Vascular plant species not encountered in the previous surveys were recorded and specimens collected using standard methods (Foreman & Bridson, 1992). Some plant species were identified on site whereas the difficult and unique ones were collected for confirmation at the East African Herbarium. Identification of indigenous vascular plants followed Agnew and Agnew (1994), Beentje (1994) and the FTEA (Various publications). The recorded plant list was compared with the existing plant checklists to check for the new records for the study area.

Results and discussions

New records

A total of 21 species were recorded as new to the existing plant list of OAN (Table 1). These were mainly in Sambara, Mlima Kisu and Kutwa. One species, *Cayratia ibuensis*, belonging to the Grapes family (Vitaceae) was recorded for the first time in K3 Floral region where the conservancy is located (see appendix 1 for the floral regions).

Two other new records to the list were recollected in the floral region after nearly 50 years since the last collection was made. Based on the general distribution, they seem to occur in a wide geographical area including countries outside Kenya (based on the Flora of Tropical East Africa) as follows;

i. *Bowiea volubilis* subspecies *volubilis* – U1; K3, 4, 6; T1-3, 7; Malawi, Mozambique, Zimbabwe, Angola and South Africa.
ii. *Aristea abyssinica* – U1-3; K1-3, 5; T 2-4, 6, 7; Nigeria, Cameroon, Ethiopia, DR Congo, Zambia, Malawi, Zimbabwe, Swaziland and South Africa.

However, from herbarium specimens previously collected in K3 floral region alone, *B. volubilis* was collected in Endebess (1946) and Churo (2014); excluding the latest collection from OAN (2015). *A. abyssinica* was collected in Kinangop (1930 & 1933), Ol Joro Orok (1932), Trans Nzoia (1957), Molo (1960) and Mt. Elgon (1967).

Previous collections of the two species based on EA records have been made further away from OAN/LNC. From K3, the current record of *A. abyssinica* is the most recent since 1967 while *B. volubilis* is the third specimen at EA herbarium and thus makes the Conservancy indeed a Key Biodiversity Area (KBA)!

Cayratia ibuensis

Bowiea volubilis

Aristea abyssinica

Table 1: List of the new species to the OAN plant list, August 2015

Family	Genus	Species	Author1	rank 1	sp2	Site
1. Acanthaceae	*Justicia*	*anagalloides*	T.Anderson			Sambara
2. Apocynaceae	*Marsdenia*	*schimperi*				Engelesha
3. Compositae	*Senecio*	*ruwenzoriensis*	S.Moore			Mlima Kisu
4. Compositae	*Sonchus*	*oleraceus*	L.			Engelesha
5. Convolvulaceae	*Ipomoea*	sp.1				Sambara
6. Convolvulaceae	*Ipomoea*	sp.2				Sambara
7. Cyperaceae	*Fuirena*	sp.				Lugga Tonkuli
8. Cyperaceae	*Scleria*	*bulbifera*	Hochst. ex A.Rich.			Engelesha
9. Fabaceae	*Caesalpinia*	sp.				Kutwa
10. Fabaceae	*Rhynchosia*	*resinosa*	(A.Rich.) Baker			Kutwa
11. Gentianaceae	*Sebaea*	*pentandra*	E.Mey.	var.	*burchellii*	Lugga Tonkuli
12. Geraniaceae	*Pelargonium*	*alchemilloides*	A.Rich.	ssp.	*multibracteatum*	Lugga Tonkuli
13. Hyacinthaceae	*Bowiea*	*volubilis*	Hook.	ssp.	*volubilis*	Sambara
14. Hyacinthaceae	*Drimia*	*altissima*	(L.f.) Ker Gawl.			Kutwa
15. Iridaceae	*Aristea*	*abyssinica*	Pax			Sambara
16. Labiatae	*Ocimum*	*lamiifolium*	Benth.			Engelesha
17. Leguminosae	*Tephrosia*	*linearis*	(Willd.) Pers.			Sambara
18. Primulaceae	*Asterolinon*	*adoense*	Kunze			Sambara
19. Scrophulariaceae	*Alectra*	*sessiliflora*	(Vahl) Kuntze			Mlima Kisu
20. Scrophulariaceae	*Orobanche*	*minor*	Sm.			Kutwa & Sambara
21. Vitaceae	*Cayratia*	*ibuensis*	(Hook.f.) Suess.			Kutwa

Conclusion and recommendations

Although biodiversity surveys have been conducted since 2008 at Ol Ari Nyiro, Laikipia Nature Conservancy, the last two (2) surveys have revealed more new plant records than previously. This means that the plant checklist is not yet fully realized. The western side of the conservancy seems to record more species to the list as opposed to other sites sampled. This may be attributed to the numerous valleys which make the place difficult to access and thus may not have been adequately studied before.

Rampant illegal cattle grazing continues to present a serious threat to biodiversity of the conservancy with thousands of livestock trampling on herbaceous and other vegetation and in some cases wiping out plants on the periphery of water reservoirs as observed during the current study. A lasting solution to this threat is urgently required to save important species at the risk of being lost even before they are documented in science.

It is recommended that more surveys be conducted in future during the wet and dry seasons focussing mainly on the areas of Sambara, Kutwa, Mlima Kisu and other areas towards Lake Baringo.

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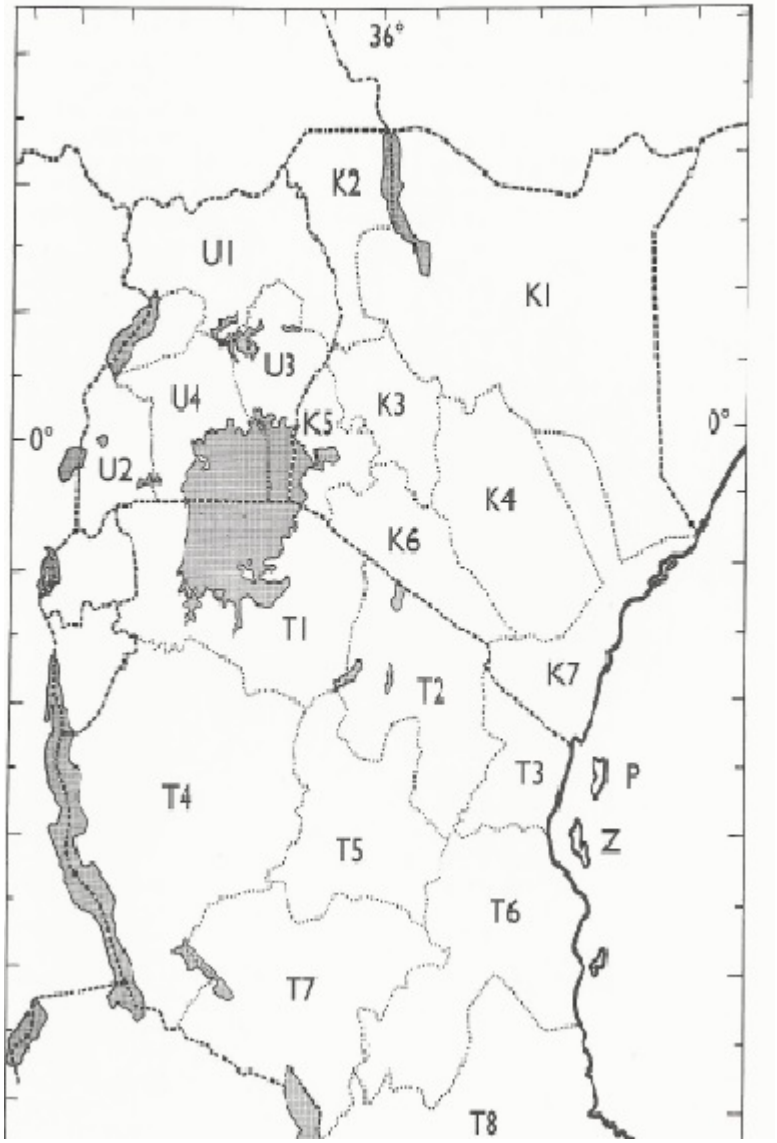
Appendix 1: Geographical Division of the Floral Regions of East Africa



CHAPTER 4: INVERTEBRATES

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Abstract

This survey formed part of annual update of the OAN-LNC invertebrates' checklist. The exercise was carried out between 5th and 9th August 2015. Different habitats were sampled including; Engelesha Forest, Kutwa, Mlima Kisu, Sambara and Lugga Tunkuri. Various sampling methods were used to collect and record invertebrates including pantraps for pests and pollinators, sweep-netting and direct searches for general detection of invertebrates. This study documented seven (7) new species to the OAN-LNC invertebrates checklist namely; three (3) true bugs (Hemiptera), two (2) grasshoppers (Orthoptera), one (1) scorpion and one (1) cockroach. Heavy livestock grazing was observed in various habitats mostly in the Kutwa area.

Introduction

Today, due to accelerating rates of resource exploitation and habitat disturbance, natural ecosystems are being faced with a biodiversity crisis. Human activities are reducing the abundance and distribution of wild populations of plants and animals, henceforth driving species to extinction. The continued loss of biodiversity will cause disruptions to ecosystem functioning, which in-turn may limit their ability to supply essential services (Bengtsson *et al*., 2002) in Ol Ari Nyiro and the surrounding areas are of no exception. The conservancy is amongst the remnant protected landscapes in northern Kenya and is a refuge for several species of flora and fauna some of which are only known from small isolated populations.

The surrounding local communities depend on these ecosystems' natural resources for survival although excessive pressures and unsustainable utilization of the resources may lead to adverse loss and disappearance of the current flourishing flora and fauna. Invertebrates are one of the natural resource in the ecosystem and formed part of the component in establishing and assessing the biodiversity in Ol Ari Nyiro Conservancy in the current study. Invertebrates, although largely ignored comprise a very important component of biodiversity and contribute valuable insights in conservation planning. Many recent studies have considered the potential of invertebrates as reliable indicators of disturbance and degradation in terrestrial systems (Rodriguez *et al*. 1998). Terrestrial invertebrates are prevalent, have high species diversity, are easy to sample, and are important in ecosystem function (Rosenberg *et al*. 1986). They respond to environmental changes more rapidly than vertebrates and can provide early detection of ecological changes (Kremen *et al.* 1993). They also have diverse values in natural environments that including roles as decomposers, predators, parasites, herbivores, and pollinators, and these ecological functions may be negatively affected without intertebrates. More so, several species of invertebrates are important in the socio-economic development of people in enterprises such as agriculture, apiculture, sericulture and butterfly farming among others (Raina *et al.,* 2011) and can be

utilized by local communities in improving their livelihoods in a bid help to curb human-wildlife conflicts.

Invertebrates populations are currently declining due to reduction and conversion of their natural ecosystems into farmlands or other man made facilities. In order to stop this trend, a strong biodiversity conservation component which in-cooperates both local capacity building and community participation based on incentives through diversification of livelihood options is required. This will need to operate within a supportive enabling environment at local and higher levels requiring an investment into biodiversity research, policy support, institutional strengthening and creation of awareness to allow informed decision making and implementation of the required interventions.

Invertebrates sampling Methods

Three methods were employed in the study of invertebrates, these were; timed sweep-netting, pan-trapping and timed direct searches on the five selected sampling sites within the Ol Ari Nyiro, Laikipia Nature Conservancy.

Timed Sweep-netting

This method entailed trapping invertebrates (mostly insects) using a sweep net for fixed periods of time between 10:00am and 12:00 noon (the best time when most of the flying insects become active and begin feeding) along the open paths of the selected sampling sites. The collected specimens were euthanized and carefully kept in well labeled butterfly envelopes and specimen vials containing 70% ethanol. Some of the specimens were identified in the field using reference guide books while the rest were taken to the laboratory for further reference and identification.

Pan trapping

Pan traps were mainly used to collect pollinators such bees and some species of beetles and flies. The traps used were small bowls of different colors including, yellow, blue, pink and white to mimic flowers. Twenty bowls were spread randomly along the open paths in every site and half-filled with water mixed with odourless detergent. The bowls /traps were inspected every evening to harvest trapped insects which were put in well labeled vials containing 70% ethanol.

Timed direct searches

This entailed searching for invertebrates in the suitable hidings within fixed periods. Collected samples were well preserved and stored for further identification using reference collection at NMK.

Results and Discussion

This survey documented 139 species of invertebrates out of which 7 species are new records to OAN/LNC checklist. Among the recorded species are 66 species of butterflies (Order Lepidoptera), 11 species of bees, 10 species of wasps, 5 species of ants (Order Hymenoptera), 8 species of bugs (Order Hemiptera), 4 species of dragon fly and1 damselfly (Order Odonata), 9 species of flies (Order Diptera), 8 species of beetles (Order Coleoptera), 3 species of cockroaches (Order Blattodea) 11 species of grasshoppers (Order Orthoptera), 1 species of termite (Order Isoptera), 1 species of scorpion (Order Scorpiones) and 1 species of snail.

Species cumulative curve

Figure 1 presents the overall species cumulative curve for the entire sampling period in all sites. The analysis was based on consecutive inclusion of the newly collected species to the checklist every year since pre-2008 sampling all through to August 2015. The curve is in gradual elevation and this suggests that more new species to the checklist could probably be encountered in subsequent surveys.

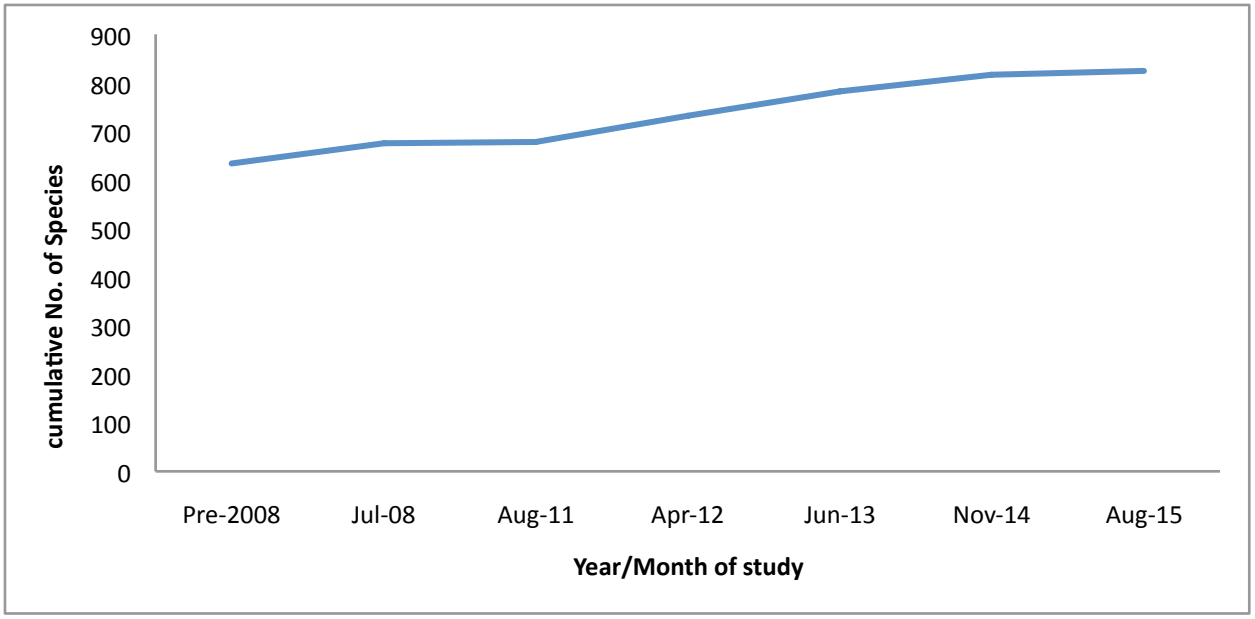

Figure 1: Species cumulative curve

Species Composition for Butterflies

A total of **66** species of butterflies comprising of five families (Nymphalidae, Pieridae, Papilionidae, Lycaenidae and Hesperiidae) in decreasing order by species composition were collected over the current study period. This presents 39% of butterfly species currently in the LNC checklist. Engelesha forest had the highest number of butterfly species (24) whilst Mlima kisu had the least (12) species (Fig.2).

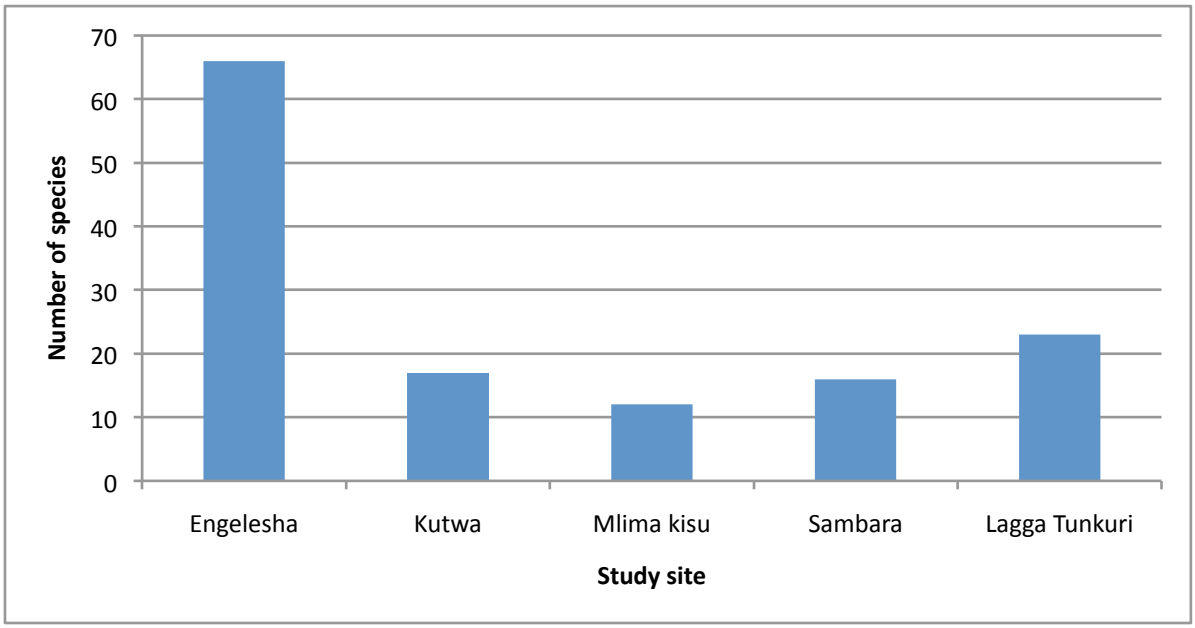

Figure 2: Butterflies species composition amongst different sampled sites

Species composition for all invertebrates

A comparison for invertebrates species composition within the sampled sites showed that butterflies (Order Lepidoptera) had the highest number of species followed by bees,wasps and ants (Order Hymenoptera) whilst termites (Order Isoptera) and scorpions (Order Scorpiones) recorded the least number of species. Figure 3 provides the species composition for each invertebrates order.

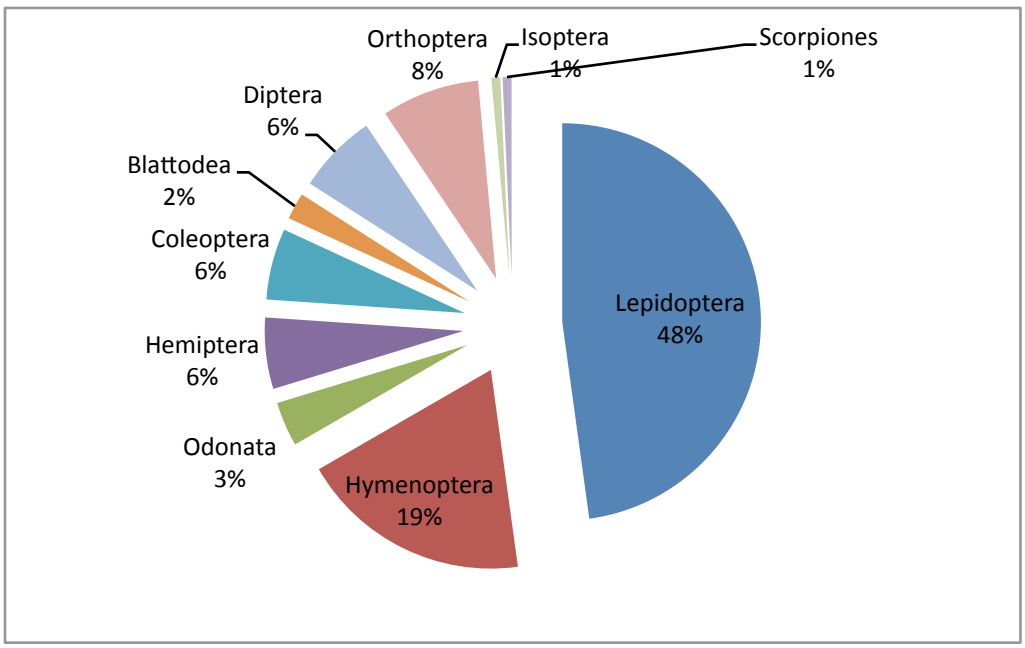

Figure 3: Species composition for general invertebrates cummunities

New records to the checklist

This survey documented seven (7) invertebrates species which are new to the current LNC checklist (Table 2). These included; three (3) true bugs (Hemiptera), two (2) grasshoppers (Orthoptera), one (1) scorpion and one (1) cockroach**.**

Table 2: New records to LNC checklist, August 2015

Order	Family	Genus	species	Engelesha	Kutwa	Mlima Kisu	Sambara	Lagga Tunkuri
Orthoptera	Acrididae	*Acrotylus*	*sp*	0	0	1	0	0
Orthoptera	Acrididae	*Tmetonota*	*sp*	0	1	1	1	1
Scorpionida	Hemiscorpiidae	*Lomachus*	*sp*	0	0	0	0	1
Blattodea	Blattidae	*Deropeltis*	*sp*	0	0	0	0	1
Hemiptera	Reduviidae	*Ectomocoris*	*fenetratus*	0	0	1	0	0
Hemiptera	Reduviidae	*Phonoctus*	*fasciatus*	0	1	0	0	0
Hemiptera	Reduviidae	*Rhinocoris*	*sp*	0	0	1	0	0

Table 3 List and distribution of Invertebrates documented in August 2015 survey

Order	Family	Genus	species	Engelesha	Kutwa	Mlima Kisu	Sambara	Lugga Tunkuri
Lepidoptera	Hesperidae	*Zenonia*	*zeno*	1	0	0	0	1
Lepidoptera	Lycaenidae	*Actizera*	*stellata*	1	1	0	0	1
Lepidoptera	Lycaenidae	*Freyeria*	*trochylus*	1	1	0	0	1
Lepidoptera	Lycaenidae	*Zizula*	*hylax*	1	0	0	0	1
Lepidoptera	Lycaenidae	*Azanus*	*natalensis*	1	0	0	0	1
Lepidoptera	Lycaenidae	*Cupidopsis*	*iobates*	1	0	0	1	0
Lepidoptera	Lycaenidae	*Leptotes*	*pirithous*	1	0	0	0	1
Lepidoptera	Lycaenidae	*Azanus*	*morigua*	1	1	0	0	0
Lepidoptera	Lycaenidae	*Euchrysops*	*brunneus*	1	0	0	0	0
Lepidoptera	Lycaenidae	*Euchrysops*	*osiris*	1	0	0	0	0
Lepidoptera	Lycaenidae	*Lepidochrysops*	*elgonae*	1	0	0	0	0

Lepidoptera	Lycaenidae	*Anthene*	*amarah*	1	1	0	1	0
Lepidoptera	Lycaenidae	*Anthene*	*pitmani*	1	0	0	1	0
Lepidoptera	Lycaenidae	*Anthene*	*indefinita*	1	0	0	1	0
Lepidoptera	Nymphalidae	*Acraea*	*eponina*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Acraea*	*encedon*	1	1	1	1	1
Lepidoptera	Nymphalidae	*Catacroptera*	*cloanthe*	1	1	0	0	0
Lepidoptera	Nymphalidae	*Phalanta*	*phalantha*	1	1	0	0	0
Lepidoptera	Nymphalidae	*Vanessa*	*cardui*	1	0	0	0	1
Lepidoptera	Nymphalidae	*Neptis*	*penningtoni*	1	0	0	0	1
Lepidoptera	Nymphalidae	*Neptis*	*saclava*	1	0	0	0	1
Lepidoptera	Nymphalidae	*Junonia*	*oenone*	1	1	1	1	1
Lepidoptera	Nymphalidae	*Junonia*	*hierta*	1	1	0	0	1
Lepidoptera	Nymphalidae	*Junonia*	*terea*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Junonia*	*sophia*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Precis*	*limnoria*	1	0	0	0	1
Lepidoptera	Nymphalidae	*Precis*	*archesia*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Hamanumida*	*daedalus*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Charaxes*	*candiope*	1	0	0	0	1
Lepidoptera	Nymphalidae	*Henotesia*	*perspicua*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Bicylus*	*safitza*	1	1	1	0	1
Lepidoptera	Nymphalidae	*Danaus*	*chrysippus*	1	1	0	0	0
Lepidoptera	Nymphalidae	*Antanartia*	*dimorphica*	1	0	1	0	0
Lepidoptera	Nymphalidae	*Hypolimnas*	*dinarcha*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Melanitis*	*leda*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Hamanumida*	*daedalus*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Danaus*	*chrysippus*	1	1	1	1	0
Lepidoptera	Nymphalidae	*Bicyclus*	*safitza*	1	0	1	0	1
Lepidoptera	Nymphalidae	*Henotesia*	*perspicua*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Charaxes*	*candiope*	1	0	0	0	1
Lepidoptera	Nymphalidae	*Precis*	*limnoria*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Precis*	*archesia*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Catacroptera*	*cloanthe*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Phalanta*	*phalantha*	1	0	1	0	0
Lepidoptera	Nymphalidae	*Neptis*	*penningtoni*	1	0	0	0	0
Lepidoptera	Nymphalidae	*Neptis*	*saclava*	1	0	0	0	0
Lepidoptera	Papilionidae	*Papilio*	*demodocus*	1	1	1	1	1
Lepidoptera	Papilionidae	*Papilio*	*nireus*	1	0	0	0	0
Lepidoptera	Papilionidae	*Papilio*	*dardanus*	1	0	0	0	0
Lepidoptera	Papilionidae	*Papilio*	*nobilis*	1	0	0	0	0
Lepidoptera	Pieridae	*Mylothris*	*jacksoni*	1	0	0	0	0
Lepidoptera	Pieridae	*Leptosia*	*alcesta*	1	0	0	0	0

Lepidoptera	Pieridae	*Dixeia*	*spilleri*	1	0	0	0	0
Lepidoptera	Pieridae	*Belenois*	*creona*	1	0	0	0	0
Lepidoptera	Pieridae	*Belenois*	*zochalia*	1	1	1	1	1
Lepidoptera	Pieridae	*Belenois*	*aurota*	1	0	0	0	0
Lepidoptera	Pieridae	*Colotis*	*hataera*	1	0	0	1	0
Lepidoptera	Pieridae	*Colotis*	*aurigineus*	1	0	0	1	0
Lepidoptera	Pieridae	*Colotis*	*entevippe*	1	1	1	1	1
Lepidoptera	Pieridae	*Colotis*	*euippe*	1	0	0	0	0
Lepidoptera	Pieridae	*Colotis*	*eris*	1	0	0	0	0
Lepidoptera	Pieridae	*Colias*	*electo*	1	0	0	1	0
Lepidoptera	Pieridae	*Catopsilia*	*florella*	1	1	1	1	1
Lepidoptera	Pieridae	*Eurema*	*brigitta*	1	1	0	1	1
Lepidoptera	Pieridae	*Eurema*	*floricola*	1	0	1	0	1
Lepidoptera	Pieridae	*Eurema*	*hecabe*	1	0	0	1	0
Hymenoptera	Anthophoridae	*Anthophora*	*sp*	1	0	0	0	0
Hymenoptera	Anthrophoridae	*Amegila*	*torrida*	1	0	0	0	1
Hymenoptera	Anthophoridae	*Mesotrichia*	*flavorufa*	1	0	0	0	1
Hymenoptera	Apidae	*Apis*	*mellifera*	1	1	1	1	1
Hymenoptera	Apidae	*Xylocopa*	*caffra*	1	1	0	0	1
Hymenoptera	Apidae	*Ceratini*	*sp*	1	0	0	0	0
Hymenoptera	Apidae	*Ceratini*	*nasalis*	1	0	0	0	0
Hymenoptera	Apidae	*Amegilla*	*sp*	1	0	0	0	1
Hymenoptera	Apidae	*Meliponula*	*bocandei*	1	0	0	0	0
Hymenoptera	Megachilidae	*Chalicodoma*	*felina*	1	0	0	0	0
Hymenoptera	Halictidae	*Halictus*	*sp*	1	0	1	0	1
Hymenoptera	Pompilidae	*Pompilus*	*plumbeus*	1	0	1	0	1
Hymenoptera	Pompilidae	*Cyphononyx*	*bretoni*	0	0	0	0	1
Hymenoptera	Scolidae	*Scolia*	*sp*	1	0	1	0	1
Hymenoptera	Mutilidae	*Dasylabris*	*signaticeps*	1	0	0	0	0
Hymenoptera	Sphecidae	*Ammophila*	*punctaticeps*	1	0	0	0	0
Hymenoptera	Sphecidae	*Scheliphron*	*quartinae*	1	0	1	0	1
Hymenoptera	Sphecidae	*Cerceris*	*rufiscutis*	1	0	0	0	0
Hymenoptera	Sphecidae	*Micreumenes*	*glaber*	0	0	0	0	1
Hymenoptera	Eumenidae	*Synagris*	*negusi*	1	0	0	0	0
Hymenoptera	Vespidae	*Polistes*	*marginalis*	1	0	0	0	0
Hymenoptera	Fomicidae	*Camponotus*	*maculatus*	0	0	1	0	1
Hymenoptera	Fomicidae	*Polyrhachis*	*gagates*	0	0	0	0	1
Hymenoptera	Fomicidae	*Crematogaster*	*sp*	0	0	0	0	1
Hymenoptera	Fomicidae	*Messor*	*cephalotes*	0	0	0	0	0
Hymenoptera	Fomicidae	*Dorylus*	*sp*	0	0	0	0	0
Odonata	Coenagoronidae	*Pseudagrion*	*kersteni*	1	0	0	0	1
Odonata	Libellulidae	*Crocothemis*	*sanguinolenta*	1	0	0	0	0

Odonata	Libellulidae	*Trithemis*	*arteriosa*	1	0	0	0	1
Odonata	Libellulidae	*Trithemis*	*furva*	0	0	0	0	1
Odonata	Libellulidae	*Palpopleura*	*sp*	0	0	0	0	1
Hemiptera	Miridae	*Stenotus*	*sp*	0	0	0	0	1
Hemiptera	Scutelleridae	*Callidea*	*sp*	0	0	0	0	1
Hemiptera	Pyrhocoridae	*Dysdercus*	*sp*	0	0	0	0	1
Hemiptera	Nepidae	*Laccotrephes*	*sp*	0	0	0	0	1
Hemiptera	Pentatomidae	*Solenosthethium*	*liligerum*	1	0	0	0	0
Coleoptera	Hispidae	*Dactylispa*	*sp*	1	0	0	0	0
Coleoptera	Cerambycidae	*Blepisanis*	*coerulea*	1	0	0	0	0
Coleoptera	Curculionidae	*Nematocerus*	*marginalis*	0	0	0	0	1
Coleoptera	Gyrinidae	*Aulonogyrus*	*sp*	0	0	0	0	1
Coleoptera	Coccinelidae	*Cheilomenes*	*sp*	1	0	0	0	1
Coleoptera	Melyridae	*Idgia*	*fulvicollis*	1	0	0	0	1
Coleoptera	Hispidae	*Dactylispa*	*sp*	0	0	0	0	1
Coleoptera	Staphylinidae	*Paederus*	*sabaeus*	0	0	0	0	1
Blattodea	Blattidae	*Pseudoderopeltis*	*sp*	0	0	0	0	1
Blattodea	Blaberidae	*Oxyhaloa*	*sp*	0	0	0	0	1
Diptera	Culcidae	*Culex*	*sp*	0	0	0	0	1
Diptera	Syrphidae	*Ischiodon*	*sp*	0	0	0	0	1
Diptera	Muscidae	*Musca*	*domestica*	1	1	1	1	1
Diptera	Muscidae	*Stomoxys*	*sp*	1	0	0	0	1
Diptera	Anthomyidae	*Anthomyia*	*sp*	1	0	0	0	1
Diptera	Diopsidae	*Diopsis*	*sp*	1	0	0	0	1
Diptera	Glossinidae	*Glossina*	*sp*	1	0	0	0	1
Diptera	Sarcophagidae	*Sarcophaga*	*sp*	1	0	0	0	1
Diptera	Calliphoridae	*Chrysomya*	*sp*	1	0	0	0	1
Isoptera	Termitidae	*Odontotermis*	*sp*	0	0	0	0	1
Orthoptera	Acrididae	*Acanthacris*	*ruficornis*	0	0	0	0	1
Orthoptera	Acrididae	*Gastrimargus*	*verticalis*	0	0	0	1	0
Orthoptera	Acrididae	*Ailopus*	*sp*	0	0	0	1	0
Orthoptera	Acrididae	*Truxalis*	*sp*	1	0	0	1	0
Orthoptera	Acrididae	*Gymnobothrus*	*sp*	0	0	0	1	0
Orthoptera	Tettigonidae	*Phaneroptera*	*sp*	0	0	0	1	0
Orthoptera	Gryllidae	*Gryllus*	*sp*	1	1		1	1
Orthoptera	Gryllidae	*Gryllus*	*bimaculatus*	0	0	0	0	0
Orthoptera	Pyrgomorphidae	*Phymateus*	*sp*	0	1	1	0	0
Gastropoda	Planorbidae	*Bullinus*	*forskali*	0	0	0	0	1
Orthoptera	Acrididae	*Acrotylus*	*sp*	0	0	1	0	0
Orthoptera	Acrididae	*Tmetonota*	*sp*	0	1	1	1	1
Scorpionida	Hemiscorpiidae	*Lomachus*	*sp*	0	0	0	0	1
Blattodea	Blattidae	*Deropeltis*	*sp*	0	0	0	0	1
Hemiptera	Reduviidae	*Ectomocoris*	*fenetratus*	0	0	1	0	0

Hemiptera	Reduviidae	*Phonoctus*	*fasciatus*	0	1	0	0	0
Hemiptera	Reduviidae	*Rhinocoris*	*sp*	0	0	1	0	0

Table 3: **Updated comprehensive Invertebrates species checklist 2008-August 2015**

	BIOLOGICAL NAME	COMMON NAME	IUCN STATUS	Pre 2008	2008(July)	2011 (Aug)	2012 (April)	2013 (June-July)	Nov-2014	2015Aug)
	ARTHROPODA	**ARTHROPODS**								
	COLLEMBOLA	**SPRINGTAILS**								
	DIPLURA	**DIPLURANS**								
	THYSANURA	**SILVERFISH & BRISTLETAILS**								
	INSECTA	**INSECTS**								
	EPHEMEROPTERA	**MAYFLIES**								
	Heptageniidae									
	Afronurus sp.						x			
	Afronurus harrisoni		NE					x		
	Baetidae									
	Baetidae sp.1						x			
	Baetis harrisoni		NE					x		
	Caenidae									
	Caenidae sp.1						x			
	Caenis sp							x		
	Telagonidae									
	Telagonidae sp							x		
	TRICHOPTERA									
	Parecnomina sp							x		
	ODONATA	**DRAGONFLIES & DAMSELFLIES**								
	ZYGOPTERA	**DAMSELFLIES**								
	Chlorocyphidae	**Jewels**								
	Platycypha caligata	Booted Dancing-Jewel	LC	x			x	x	x	

				x						
	Lestidae	**Spreadwings**		x						
	Lestes virgatus	Smoky Spreadwing	LC	x						
				x						
	Synlestidae/Chlorolestidae	**Malachites**		x						
	Chlorolestes elegans	Elegant Malachite	NT	x						
				x						
	Coenagrionidae	**Pond Damsels**		x						
	Africallagma glaucum	Swamp Bluet	LC	x						
	Enallagma glaucum		LC	x						
	Ischnura senegalensis	Marsh Bluetail	LC	x						
	Pseudagrion hageni	Painted Sprite (Green Form)	LC	x			x			
	Pseudagrion kersteni	Powder-striped Sprite	LC	x			x	x		x
	ANISOPTERA	**DRAGONFLIES**								
	Gomphidae	**Clubtails**		x						
	Paragomphus elpidius	Corkscrew Hooktail	LC	x						
	Paragomphus sp							x		
	Aeshinidae									
	Anax imperator	Blue Emperor	LC	x			x	x	x	
				x						
	Libellulidae	**Skimmers**		x						
	Brachythemis leucosticta	Banded Groundling	LC	x			x	x		
	Colatogomphus pictus		NE	x						
	Crocothemis erythraea	Common Scarlet Darter	LC	x						
	Crocothemis sanguinolenta	Slim Scarlet-Darter	LC	x				x		x
	Henistigma albipuncta	Pied-spot	LC	x						
	Orthetrum Julia	Julia Skimmer	LC	x			x	x		
	Orthetrum sp.1						x			
	Orthetrum sp.2						x			
	Palpopleura jucunda	Yellow Widow	LC	x						
	Palpopleura lucia	Lucia Widow	LC	x				x		x
	Palpopleura portia		LC	x			x			
	Pantala flavescens	Wandering Glider	LC	x				x		
	Trithemis arteriosa	Red-veined Dropwing	LC	x			x	x		x
	Trithemis furva	Dark Dropwing	LC	x			x	x		x
	Trithemis pruinata		LC	x						
	Trithemis stictica	Jaunty Dropwing	LC	x			x			
	Urothemis assignata	Red Basker	LC	x				x		
	Nesciothemis farinose		LC				x			

	BLATTODEA	**COCKROACHES**								
				x						
	Blattidae			x						
	Deropeltis mossambica								x	
	Pseudoderopeltis albilatena	Orange-shouldered Cockroach	NE	x						
	Pseudoderopeltis sp			x				x		x
	Periplaneta Americana	American/Common Cockroach	NE	x					x	
	Deropeltis sp									
				x						
	Blatellidae			x						
	Blatella germanica	German Cockroach	NE	x					x	
	Aptera sp.				x					
	Periplaneta petrophila								x	
				x						
	Blaberidae			x						
	Oxyhaloa deusta		NE	x				x		x
	Lexta sp.						x			
	ISOPTERA	**TERMITES**								
				x						
	Termitidae			x						
	Macrotermes natalensis	Large Fungus-growing Termite	NE	x						
	Macrotermes sp.				x					
	Odontotermes badius	Common Fungus-growing Termite	NE	x			x			x
	MANTODEA	**MANTIDS**								
	Hymenopodidae	**Flower Mantids**								
	Golinthias amoena		NE	x						
	Oxypiloidea tridens		NE	x						
	Phyllocrania paradoxa	Leaf Mantid	NE	x						
	Pseudocreobotra wahlbergi	Eyed-flower Mantid	NE	x						
	Mantidae	**Common Mantids**								
	Compsothespis sp				x					
	Epioscopomantis chalybea		NE	x						
	Metentella meruensis		NE	x						
	Miomantis sp			x						

	Polyspilota aeruginosa		NE	x						
	Popa sp				x					
	Sphodromantis gastrica	Giant/Common Green Mantid	NE	x						
	Tarachodes sp	Bark Mantid		x	x					
	PHASMATODEA	**STICK INSECTS**								
	Phasmatidae			x						
	Leptinia graminea	Grass Stick Insect	NE	x				x		
	Palophus veyi	Giant Stick Insect	NE	x						
	DERMAPTERA	**EARWIGS**								
	Labiduridae	**Long-horned Earwigs**								
	Labidura riparia		NE	x						
				x						
	Forficulidae	**Common Earwigs**		x						
	Forficula senegalensis		NE	x						
	PLECOPTERA	**STONEFLIES**								
	Perlidae									
	Neoperla kunensis		NE	x			x	x	x	
	ORTHOPTERA	**GRASSHOPPERS,LOCUSTS&CRICKETS**								
	Gryllatalpidae	**Mole Crickets**		x						
	Gryllotalpa Africana		NE	x						
	Tettigonidae	**Katydids, Bush Crickets & Long-horned Grasshoppers**		x						
				x						
	Melidea brunneri	Leaf Katydid	NE	x						
	Phaneroptera sparsa	Leaf Katydid	NE	x				x		x
	Terpnistria zebrata	Acacia Katydid	NE	x						
	Tylopis sp	Grass Katydid		x						
	Gryllidae	**Crickets**								
	Gryllus bimaculatus	Common Garden Cricket	NE	x						x
	Gryllus xanthoneurus		NE	x				x		
	Gryllulus sp						x			x
	Macrogryllus consocius			x						
	Phlaeoacris sp			x						

	Platygryllus primiformis		NE	x						
	Teleogryllus sp			x						
	Pyrgomorphidae	**Foam & Lubber Grasshoppers**								
	Chrotognus sp.				x					
	Phymateus morbillosus	Common Milkweed Locust	NE	x				x		
	Phymateus viridipes	Green Milkweed Locust	NE	x					x	x
	Taphronota stali			x						
	Zonocerus elegans	Elegant Grasashopper		x						
	Pamphagidae									
	Lamarckiana sp	Rain Locust		x						
				x						
	Acrididae	**Short-horned Grasshoppers/Locusts**		x						
	Acanthacris ruficornis	Garden Locust	NE	x					x	
	Acanthacris sp.				x					
	Acrida acuminate	Common Stick Grasshopper		x						
	Ailopus sp		NE	x				x		x
	Cantanops humeralis		NE	x						
	Coryphosima stenoptera		NE	x						
	Cyrtocanthacris tartarica		NE	x				x		
	Gasrimargus sp			x						x
	Gymnobothrus temporalis flexuasa		NE	x						
	Gymnobothrus temporalisii		NE	x				x		x
	Heteropternis thoracica		NE	x						
	Humbe sp			x						
	Oedalus senegalensis	Yellow Wings	NE	x						
	Parachynoma tricolor	Vlei Grasshopper	NE	x				x		
	Truxalis sp			x				x		x
	Acrotylus sp									x
	Tmetonota sp									
	HEMIPTERA	**BUGS**								
	Miridae	**Plant Bugs & Capsids**		x						
	Proboscidoceris sp			x						
	Stenotus elegans		NE	x						
	Stenotus sp			x				x		x

	Reduviidae	**Assassin Bugs**		x						
	Oncocephalus annulipes			x						
	Phonoctonus sp	Cotton Steiner Assassin		x				x		
	Pirates aurigens			x						
	Ectomocoris									
	Phonoctus									
	Rhinocoris									
	Coreidae	**Twig Wilters, Squash Bugs & Leaf-footed Bugs**		x						
				x						
	Akbaratus tripunctatus		NE	x						
	Anoplocnemis curvipes	Twig Wilter	NE	x						
	Cletus orientalis		NE	x						
	Leptoglossus membraceus		NE	x						
	Pendulinus basicornis								x	
	Pyrrhocoridae	**Cotton stainers, Red Bugs & Fire Bugs**		x						
	Dysdercus cordinalis	Cotton Stainer	NE	x				x	x	x
	Dysdercus nigrofasciatus								x	
	Dysdercus superstiosus								x	
	Probergrothius sexpunctus		NE	x						
	Lygaeidae	**Seed Bugs & Ground Bugs**		x						
	Graptoslethus servus		NE	x						
	Cydnidae	**Burrowing Bugs**		x						
	Dismegistus sanguineus		NE	x					x	
	Plonisa plagiata		NE	x						
	Plataspidae	**Pill Bugs**								
	Coenomorpha sp.			x						
	Lybyaspis (plataspis) wahlbergi		NE	x						
	Scutelleridae	**Shield-backed Bugs**								
	Callidea dregii	Rainbow Shield Bugs	NE	x					x	x
	Steganocerus multipunctatus								x	
	Pentatomidae	**Stink Bugs & Shield Bugs**								
	Acoloba lanceolata		NE	x						

	Agonoscelis versicolor	Sunflower Seed Bug	NE	x						
	Antestia orbitalis	Antestia Bug	NE	x						
	Callidea signata		NE	x						
	Sepontia misella								x	
	Gynenica sp			x						
	Nezara viridula	Green Vegetable Bug		x						
	Peizodorus purus			x						
	Hydrometridae	**Water Striders**								
	Hydrometra ambulator		NE	x			x	x		
	Gerridae	**Pond Skaters & Water Striders**								
	Eurymetra natalensis	Chevron Pond Skater	NE	x				x		
	Gerris swakopensis		NE	x				x		
	Metrocolis natalensis		NE				x			
	Limnogogus capensis	Striped Pond Skater	NE	x						
	Gerris sp.						x		x	
	Corixidae	**Water Boatmen**								
	Sigara meridianalis		NE	x						
	Sigara sp.						x	x	x	
	Notonectidae	**Backswimmers**								
	Anisops varia	Variable Backswimmer	NE	x						
	Anisops sp.	Common Backswimmers		x					x	
	Anisops ares		NE				x	x		
	Anisops pellucens	Backswimmer	NE					x		
	Micronecta sp.						x	x	x	
	Enithares sobria		NE					x		
	Naucoridae									
	Laccocoris limigenus		NE					x		
	Nepidae	**Water Scorpions**								
	Appassus sp			x						
	Cofana spectra		NE	x						
	Laccotrephes sp			x			x	x		x
	Ranata grandicollis			x						
	Ranatra cinnamomea		NE					x		
	Belastomatidae									
	Sphaerodena sp.						x		x	
	Sphaerodena nephroides		NE					x		
	Veliidae									
	Microvellia sp.								x	

	Tettigometridae			x						
	Hilda patruelis		NE	x						
	Cercopidae	**Spittle Bugs & Froghoppers**								
	Poophilus sp			x						
	Cicadidae	**Cicadas & Christmas beetles**								
	Acanthaspis obscura			x						
	Phyllontochila wahlbergi		NE	x						
	Systophlochius palochius		NE	x						
	Xosopsaltria punctata	Bladder Cicada	NE	x						
	Membracidae	**Treehoppers**								
	Anchon nodicornis		NE	x						
	Cornutobelus tanganensis								x	
	Cicadellidae	**Leaf Hoppers**								
	Circulifer sp			x						
	Cofana sp			x						
	Coloborrhis cortinicina		NE	x						
	Euscelis sp			x						
	Mecalus sp			x						
	Milaewa rhodesiana		NE	x						
	Nephotettix sp			x						
	Pentastiridius moestus		NE	x						
	Platyretus sp			x						
	Selanocephalus			x						
	Margarodidae	**Giant Coccids & Ground Pearls**								
	Icerya purchase	Cottony Cushion Scale/Fluted Scale	NE							
	THYSANOPTERA	**THRIPS**								
	MEGALOPTERA	**DOBSONFLIES & ALDERFLIES**								

	NEUROPTERA	**LACEWINGS & ANTLIONS**								
	Hemerobiidae	**Brown Lacewings, Aphid wolves**								
	Micromus sp.			x						
	Chrysopidae	**Green Lacewings, Golden Eyes**								
	Chrysopa sp.			x						
	Mantispidae	**Mantidflies, Mantispids**								
	Pseudoclimaciella sp.			x						
	Myrmeleontidae	**Antlions**								
	Cueta punctatissima,		NE	x						
	Formicaleon voseus,		NE	x						
	Myrmeleon sp.	Pit-building Antlions		x						
	Palpares sobrinus,	Dotted Veld Antlion	NE	x						
	Ascalaphidae	**Owl Flies**								
	Melambrotus sp.			x						
	COLEOPTERA	**BEETLES**								
	Carabidae	**Ground Beetles**								
	Abacetus optimus		NE				x			
	Abacetus sp			x			x	x		
	Agonum rugaticolle		NE				x			
	Agonum sp.						x			
	Anoncopencus sp.				x					
	Anthia bucolica				x					
	Chlaenius fenestratus		NE				x			
	Cypholoba chanleri		NE		x					
	Cypholoba cinereocinata		NE		x					
	Cypholoba tetrastigma		NE		x					
	Cypholoba tenuicollis		NE		x					
	Diatypus picinus		NE				x			
	Distichus picicornis		NE		x					
	Eccoptoptera cupricollis		NE	x	x					
	Macrochilus biplagiatus		NE		x					
	Melanodes proximus		NE	x						

	Pherosophus insignis		NE		x					
	Platyns sp.						x			
	Stereostoma sp			x						
	Tefflus fischeri	Peaceful Giant Ground Beetles			x					
	Tefflus sp							x		
	Trechus cryobius		NE				x	x		
	Cicindelidae	**Tiger Beetles**								
	Paussidae	**Ant guest/Nest Beetles**								
	Paussus sp			x						
	Gyrinidae			x						
	Dineustes africanus		NE	x				x		
	Orectogyrus bicostatus		NE				x	x		
	Dineutes aereus		NE				x	x		
	Aulonogyrus caffer						x	x		x
	Hydrophilidae									
	Hydrophilus senegalensis		NE	x				x		
	Hydrophilus deplanatus		NE	x				x		
	Helochares sp.						x	x		
	Regimbartia inflata		NE				x	x		
	Psephenidae	**Water Peny**								
	Psephenidae sp.1						x			
	Psephenus sp							x		
	Elmidae	**Riffle Beetle**								
	Elmidae sp.1									
	Elmis sp							x		
	Histeridae									
	Hister tropicus		NE	x						
	Hister nomas?				x				x	
	Hister latipes		NE				x			
	Macrolister sp			x						
	Tribalus capensis		NE				x			
	Staphylinidae									
	Staphylinus erichsoni		NE	x						
	Staphylinus jeanneli		NE		x					
	Paederus sabaeus		NE	x			x	x	x	x
	Zyras sp			x						

	Ontholestes africanus		NE				x			
	Philonthus sp						x			
	Trogidae	**Carcass Beetles**								
	Trox sp			x						
	Scarabaeidae	**Scarab beetles & Dung Beetles**								
	Anachalcos convexus		NE	x						
	Aphodius lividus		NE	x			x			
	Aphodius maculicollis								x	
	Apogonia kraatzi		NE				x			
	Apogonia sp			x						
	Caccobius obtusus								x	
	Catharsius sp				x					
	Catharsius sp			x				x		
	Catharsius stuhlmani		NE	x						
	Catharsius tricornutus		NE	x			x			
	Copris elephenor		NE	x						
	Copris amyntor								x	
	Copris evadinus			x						
	Copris harrisi			x						
	Copris mesacanthus			x						
	Copris sp			x						
	Copris typhoeus			x						
	Cyphonistes gasanus				x					
	Diplognatha gagates	Large Black Nest Chaffer		x						
	Drepanocerus kirbyi								x	
	Dischista cincta			x						
	Eudicella smithi			x						
	Fornassinus fornassinae			x						
	Gerreta niteus			x				x		
	Gymnopleurus azureus				x					
	Gymnopleurus humanus	Small Green Dung Beetles	NE	x				x		
	Gymnopleurus virens			x	x					
	Kheper eratus			x						
	Leucoscelis amethystia	Common Dotted Fruit Chaffer		x						
	Leucoscelis elegans			x						
	Milichus picticollis						x			
	Oniticellus inaequalis								x	
	Oniticellus millitaris			x						
	Oniticellus planatus			x						

	Onitis africanus			x						
	Onitis alexis	Bronze Dung Beetle		x						
	Onitis arrowi								x	
	Onthophagus blanchardi			x						
	Onthophagus jugicole								x	
	Onthophagus miricornis								x	
	Onthophagus sp			x				x		
	Onthophagus verticallis			x						
	Oryctes boas	Rhinoceros Beetle		x						
	Oryctes sp			x						
	Pachnoda sinuate		NE	x				x		
	Pachnoda stehelini								x	
	Paeleopragma petersi			x						
	Poecilophila hebraea				x		x			
	Porphyronota hebreae			x						
	Proagoderus sp.								x	
	Rhabdotis Sabrina			x						
	Scarabaeus catenatus				x				x	
	Schizonycha sp			x						
	Sisyphus rugosus			x			x		x	
	Tephraea dichroa			x						
	Trochalus sp			x						
	Buprestidae									
	Acmeodera sp			x						
	Acmeodera virgo			x						
	Agrilus discolor			x						
	Darmasila lethalis		NE	x				x		
	Lampetis amaurotica			x						
	Steraspis fastuosa			x						
	Elateridae									
	Tetralobus flabellicornis			x						
	Adelocera basalis						x			
	Drillidae									
	Selasia pulchra			x						
	Lampyridae									
	Luciola sp			x						
	Lampyris sp			x						

	Bostrychidae									
	Bostrychopsis villosula			x						
	Heterobostrychus brunneus			x						
	Xylion adastus			x						
	Cleridae									
	Gyponyx signifier			x						
	Melyridae									
	Idgia dimidiate				x					
	Idgia fulvicollis		NE	x				x		x
	Lymexylidae									
	Atractocerus brevicornis			x						
	Coccinellidae									
	Cheilomenes aurora								x	
	Cheilomenes lunata		NE	x				x	x	x
	Cheilomenes sulphurea			x						
	Chilocorus calvus			x						
	Epilachua sp			x						
	Henosepilachna hirta			x						
	Henosepilochna bifasciata			x						
	Hippodamia variegata			x						
	Tenebrionidae									
	Eupezus sp			x						
	Eurychora sp			x						
	Gonocephalus simplex			x						
	Lagria vulnerata			x						
	Oncoosoma ertli			x						
	Oncoosoma sp			x						
	Paramaryginus globulatus			x						
	Psammodes sp			x						
	Rhytinota gracillis			x						
	Strongylium purpuri penne			x						
	Zophosis abyssinica			x						
	Zophosis agaboides								x	
	Pltoides sp						x			

	Meloidae									
	Mylabris praestans		NE	x				x		
	Coryna apicicornis			x					x	
	Cissites cephalotes			x						
	Cerambycidae									
	Calothyrza jardinei			x						
	Ceroplesis militaris			x						
	Closteromerus laevipus			x						
	Closteromerus suturalis			x						
	Macrotoma palmata			x						
	Merionaeda africana			x						
	Phantasis gorgo			x						
	Xystoceza dispar			x						
	Chrysomelidae									
	Haltica cuprea								x	
	Haltica pyritosa			x					x	
	Plagiodera caffra			x						
	Anthribidae									
	Xylinades vugicollis			x						
	Xylinada atricornis						x			
	Brentidae			x						
	Eupsalis vulsellata			x						
	Apionidae									
	Apion sp				x					
	Nanophyes pilipennis			x						
	Curculionidae									
	Anaplesius granulicollis						x			
	Hapliotrachelus orbitalis			x						
	Hipporrhinus tennegranosus			x						
	Myllocerus mystacinus			x						
	Nematocerus marginalis		NE	x				x		x
	Nematocerus sp.			x				x		
	Neocleonus sannio			x						
	Sphadasmus camelus			x						

	Carabacidae									
	Anthia maxillosa			x						
	Graphiphipterus circumdatus			x						
	Peizia sp			x						
	Cantharidae									
	Diaphanes rugiocollis		NE	x				x		
	Lamphatus sp			x						
	Lycus constrictus			x	x					
	Lycus ampliatus		NE					x		
	Galeruchidae									
	Hemixantha bifasciata			x						
	Hypercantha pauli			x						
	Spilocephalus apicalis			x						
	Crioceridae									
	Zeugophora humeralis			x						
	Silphidae									
	Thanatophilus sp.				x				x	
	Dytiscidae									
	Cybister tripunctatus				x					
	Copelatus atrusulcatus						x			
	Rhantus capensis						x			
	Laccophilus adspersus						x			
	Guignatus sp.						x			
	Hyphydus grossus						x			
	Hydroglyphus infirmus		NE					x		
	Laccophilus incrassatus		NE					x		
	Hydaticus matruelis		NE					x		
	MECOPTERA	**SCORPIONFLIES**								
	Bittacidae			x						
	Bittacus sp			x						
	DIPTERA	**FLIES**								
	Simuliidae									
	Simulium sp.						x	x		

	Empididae									
	Empididae sp.1						x			
	Tipulidae			x						
	Nephrotoma sp			x			x			
	Tipula sp							x		
	Pyrgotidae									
	Pygotidae sp.1						x			
	Psychodidae	Moth Flies								
	Clogia albipunctata			x						
	Chironomidae	Midges, Gnats, Bloodworms								
	Chironomus sp			x			x	x		
	Culicidae	**Mosquitoes**								
	Culex pipiens	House Mosquito		x						
	Aedes aegyptii	Bush Mosquito		x						
	Culex sp.						x	x		x
	Culicine							x		
	Tabanidae									
	Haematopota sp				x					
	Haematopota ocellata	Clegs		x						
	Philoliche aethiopica		NE	x				x		
	Tabanus sp							x		
	CERATOPOGONIDAE									
	Culicoides sp							x		
	Asilidae	**Robber Flies**								
	Lasiocnemis lugens	Picture-winged Robber Fly		x						
	Leptogaster sp			x						
	Microstylum sp			x				x		
	Bombyliidae	**Bee Flies**								
	Bombylus delicatus			x						
	Bombylus luteipennis			x						
	Bombylus mantium			x						
	Exoprosopa sp			x					x	
	Litorhina allothyris				x					
	Syrphidae	**Hover Flies**								

	Allograpta fuscotibialis		NE	x				x		
	Asarkina africana			x						
	Dicrano sepsis				x					
	Ischiodon sp			x				x		x
	Eristalis tenax	Drone Fly		x			x			
	Syritta sp				x					
	Tephritidae	**Fruit Flies**								
	Aciura sp				x					
	Ceratitis capitata	Mediterranean Fruit Fly		x						
	Didacus ciliatus	Lesser/ Small Cucurbit Fly		x						
	Diopsidae	**Stalk-eyed Flies**								
	Diopsis sp			x				x		x
	Drosophilidae	**Vinegar Flies**								
	Drosophila sp			x						
	Anthomyidae	**Root-maggot Flies**								
	Anthonyia sp			x				x		x
	Muscidae	**House Flies**								
	Atherigona sp				x					
	Dichaetomyia sp				x					
	Helina sp				x					
	Lispe sp			x						
	Musca sp				x					x
	Musca sp				x					
	Musca domestica	House Fly	NE	x				x		x
	Stomoxys calcitrans	Stable Fly	NE	x				x		x
	Glossonidae	**Tsetse Flies**								
	Glossina sp			x				x		x
				x						
	Calliphoridae	**Bluebottles, Greenbottles, Blowflies**								
	Auchmeromyia sp				x		x			
	Calliphora sp				x					
	Calliphora sp				x					
	Chrysomya albiceps	Banded Blowfly		x						
	Chrysomya chloropyga	Copper-tailed Blowfly	NE	x				x		x
	Chrysomya marginalis								x	
	Lucilia sericata	European Green Blowfly		x			x			
	Stegosoma sp				x					

	Sarcophagidae	Flesh Flies								
	Hoplacephala tesselata				x					
	Rhinia sp.				x					
	Sarcophaga haemorrhoidalis			x						
	Sarcophaga sp				x			x		x
	Faniidae									
	Fannia canicularis			x						
	Fannia scalaris			x						
	Sphaeroceridae									
	Leptocera sp				x					
	Sciaridae									
	Lucicilia sp				x					
	Sciaris sp				x					
	Sepsidae									
	Dicranosepsis Sp.				x					
	LEPIDOPTERA	**MOTHS AND BUTTERFLIES**								
		MOTHS								
	Cossidae									
	Azygophleps inclusa	Leopard Goat		x						
	Yponomentidae	**Ermine Moths**		x						
	Plutella maculipennis			x						
	Pyralidae									
	Achyra coelatalis			x						
	Duponchelia fovialis			x						
	Encylopomia sp			x						
	Euclarta warreni			x						
	Eurrhyparodes bractedalis			x						
	Hellula undalis			x						
	Hendecasis apicefulva,			x						
	Herpetogramma licarsisalis			x						
	Herpetogramma mutualis			x						

	Lamoria cafrella			x						
	Leucinodes orbonalis			x						
	Palpita bicolor			x						
	Palpita unionalis			x						
	Stemmatophora excurvalis			x						
	Syngamia latimarginalis			x						
	Tegalifera oblureta			x						
	Tyndis senior			x						
	Udea fernigalis			x						
	Viettessa margaritalis			x						
	Sphingidae									
	Acherontia atropos	Death's Head Hawk Moth		x						
	Cephonodes hylas	Oriental Bee Hawk Moth		x					x	
	Deilephila nerii	Oleander Hawk Moth		x						
	Hippotion celerio	Silver-tipped/ Vine Hawk Moth		x						
	Nephele comma	Common Nephele		x						
	Pseudoclanis postica	Mulberry Hawk Moth		x						
	Sphingomorpha chlorea			x						
	Saturniidae									
	Pseudobunaea irius	Poplar Emperor Moth		x						
	Ludia cf. pseudovetusta			x						
	Thyretidae									
	Thyretes hippotes	Equine Maiden		x						
	Arctiidae									
	Digama strabonis	Squinting Digama		x						
	Utethisa pulchella	Crimson-speckled Footman		x						
	Noctuidae									
	Cyligramma latona	Cream-Striped Owl		x						
	Erebus macrops	Owl Moth		x						
	Earias cupreoviridis	Cupreous Spiny Boll Worm		x						
	Phytometra orichalcea	Golden Plusia		x						
	Ctenuchidae									
	Syntomus cerbera			x						
		BUTTERFLIES								

	Hesperiidae	**Skippers**		x						
	Acleros mackenii	Macken's Skipper		x						
	Borbo gemella						x			
	Celaenorrhinus bettoni			x					x	
	Celaenorrhinus galenus	Orange Sprite		x						
	Celaenorrhinus intermixtus			x						
	Coeliades anchises	One Pip Policeman		x						
	Coeliades pisistratus	Two Pip Policeman		x			x			
	Coeliades libeon	Spotless Policeman		x						
	Eagris nottoana			x						
	Eagris sabadius		NE	x				x		
	Eretis umbra	Small Marbled Elf	NE	x		x		x		
	Eretis melania		NE	x		x		x		
	Eretis lugens			x		x				
	Gegenes niso	Plain Hottentot	NE	x				x		
	Gegenes pumilio	Dark Hottentot		x						
	Kedestes rogersi	Roger's Ranger		x						
	Metisella midas	Golden Sylph		x					x	
	Metisella orientalis		NE	x				x		
	Metisella trisignatus	Three Spot Sylph		x		x				
	Netrobalane canopus	Buff-Tipped Skipper		x						
	Parosmodes morantii	Morant's Skipper		x						
	Pelopidas mathias	Lesser Millet Skipper	NE	x				x		
	Sarangesa phidyle			x						
	Saranges sp.	(Engelesha)		x						
	Spialia colotes	Transvaal Grizzled Skipper		x						
	Spialia diomus	Diomus Grizzled Skipper	NE	x				x		
	Spialia spio	Mountain Sandman		x		x			x	
	Tagiades flesus	Clouded Flat		x			x			
	Zenonia zeno	Orange Spotted Skipper	NE	x				x		x
	Zophopetes dysmephila	Palm Tree Nightflier		x						
	Papilionidae									
	Graphium antheus	Large Striped Swordtail		x		x				
	Papilio bromius	Broad Green-Banded Swallowtail					x			
	Papilio dardanus	Mocker Swallowtail	NE	x				x		x
	Papilio demodocus	Citrus Butterfly	NE	x		x	x	x	x	x
	Papilio jacksoni	Jackson's Swallowtail		x						
	Papilio mackinnoni	MacKinnon's Swallowtail		x						
	Papilio nireus	Narrow Green-Banded Swallowtail	NE	x		x	x	x	x	x
	Papilio nobilis	Noble Swallowtail	NE	x		x	x	x		x
	Papilio phorcas	Green-Banded Swallowtail		x						

	Pieridae									
	Belenois aurota	Brown-Veined White	NE	x			x	x	x	x
	Belenois creona	Common White	NE	x		x		x	x	x
	Belenois thysa	False Dotted Border		x					x	
	Belenois zochalia	Forest Caper White	NE	x		x		x		x
	Catopsilia florella	African Emigrant	NE	x		x	x	x		x
	Colias electo	African Clouded Yellow	NE	x		x		x		x
	Colotis amatus	Small Salmon Arab		x						
	Colotis antevippe	Large Orange Tip	NE	x		x	x	x		x
	Colotis aurigineus	African Golden Arab	NE	x		x		x		x
	Colotis celimene	Magenta Tip	NE	x		x		x		
	Colotis chrysonome								x	
	Colotis eris eris	Banded Gold Tip	NE	x				x		x
	Colotis euippe	Round Winged Orange Tip	NE	x		x		x	x	x
	Colotis evagore								x	
	Colotis evanina								x	
	Colotis hetaera	Coast Purple Tip	NE	x		x		x		x
	Colotis protomedia	Yellow splendor		x						
	Colotis rogersi	Orange Tip				x	x			
	Colotis vesta								x	
	Dixeia pigea	Antheap White		x						
	Dixeia spilleri	Spiller's Yellow	NE	x			x	x		x
	Eurema brigitta	Small Grass Yellow	NE	x		x	x	x	x	x
	Eurema floricola	Malagasy Grass Yellow	NE	x		x		x	x	x
	Eurema hapale	Marsh Grass Yellow	NE	x		x	x	x		
	Eurema hecabe	Common Grass Yellow	NE	x		x	x	x		x
	Eurema regularis								x	
	Leptosia alcesta	African Wood White	NE	x			x	x	x	x
	Mylothris agathina	Eastern Dotted Border		x		x	x			
	Mylothris jacksoni	Jackson's Dotted Border	NE	x				x	x	x
	Mylothris rueppelli	Ruppell's Dotted Border		x			x		x	
	Nepheronia thalassina	Blue Vagrant		x					x	
	Pinacopteryx eriphia	Zebra White		x					x	
	Pontia helice johnstoni	Meadow White	NE	x				x		
	Nymphalidae									
	Acraea caecilia			x		x				
	Acraea encedana	Pierre's Acraea		x						
	Acraea encedon	Encedon Acraea	NE	x			x	x		x
	Acraea eponina	Orange Acraea	NE	x			x	x		x
	Acraea insignis			x						
	Acraea lycoa			x						
	Antanartia abyssinica	Abyssinian Admiral		x						

	Antanartia dimorphica	Dimorphic Admiral	NE	x		x		x		x
	Antanartia schaeneia	Long Tail Admiral		x						
	Aphysoneura pigmenteria	Painted Ringlet		x						
	Bicyclus campinus								x	
	Bicyclus safitza	Common Bush Brown	NE	x		x	x	x		x
	Byblia ilithya								x	
	Catacroptera cloanthe	Pirate	NE	x		x	x	x		x
	Charaxes berkeleyi	Berkeley's Charaxes		x			x			
	Charaxes baumanni	Baumann's Charaxes		x						
	Charaxes brutus	White Barred Charaxes		x					x	
	Charaxes candiope	Green-Veined Charaxes		x		x	x	x	x	x
	Charaxes hansali	Cream-Banded Charaxes		x			x			
	Charaxes jahlusa	Pearl Spotted Charaxes					x			
	Charaxes kirki	Kirk's Charaxes		x						
	Charaxes varanes	Pearl Charaxes		x			x		x	
	Charaxes zoolina	Club-Tailed Charaxes	NE	x		x	x	x	x	
	Danaus chrysippus	African Queen	NE	x				x	x	x
	Eurytela dryope	Golden Piper		x						
	Eurytela hiarbas	Pied Piper		x						
	Hamanumida daedalus	Guineafowl	NE	x				x	x	x
	Henotesia perspicua	Swamp Patroller	NE	x		x	x	x	x	x
	Hypolimnas misippus	Diadem	NE	x		x		x		
	Junonia hierta	Yellow Pansy	LC	x		x	x	x	x	x
	Junonia oenone	Dark Blue Pansy	LC	x		x	x	x	x	x
	Junonia orithya	Blue Pansy	NE	x		x	x			
	Junonia sophia	Little Commodore	NE	x		x	x	x	x	x
	Junonia natalica	Natal Pansy	NE	x		x				
	Junonia terea	Soldier Commodore	NE	x		x	x		x	x
	Libythea labdaca	African Snout		x						
	Melanitis leda	Common Evening Brown	NE	x			x	x		x
	Neocoenyra gregorii		NE	x		x		x		
	Neptis kikuyuensis	Kikuyu Sailer	NE	x				x		
	Neptis penningtoni	Pennington's Sailer	NE	x		x		x		x
	Neptis kiriakoffi						x		x	
	Neptis saclava	Small Spotted Sailer	NE	x			x	x		x
	Neptis serena						x		x	
	Phalanta eurytis	African Leopard Fritillary		x						
	Phalanta phalantha	Common Leopard Fritillary	NE	x		x	x	x		x
	Precis antilope	Darker Commodore		x						
	Precis archesia	Garden Inspector	NE	x		x		x		x
	Precis limnoria	White-Spotted Commodore	NE	x		x	x	x	x	x
	Precis octavia	Gaudy Commodore		x						
	Precis tugela	Eared Commodore		x						
	Salamis anacardii	Clouded Mother-of-Pearl		x			x			

	Salamis parhassus	Forest Mother-of-Pearl		x						
	Sallya boisduvali	Brown Tree Nymph		x						
	Vanessa cardui	Painted Lady	NE	x		x		x		x
	Lycaenidae									
	Actizera lucida	Rayed Blue				x				
	Actizera stellata	Clover Blue	NE	x		x		x	x	x
	Aloeides conradsi	Conrad's Copper		x						
	Anthene amarah	Leaden Ciliate Blue	NE	x		x		x		x
	Anthene butleri	Butler's Ciliate Blue		x				x		
	Anthene definita	Common Ciliate Blue		x						
	Anthene indefinita		NE	x				x		x
	Anthene ligures								x	
	Anthene lunulata	Red Spot Ciliate Blue		x						
	Anthene pitmani	Pitman's Ciliate Blue	LC	x				x		x
	Anthene princeps								x	
	Anthene schoutedeni								x	
	Aslauga latifurca			x						
	Aslauga sp. nov			x						
	Axiocerses harpax	Common Scarlet		x					x	
	Axiocerses tjoane	Eastern Scarlet		x						
	Azanus jesous	African Babul Blue		x		x	x		x	
	Azanus moriqua	Black-Bordered Babul Blue	NE	x				x		x
	Azanus natalensis	Natal Babul Blue	NE	x				x		
	Azanus ubaldus	Dessert Babul Blue		x		x			x	
	Baliochila fragilis			x					x	
	Cacyreus lingeus	Common Bush Blue		x		x				
	Cacyreus palemon								x	
	Cacyreus virilis	Eastern Bush Blue		x		x				
	Capys hermes			x						
	Cupidopsis cissus	Meadow Blue		x						
	Cupidopsis iobates	Tailed Meadow Blue	NE	x		x		x		x
	Deloneura ochrascens								x	
	Desmolycaena rogersi	Rogers' Gem		x						
	Deudorix antalus	Brown Playboy	NE	x				x		
	Deudorix lorisona	Coffee Playboy		x			x			
	Eicochrysops hippocrates			x						
	Eicochrysops nandianus	Cupreous Blue		x		x	x			
	Euchrysops brunneus	Brown Cupid		x				x		x
	Euchrysops malathana	Smoky Bean Cupid	NE	x				x		
	Euchrysops nandensis	Smoky Bean Cupid		x						

	Euchrysops osiris	African Cupid	NE	x		x		x		x
	Euchrysops subpallida			x		x				
	Freyeria trochylus	Grass Jewel	NE	x		x		x	x	x
	Gegenes hottentota								x	
	Hypolycaena pachalica	Eastern Hairstreak		x						
	Hypolycaena philippus	Common Hairstreak		x		x				
	Iolaus crawshayi	Crawshay's Sapphire		x			x			
	Lachnocnema bibulus	Woolly Legs		x						
	Lachnocnema brimo								x	
	Lampides boeticus	Pea Blue		x					x	
	Lepidochrysops elgonae	Elgon Giant Cupid		x				x		x
	Lepidochrysops cf. neonegus			x						
	Lepidochrysops parsimon			x		x				
	Leptomyrina gorgias	Common Black Eye		x						
	Leptotes pirithous	Common Zebra Blue	NE	x		x		x	x	x
	Lycaena phlaeas	Small Copper		x						
	Paraphnaeus hutchinsoni	Hutchinson's Silver Spot		x						
	Pilodeudorix caerulea	Blue Heart Playboy		x						
	Spindasis nyassae	Nyasa Silverline		x						
	Spindasis tavetensis	Taveta Silverline		x						
	Tarucus grammicus	Black Pierrot		x		x				
	Teriomima micra								x	
	Tuxentius melaena	Dark Pied Pierrot		x						
	Uranothauma nubifer	Black Heart		x						
	Zizeeria knysna	African Grass Blue	NE	x				x	x	
	Zizina antanossa	Dark Grass Blue		x		x			x	
	Zizula hylax	Tiny Grass Blue	NE	x				x		x
	HYMENOPTERA	**BEES, WASPS & ANTS**								
	Tenthredinidae	**Sawflies**								
	Athalia sp			x						
	Euaspis sp			x						
	Braconidae	**Braconid Wasps**								
	Brannsia analis			x						
	Braunsia fenestrata			x						
	Cardiochiles sp			x						
	Cardiochiles trimaculata			x						

	Gastrotheca sp			x						
	Chrysididae	**Cuckoo Wasps**								
	Chrysis lyncea			x						
	Chrysis concinna		NE	x				x		
	Hcolychridium morosum			x						
	Scoliidae	**Mammoth Wasps**								
	Cathimeris clothu		NE	x				x		
	Cathimeris hymenae			x						
	Myzina sp 1			x						
	Myzina sp 2			x						
	Scolia ruficornis		NE	x				x		
	Scolia sp			x				x		x
	Mutillidae	**Velvet Ants**								
	D. glossina			x						
	Dasylabris signaticeps			x				x		x
	Dasylabris sp			x				x		
	Mutilla astarte			x						
	Pompilidae	**Spider-Hunting Wasps**								
	Cyphononyx bretoni antennatus		NE	x				x		x
	Dichragenia jacob			x						
	Epysyron natalicolus			x						
	Hemipepsis sp			x						
	Hemipepsis tamisieri			x						
	Pompilus laptacantha			x						
	Pompilus plumbeus		NE	x				x		x
	Vespidae	**Paper Wasps**								
	Belonogaster juncens			x				x		
	Belonogaster vasseae			x						
	Delta sp			x						
	Polistes marginalis		NE	x				x		x
	Polistes tenellus			x						
	Popalidia sp			x						
	Eumenidae	**Potter/ Mason Wasps**								
	Eumenes tinctor			x						
	Synagris analis			x						
	Synagris negusi		NE	x				x		x
	Synagris sp							x		

	Sphecidae									
	Ammophila punctaticeps		NE	x				x		x
	Antepipona senegalensis		NE	x				x		
	Bembix fuscipennis	Sand Wasp	NE	x				x		
	Cerceris iniqua		NE	x				x		
	Cerceris rufiscutis			x				x		x
	Gastrosericus brannsi			x						
	Gastrosericus walthii			x						
	Liris haemorrhoidalis			x						
	Micreuruenes glaber			x				x		x
	Philanthus triangullum			x						
	Scheliphron quartinae			x				x		x
	Tachysphex prosopigastroides			x						
	Tachysphex sp			x				x		
	Tachytes observabilis			x						
	Trypoxylon sp	Keyhole wasp		x						
	Halictidae									
	Halictus sp 1			x				x		x
	Halictus sp 2			x						
	Halictus tinctus			x						
	Nomia tridentata			x					x	
	Lasioglossum sp.								x	
	Patellapsis sp.								x	
	Seladonia sp.								x	
	Sphecodes sp			x						
	Megachilidae									
	Chalicodoma felina		NE	x				x		x
	Chalicodoma rufiventris			x						
	Heriades sp			x					x	
	Megachile basalis			x						
	Megachile combusta			x						
	Megachile sp			x					x	
	Megachile venusta			x						
	Anthophoridae									
	Amegilla torrida			x				x		x
	Anthophora albigena			x						
	Anthophora armata			x						
	Anthophora conspicua		NE	x				x		

	Anthophora sp			x				x	x	x
	Ceratini nasalis		NE	x				x		x
	Ceratini sp			x				x	x	x
	Mesotrichia flavorufa		NE	x				x		x
	Tetralonia sp			x						
	Xylocopa caffra			x				x	x	x
	Xylocopa incostans			x						
	Apidae									
	Amegilla sp			x				x		x
	Apis mellifera		NE	x				x	x	x
	Braunsapis sp.								x	
	Macrogalea candida								x	
	Meliponula bocandei		NE	x				x		x
	Meliponula denoiti?								x	
	Meliponura sp.				x					
	Pleibena haldibrandti								x	
	Thyreus sp.								x	
	Xylocopa flavorufa								x	
	Formicidae									
	Camponotus fulvopilosus			x						
	Camponotus maculatus			x				x		x
	Camponotus sp			x	x			x		
	Carebare sp			x						
	Carebare vidua			x						
	Crematogatser sp.						x	x		x
	Dorylus sp.				x			x		x
	Dorylus (T) fulvus			x						
	Messor barbarus			x				x		x
	Pachycondyla tarsata			x						
	Plectoctena mandioularis		NE	x				x		
	Polyrhachis gagates		NE	x				x		x
	Ichneumonidae									
	Atropha sp			x						
	Compoplex sp			x						
	Ctenochares sp			x						
	Ctenochares unifithorax			x						
	Echthromorpha variagate			x						
	Exochus sp			x						

	Ischnojoppa flavipennis			x						
	Ophion sp			x				x		
	Osprynchotus gueinzii			x						
	ARACHNIDA	**SPIDERS, SCORPIONS, TICKS & MITES**								
	SCORPIONES	**SCORPIONS**								
	Scorpionidae			x						
	??									
	Hemiscorpiidae	**Lomachus sp**								
	Buthidae			x						
	??									
	ARANAEA	**SPIDERS**								
	Aranaea sp.1						x			
	ACARINA	**TICKS AND MITES**								
	IXODOIDEA	**TICKS**								
	Ixodidae sp.1			x						
	CHILOPODA	**CENTIPEDES**								
	Chilopoda sp.1						x			
	Chilopoda sp.2						x			
	DIPLOPODA	**MILLIPEDES**								
	Diplopoda sp1						x			
	Diplopoda sp.2						x			
	Diplopoda sp.3						x			
	Wajirinus gracilepis	**Flat millipede**						x		
	CRUSTACEA	**CRABS, LOBSTERS, WOODLICE**								
	ISOPODA									
	Armadillium sp	Common pill-woodlouse/pill-bug						x		
		Freshwater Crab?		x						
	DECAPODA									
	Potamonautes neumanni	Freshwater crab	LC					x		
	Procambarus clarkii	Lousianna crayfish	LC					x		
	OLIGOCHAETAE									
	Lumbricus	Aquatic earthworm						x		
	Lumbricidae sp	Earthworm								
	HIRUDINAE									
	Erpobdellidae sp	Leech						x		
	MOLLUSCA	**SNAILS, SLUGS & SHELLFISH**								

	GASTROPODA	**SLUGS AND SNAILS**								
	UROCYCLIDAE	Terrestrial molluscs								
	Chlamydarion oscitans		NE					x		
	Trochinanina densestriata		NE					x		
	Trochonanina keniana							x		
	Trachycysti ariel							x		
	SUBULINIDAE									
	Pseudoglessula boivini		NE					x		
	Pseudoglessula conradti		DD					x		
	Pseudopeas rumuritiensis		NE					x		
	Opeas marsabitiensis									
	ENIDAE									
	Rachidina virginea		NE					x		
	Rachidina chiradzuluensis		NE					x		
	Edourdia tumida		NE					x		
	Cerestua baringi		NE					x		
	STREPTAXIDAE									
	Gullela funera		NE					x		
	BRADYBAENIDAE									
	Hallolimnohelix planulata		NE					x		
	Hallolimniohelix iredalei		NE					x		
	Vicariihekix keniensis		NE					x		
	SPHAERIIDAE									
	Pisidium sp	Pill clam						x		
	Achatinidae									
	Achatina sp				x					
	Limicolaria martensiana									
	Lymnaeidae									
	Lymnae sp.						x			
	Lymnae natalensis	Pond snails	NE					x		
	Planorbidae									
	Biomphallaria sp.						x			
	Biomphallaria pfeifferi	Orb snails								
	Burnupia crassistriata	Limpets	NE					x		
	Bullinidae									
	Bullinus sp.						x			
	Bulinus forskali		NE					x		x

	COLEOPTERA									
	Cerambycidae									
	Blepisanis coerulea		NE					x		x
	Chrysomelidae									
	Dactylispa sp.							x		x
	HEMIPTERA									
	Pentatomidae									
	Deroplax siphoides		NE					x		x
	Solenosthethium liligerum		NE					x		
	Callidea bohemanni		NE					x		
	TRICHOPTERA	Caddisflies								
	Hydrosychidae									
	Hydropsyche sp						x	x		

PHYLUM
CLASS
ORDER
SUB ORDER

Species listed in red were added during the NMK visit in September 2008
Species listed in blue are the new records for April 2012
Species listed in green are new records for November 2o14

NB: The fish species added to the LNC invertebrates checklist in July 2013 have been deleted since fish doesn't belong to the same taxa with invertebrates

IUCN RED LIST CATEGORIES

EX: Extinct
EW: Extinct in the Wild
CR: Critically Endangered
EN: Endangered
VU: Vulnerable
NT: Near Threatened
LR: Low Risk
LC: Least Concern
DD: Data Deficient
NE: Not Evaluated
cd: conservation dependent