STATE OF WILDLIFE RESOURCES IN UGANDA

2018

FOR GOD AND MY COUNTRY

UGANDA WILDLIFE AUTHORITY

UWA

Conserving for Generations

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STATE OF WILDLIFE RESOURCES IN UGANDA 2018

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FOREWORD

Wildlife resources play critical ecological and economic roles and immensely contribute to the development of the country. Uganda Wildlife Authority (UWA) is mandated to publish annual status of wildlife reports to guide planners and policy makers in making informed decisions about wildlife conservation and its contribution to the economy. UWA has been delivering on this mandate by conducting wildlife censuses over the years. This report presents the results on the status of wildlife resources in Uganda.

The report contains data generated by UWA and partners and shows performance patterns and trends of key wildlife species in the country including mammals, reptiles, birds, amphibians and invertebrates. The report also highlights favorable policies, gaps and opportunities for conservation and sustainable utilization of wildlife.

This publication is an important milestone for the country and comes at a time when Uganda is implementing the National Development Plan II (2015/16–2019/20) as well as Vision 2040. Uganda is currently grappling with unprecedented levels of habitat loss including deforestation, environmental degradation and high human population growth. The information presented in this report will, therefore, serve as an important reference for Ugandans and other partners/stakeholders in understanding the status of wildlife and will guide on the strategic directions that need to be followed to ensure the survival and protection of wildlife, their habitats and related natural resources.

Finally, this report may be used by stakeholders in conservation, community development and tourism promotion, among others. I therefore encourage all planners, policy makers and the general public to read this report and use the knowledge herein for the various purposes that may be beneficial to our country and wildlife conservation in particular.

Prof. Ephraim Kamuntu (MP)

MINISTER OF TOURISM, WILDLIFE AND ANTIQUITIES

MESSAGE FROM THE CHAIRMAN BOARD OF TRUSTEES

The pre-1920s period was characterized by a high diversity of wildlife in East Africa. From the 1920s up to the 1960s, Uganda had a high diversity of wildlife resources widely distributed across the country. With the establishment of wildlife protected areas at the beginning of the 20th century, the population of wildlife outside protected areas declined and remained largely in protected areas and a relatively low pockets of habitats outside the protected areas mainly due to increased human populations. In addition, there was upsurge in competing land uses and unsustainable utilization of wildlife in the form of poaching for bush meat and trophies. These caused a serious threat to conservation and led to a sharp decline in wildlife population in Uganda.

Management of wildlife in Uganda suffered greatly due to breakdown of law and order in the 1970s and early 80s as it exacerbated commercial poaching. Populations of large mammal species declined drastically. From 1985, the country began to experience peace and stability and there has been marked improvement in wildlife conservation and steady recovery of wildlife populations within and outside protected areas. Some species which had gone extinct or been extirpated have been recovering progressively. Out of range white rhinos have been introduced in Ziwa Ranch. Kabwoya Wildlife Reserve was restocked with Waterbukcs, Jackson heartbeasts and Gaint forest horges while Katonga Wildlife Reserve has been restocked with Impalas and Zebras while Kabwoya Wildlife Reserve has been restocked with Hartebeests, Giant forest horges and Waterbucks. Translocations of Giraffe to Lake Mburo National Park and the Southern Bank of Murchison Falls National Park have been done. KVNP was restocked with Uganda kobs ans Pian Upe WR was restocked with Imapalas.

In 1996 UWA was established to ensure sustainable management of wildlife resources in Uganda. The organization is responsible for the management of 10 National Parks and 12 Wildlife Reserves, and provides guidance for the management of 5 Community Wildlife Areas and 10 Wildlife Sanctuaries. UWA is also responsible for the management of wildlife outside Protected Areas (PAs). In 1999, a Uganda Wildlife Policy was produced which contains guiding principles for the organizational reform and activities of the UWA. Since 1999, many institutional reforms have taken place thus making it imperative to revise the policy. In 2014 the revised Uganda Wildlife Policy was approved and is operational.

Based on the policy, inventories and assessments have been undertaken to establish the state of ecosystems, wildlife habitat health, species diversity and abundance in some protected areas. UWA has been carrying out periodical surveys of medium – large mammals using both aerial and ground count methods to establish species' population trends and distribution patterns in the country. A program for monitoring species populations and trends over time is in place. This has enabled generation of information on wildlife species trends, abundance and distribution patterns within protected areas as required and stipulated in the Wildlife Act Cap 200.

This report analyses data, reviews previous literature and highlights the effects of poaching on wildlife resources over the years. It calls for concerted efforts in protecting the remaining wildlife through increased surveillance, stakeholder collaboration, law enforcement, resource mobilization and increased budget allocation and community involvement with a view to generating long-term socio-economic benefits. Similarly, the report highlights the need to address some of the traditional and emerging challenges like continued habitat deg-

radation and climate change. Climate change impacts wildlife habitats, feeding habits, breeding patterns and migration activities. This in turn influences the survival and welfare of the animals as well as the interface with humans and its related levels of conflict between wildlife and communities. UWA will work with its stakeholders and partners through increased surveillance, regular monitoring and applied research to enhance the conservation of Uganda's wildlife resources for the benefit of the present and future generations.

The report presents baseline information to enable UWA management make informed decisions, apply conservation strategies as well as evaluate the impacts of management actions on species diversity, population trends and the state of their habitats and ecosystems.

It is my sincere hope that the information contained in this report will serve as baseline upon which future assessments and evaluation of the performance of the wildlife sector in Uganda will be based.

Benjamin Otto

CHAIRMAN BOARD OF TRUSTEES

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The compilation of this report was a collaborative effort spearheaded by the Ecological Monitoring and Research Unit of Uganda Wildlife Authority with the input of numerous experts, people and organizations. Contributing experts were Dr. Robert Kityo, Dr. Grace Nangendo, Dr. James Kalema, Dr. Panta Kasoma, Dr. Simon Nampindo, Mr. Achilles Byaruhanga, Dr. Priscilla Nyadoi, Dr. Robert Bitariho, Dr. Edward Andama, Mr. Edgar Buhanga, Mr. Charles Tumwesigye and Ms. Annet Tuhaisomwe. UWA also acknowledges the contribution of NatureUganda, National Biodiversity Data Bank and Individuals that contributed data and the technical committee that reviewed this report. The management of Uganda Wildlife Authority which provided all the funding that enabled the team to undertake the preparation of this report is highly appreciated.

EXECUTIVE SUMMARY

The report on the state of wildlife resources in Uganda has been developed in line with the statutory obligation for Uganda Wildlife Authority to produce annual reports on the state of wildlife resources (Section 5(p) of the Uganda Wildlife Act CAP 200.

The diversity and trends of key wildlife species inside and outside protected areas of Uganda has varied over the past decades. However, the latest figures show that the population of some species has doubled since 1999. For example, the mountain Gorilla population has increased from 292 in 1995 to a minimum of 400 in 2015, the Elephant population has increased by over 1000% from 550 in 1995 to over 5,000 in 2014, Buffaloes increased from 7,000 in 1995 to 36,953 in 2014, the Giraffe population increased from 153 individuals in 1995 to 1064 in 2014 and the Chimpanzee population increased from 3,300 in 1997 to 5,000 in 2003. This report was compiled through a consultative process and it strives to provide information on population status and performance of the different taxa in Uganda. However due to lack of data on some species such as plants, the report focuses mainly on the status and distribution of key wildlife species in Uganda.

Chapter I of the report covers introduction which highlights national biodiversity conservation status, relevant national and international policy and legal framework, and the background to wildlife conservation in Uganda

Chapter II presents the extent of protected areas in Uganda and population trends of different species of mammals, reptiles, amphibians and birds, inside and outside wildlife protected areas but to a large extent inside protected areas.

Chapter III presents threats to conservation of wildlife in Uganda. These include poaching, habitat fragmentation and degradation, human-wildlife conflicts, climate change, invasive species, parasites and diseases. This chapter also outlines various conservation actions required to address the front line threats. It further explores opportunities for promoting conservation and enhancing populations through collaborative management with local communities and the private sector.

Chapter IV provides information on the significance of the wildlife sector to national economy. It also presents a section on conclusion and recommendations.

ACRONYMS AND ABBREVIATIONS

BINP	Bwindi Impenetrable National Park
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CFR	Central Forest Reserve
EN	Endangered
GIS	Geographical Information System
GMP	General Management Plan
GPS	Global Positioning System
IUCN	International Union for Conservation of Nature
KNP	Kible National Park
KTWR	Katonga Wildlife Reserve
KWR	Kabwoya Wildlife Reserve
JGI	Jane Goodall Institute
LMNP	Lake Mburo National Park
MEMD	Ministry of Energy and Mineral Development
MENP	Mt. Elgon National Park
MFNP	Murchison Falls National Park
NBDB	National Biodiversity Data Bank
NEMA	National Environment Management Authority
NFA	National Forest Authority
NP	National Park
QENP	Queen Elizabeth National Park
RMNP	Rwenzori Mountains National Park
TSWR	Toro Semuliki Wildlife Reserve
UNCST	Uganda National Council for Science and Technology
UBOS	Uganda Bureau of Statistics
VU	Vulnerable
UWA	Uganda Wildlife Authority
WCS	Wildlife Conservation Society
WMD	Wetlands Management Department under the Ministry of Water and Environment
WR	Wildlife Reserve
WTTC	World Travel and Tourism Commission

CHAPTER 1

Introduction

1 INTRODUCTION

Uganda lies between latitudes 4°N and 2°S (a small area is north of 4°), and longitudes 29° and 35°E. The country is located in an area where seven of Africa's distinct biogeographic regions or phytochoria converge (White, 1983). Given its location in a zone between the ecological communities that are characteristic of the drier East African savannas and the more moist West African rain forests, coupled with high altitude ranges, Uganda has a high level of biological diversity.

In 2015 a team of experts from Wildlife Conservation Society, Uganda Wildlife Authority, Ministry of Energy and Mineral Development, National Environment Management Authority and Uganda National Council for Science and Technology evaluated the status of threats for six taxa including mammals, birds, reptiles, amphibians, butterflies, dragonflies and vascular plants using the IUCN Red List Guidelines. The total number of species per taxa found to be nationally threatened are; 77 species of mammals, 83 birds, 31 reptiles, 19 amphibians, 44 dragon flies, 184 butterflies and 99 plant species. Of these, 110 species are critically endangered, 174 endangered and 253 vulnerable.

1.1. POLICY AND LEGAL FRAMEWORK

1.1.1. The 1995 Constitution of the Republic of Uganda

Objective XIII of the 1995 Constitution of the Republic of Uganda provides for State protection of important natural resources such as land, water, wetlands, minerals, fauna and flora on behalf of the people of Uganda. The Constitution provides for creation and development of parks, reserves, recreation areas and conservation of natural resources by central and/or Local Governments under Objective XXVII. The same objective further obligates the state to promote the rational use of natural resources so as to safeguard and protect the biodiversity of Uganda. Under Article 237(b) of the Constitution, Government or a local government as determined by Parliament by law shall hold in trust for the people and protect natural lakes, rivers, wetlands, forest reserves, game reserves, national parks and any land to be reserved for ecological and touristic purposes for the common good of all citizens.

1.1.2. Wildlife Policy 2014

The Wildlife Policy 2014 provides for sustainable management and development of wildlife resources in a manner that contributes to the development of the nation and the well-being of its people. The theme of the policy is "enhanced wildlife contribution to national growth, employment and socio -economic transformation for prosperity".

1.1.3. The Uganda Wildlife Act cap 200.

Section 5(p) of Uganda Wildlife Act cap 200 provides for the establishment of wildlife conservation areas and management of wildlife resources inside and outside wildlife protected area. The Act also establishes wildlife user rights and the institutional framework for the program development and implementation.

1.1.4. Uganda Wildlife Conservation Education Centre Act 2015

The Uganda Wildlife Conservation Education Centre Act, 2015 is an Act to promote the conservation of renewable natural resources through education using the Centre, its facilities and programs, both on site and through extension services; establishment of Uganda Wildlife Education Centre with its trustees as a body corporate and for other matters incidental to or connected with the foregoing.

1.1.5. Uganda Wildlife Research and Training Institute Act 2015

The Uganda Wildlife Research and Training Institute Act 2015 provides for the establishment of a self-sustaining centre of excellence for conducting research, training and consultancy services in conservation and sustainable development of wildlife resources in and outside Protected Areas.

1.1.6. The National Environment Act, Cap 153 of 2000

The object of the National Environment Act is to further the principles of environmental management by facilitating the conservation and enhancement of the environment. The Act provides for wildlife protection and contains provisions which can be applied to the protection and sustainable use of wildlife. It includes provisions for the conservation of biological resources in situ, and the selection and management of protected and buffer areas. The act also provides a basis for environmental impact assessment and audit for developments with potential negative impacts on wildlife resources in and outside protected areas.

1.2. INTERNATIONAL LAWS

The 1995 Constitution of the Republic of Uganda sets out the principles of foreign policy objective of Uganda as (a) promotion of the national interest of Uganda (b) respect for international law and treaty obligations(c) peaceful coexistence and nonalignment (d) Settlement of international disputes by peaceful means (e) opposition to all forms of domination, racism and other forms of oppression and exploitation.

Uganda is a signatory to a number of international conventions, treaties and Agreements relating to wildlife. These are in line with Uganda's foreign policy which obligates the state to conserve wildlife and wildlife protected areas and promote sustainable development of wildlife resources. International laws which are of immediate importance for the conservation of wildlife – and laws to which Uganda is a member state include:

1.2.1. Convention on Biological Diversity (CBD) of 1992

The Convention on Biological Diversity (CBD), 1992 obliges member states to establish a system of protected areas, develop guidelines for the selection, establishment and management of protected areas, and promote the protection of ecosystems, natural habitats and the maintenance of viable populations of species in natural surroundings and integration of sustainable utilization of natural resources in national strategies.

1.2.2. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) of 1973

The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), 1973 obliges member states to regulate international trade in endangered species of fauna and flora through international cooperation. It's aim is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. The Ministry of Tourism, Wildlife and Antiquities is the Management Authority of CITES in Uganda.

1.2.3. Convention on Migratory Species (CMS) of 1979

The Convention on Migratory Species (CMS), 1979 obligates Uganda to conserve migratory species of wildlife across their migratory range. It also requires Uganda to cooperate with other states that form part of the migratory range of wildlife resources found or migrating through Uganda. Other protocols have been formulated under this convention and they include African-Eurasian Waterbird Agreement which Uganda is a party to and Gorilla Agreement which Uganda is yet to ratify.

1.2.4. East African Community Protocol on Environment and Natural Resources (2006)

The East African Community Protocol on Environment and Natural Resources (2006) obligates Uganda as one of the Partner States of the East African Community to sustainably conserve wildlife resources in collaboration with the local communities. The protocol requires Uganda to cooperate in the management of trans-boundary wildlife resources, promotion of social and economic incentives for conservation and to conclude agreements aimed at conserving trans-boundary wildlife resources.

1.2.5. Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat, 1971

Parties to the Ramsar Convention 1971, are expected to demonstrate their commitments to wetland management through three 'pillars' of action: 'wise – or sustainable - use of wetlands; identification of internationally important wetlands for inclusion in the Ramsar List; and the international cooperation and sharing of information and expertise. Uganda ratified the Ramsar Convention in 1988 and since then the country has made significant progress in implementing the principles of the convention. After acceding to the treaty in 1988, Uganda listed the Lake George Ramsar site.

1.3. RATIONALE

Section 5(p) of the Uganda Wildlife Act Cap 200 requires UWA to prepare annual reports on the state of wildlife resources and related reports as may be deemed necessary. The publication of the status of wildlife resources is an essential ingredient for planning and formulation of conservation policies. Information on wildlife species distribution, abundance patterns, and seasonal variations, is also required to understand the significance of each individual species in the habitat and ecosystem and the required conservation measures against their frontline threats.

1.4. BACKGROUND TO WILDLIFE CONSERVATION IN UGANDA

Until 1960s when the country's human population was still small and scattered, Uganda had high diversity of wildlife resources distributed across the country. Huge herds of Elephants and Buffaloes and other 'plains wildlife' ranged over wide areas. From1960s the human population has been increasing posing a serious threat to wildlife. For instance in 2014 the population of Uganda was estimated at 34.6 million people (UBOS, 2014). Looking back, in the year 1960, Uganda had a population of 6.8 million people.

In the 1950s and 1960s, the Game Department and the Uganda National Parks responded to the challenges of wildlife conservation by creating and expanding a network of national parks and game reserves to protect

wildlife and its habitats. In these areas, settlement, cultivation and hunting were prohibited. During the 1960s, Uganda National Park made great efforts to develop the three national parks, Queen Elizabeth, Murchison Falls and Kidepo Valley. These parks became famous world-wide for their variety of scenery and spectacular concentrations of wildlife, and Uganda quickly surpassed Kenya and Tanzania in the development of wildlife-based tourism. Lodges were built, road networks expanded, and there were scheduled flights to the parks' airfields from Entebbe International Airport. Murchison Falls National Park became the most popular wildlife destination for tourists in East Africa, attracting some 60,000 visitors annually. Safari lodges were constructed at Paraa, Chobe and later Pakuba to cater for the tourist influx. The launch trip to the base of the Water Falls on River Nile was the primary attraction, and at the peak of tourist visitations up to 12 launch trips were made each day.

With the breakdown of law and order in the 1970s and early 1980s, wildlife in Uganda faced drastic decline. Wildlife suffered a great deal from heavy commercial poaching due to breakdown of law and order. With the overthrow of Idi Amin in 1979, "powerful rifles and machine guns dropped by fleeing soldiers were turned against game in every conservation area" (Game Department, 1979). The systems through which the Game Department enforced the Game Act were rendered archaic by the improved and newly developed poaching methods of using automatic weapons. A number of aerial surveys conducted from 1980-1983 reported drastic decline in wildlife in general, and Elephants in particular, throughout the protected areas (Eltringham and Malpas 1980, 1983; Douglas Hamilton et al 1980). Throughout the 1970s, Elephants in Uganda were intensively hunted for their ivory to supply an expanding international ivory market (Eltringham and Malpas 1980). Over the period 1979-1985, there was continued and increased slaughter of Elephants and other wildlife in protected areas with automatic weapons due to civil wars and political instability (Edroma 1984). By 1980 the Elephant population in Queen Elizabeth National Park had declined from the 1960s estimates of 2,500-4,000 to just 150 and from 12,000 to 1,420 in Murchison Falls National Park (Douglas-Hamilton et al 1980).

The 1970s was also a decade of intensive encroachment of the protected areas. The Game Department reported in 1975 that the future of Uganda's rich wildlife heritage was seriously threatened by conflicting land use patterns which received preferential treatment to meet the immediate needs and requirements of increasing human population and economic development.

Since 1986 when the National Resistance Movement Government came into power, Uganda has enjoyed greater political stability and peace. In recognition of the past contribution of tourism to the national economy, the Government embarked on securing wildlife protected areas and rebuilding tourism infrastructure. Six forest reserves namely Kibale, Semliki, Mount.Elgon, Rwenzori Mountain, Bwindi Impenetrable and Mgahinga that conserve biodiversity of national and international importance and hitherto managed by the Uganda Forest Department were upgraded to national park status.

In 1995/96, a country-wide aerial survey was conducted in the national parks, wildlife reserves and controlled hunting areas to determine the status of wildlife protected areas, prior to the creation of the Uganda Wildlife Authority. The survey revealed that many protected areas were massively encroached and that wildlife populations had been reduced to critically low levels and several key wildlife species had become extinct. For instance, Oryx had been entirely extirpated from their range in Karamoja, Derby's Eland from West Nile, the bongo from Mt Elgon, and both the black and the white rhino from their ranges in the north of the country. Over the entire country, wildlife in savannah areas had been reduced by 95% since the 1960s (Edroma 1984).

In 1996, Uganda Wildlife Authority was established by the Uganda Wildlife Statute, which merged the Uganda National Parks Department with the Uganda Game and Fisheries Department. UWA was established to man-

age wildlife within and outside protected areas. Because the parks and reserves were in a critically poor condition, UWA has faced an unprecedented challenge in reversing the declines of the 1970s. The frontline challenges faced by UWA include addressing human-wildlife conflicts, prolific spread of invasive species as well as climate change and diseases. UWA has been striving to address these conservation challenges but amidst these challenges it will take considerable time to attain the wildlife densities and diversities of the 1960s.. Nonetheless the protected areas are being rehabilitated, and in most national parks there has been a recovery in wildlife numbers since the late 1980s. The rehabilitation of protected areas could have been the precursor for improved visitor numbers to the National Parks and Wildlife Reserves.

Since 1996, the country has made remarkable strides to re-stock some of the wildlife protected areas including private ranches.

The rhino of the southern white subspecies has been introduced into the country. This year 2018 there are 2 individuals at Uganda Wildlife Education Centre and 22 at Ziwa ranches in Nakasongola District. In January 2018, Katonga Wildlife Reserve was restocked with 43 individuals of Zebras and 20 individues of Topi, were , in May 2008, Kabwoya Wildlife Reserve was restocked with12 individuals of Waterbucks, 15 individuals of Jackson heartbeasts and 3 individuals of Giant forest horges, , In May 2017, KVNP was restocked with 110 individuals of Uganda kobs in March 2018 Pian Upe WR was restocked with 92 individuals of Imapalas, in May 2017, LMNP was restocked with 15 individuals of Giraffe and in January 2016, Southern Bank of MFNP was restocked with 18 individuals of Giraffe.

CHAPTER 2

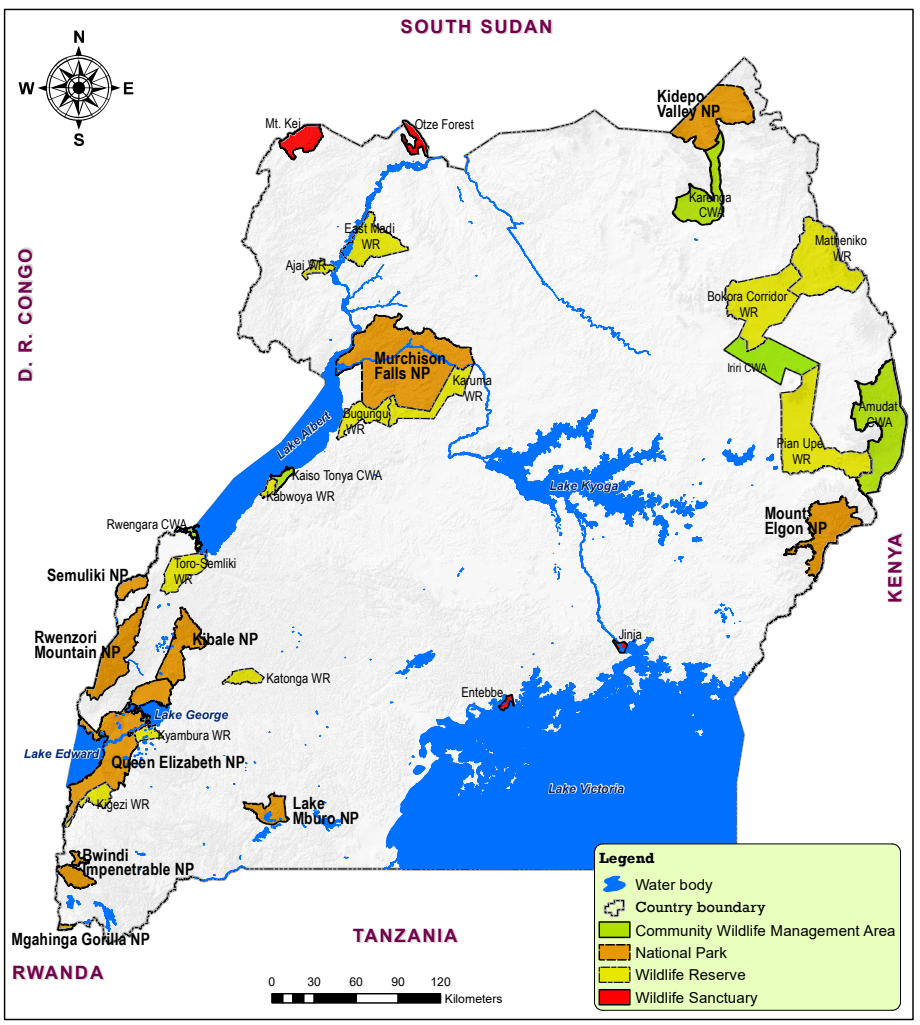
Wildlife Trends in Uganda

2 WILDLIFE TRENDS IN UGANDA

2.1. EXTENT OF PROTECTED AREAS IN UGANDA.

Uganda's total surface area 25,981.57(both land and water) is square kilometres (Wildlife Policy, 2014). Out 25,981.57 square kilometres (10%) is gazetted as wildlife conservation areas, 24% as forest reserves and 13% as wetlands. Uganda has 734 protected and conservation areas comprising 10 National Parks, 12 Wildlife Reserves, 10 wildlife sanctuaries, 5 community wildlife areas, 506 central forest reserves and 191 local forest reserves. UWA is responsible for overseeing the management of National Parks, Wildlife Reserves, Community Wildlife Management Areas and Wildlife Sanctuaries while the National Forestry Authority is mandated to manage Central Forest Reserves (CFRs). The District Forestry Services oversee the management of Local Forest Reserves (Figure 1)

Figure.1: Protected Areas In Uganda.



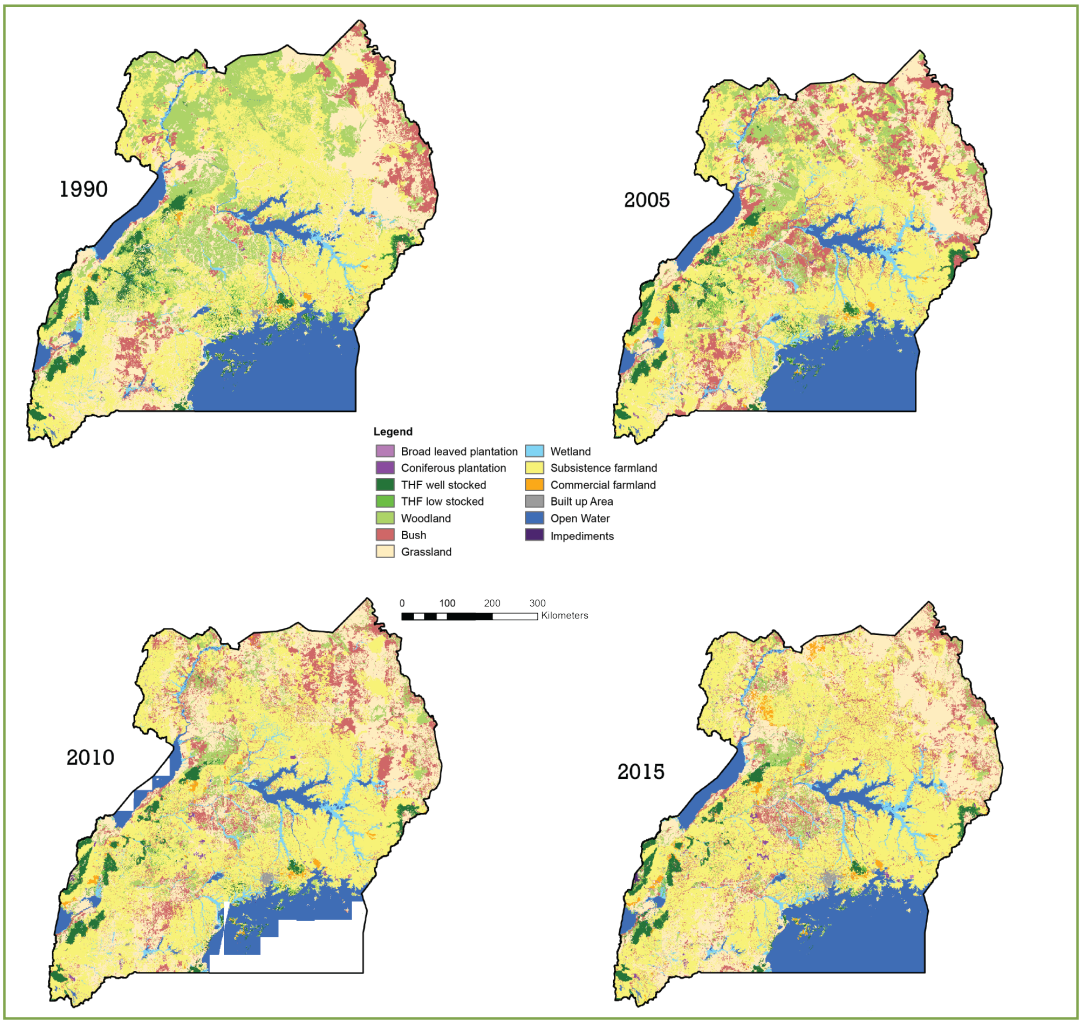
2.2. LAND COVER CHANGES

Actual numbers of woody plant species abundance countrywide has not been recently estimated. So the change in 'natural' vegetation cover, especially forest cover (tropical high forest and woodlands), have been used as a proxy for the change in woody plants.

2.2.1. Trends in forest coverage

Uganda is estimated to be losing its forest cover at a rate of 80,000 hectares per year. Between 1890 and 1990, the area of forest and woodland has declined from 45 percent to 20 percent of total land surface (NFA, 2011 in NEMA, 2015). The majority of forest loss has occurred outside of PAs and is largely due to conversion of forest lands to agriculture and over-harvesting of wood for firewood and charcoal (NFA, 2011, in NEMA, 2015). The rate of decline of forest cover is 1.8 percent per year, equivalent to 2.2 percent in private forests and 0.9 percent in PAs (NEMA, 2012). Figure 2 shows the trend in loss of forest cover since 1990.

Figure.2: Change in Uganda Forest Cover, 1990–2015



Source: NFA, 2015

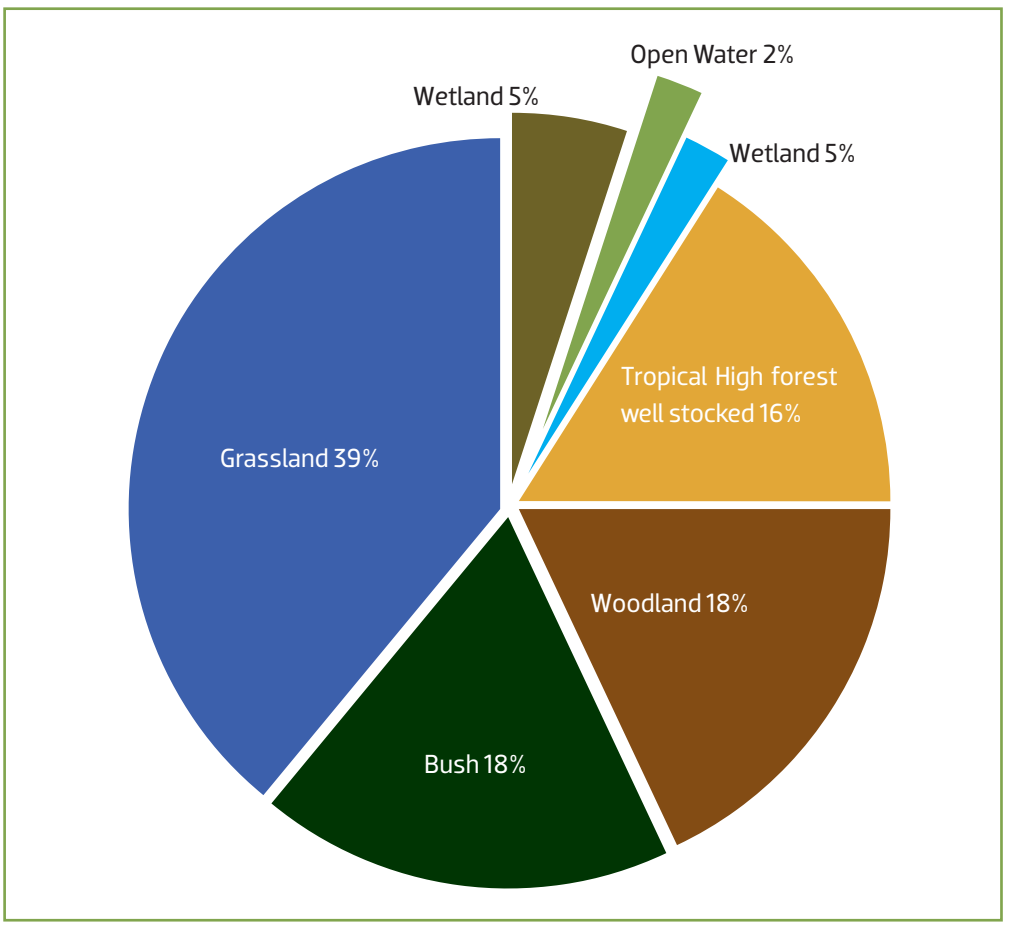
2.2.2. Trends of vegetation cover in wildlife protected areas.

Studies to assess the vegetation changes have not been conducted in all the parks. Studies on vegetation changes have been conducted in Rwenzori Mountains National Park (Eilu, 2013; Plumptre, 1996), Queen Elizabeth National Park (Lock, 1998) and Murchison Falls National Park (Plumptre, 2015).

QUEEN ELIZABETH NATIONAL PARK

The major plant communities in the park are grasslands which constitute 39% of the park area with woodlands and Bush covering 18% each, whilst Tropical high forests comprise 16% of the total area. Wetlands and open water cover 5% and 2% respectively. It is worth noting that open water bodies located within the park include the Kazinga Channel approximately 40km in length, Lake George, part of LakeEdward, and several crater lakes all in Queen Elizabeth National Park. The vegetation classes are similar to those identified by previous researchers who did more detailed studies in the past (Mapesa, 1991 and Lock 1988 in UWA report 2011) Figure 3. Proportion of land covers types in the Park.

Figure.3: Proportion of land covers types in Queen Elizabeth National Park



Source: UWA, 2011

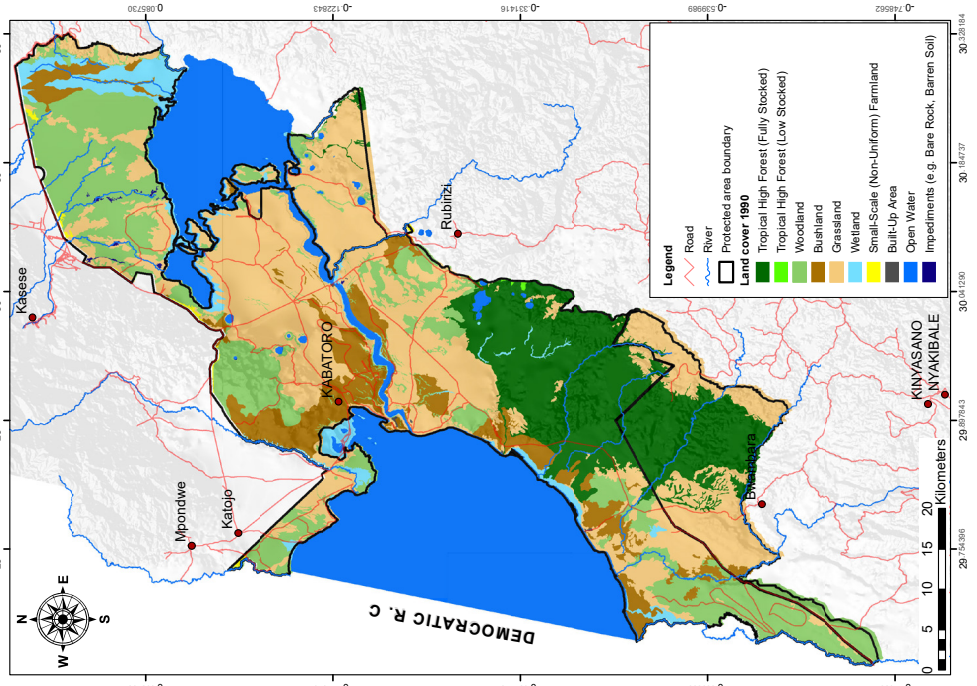


Figure.5: QEPA land cover Map for 2015

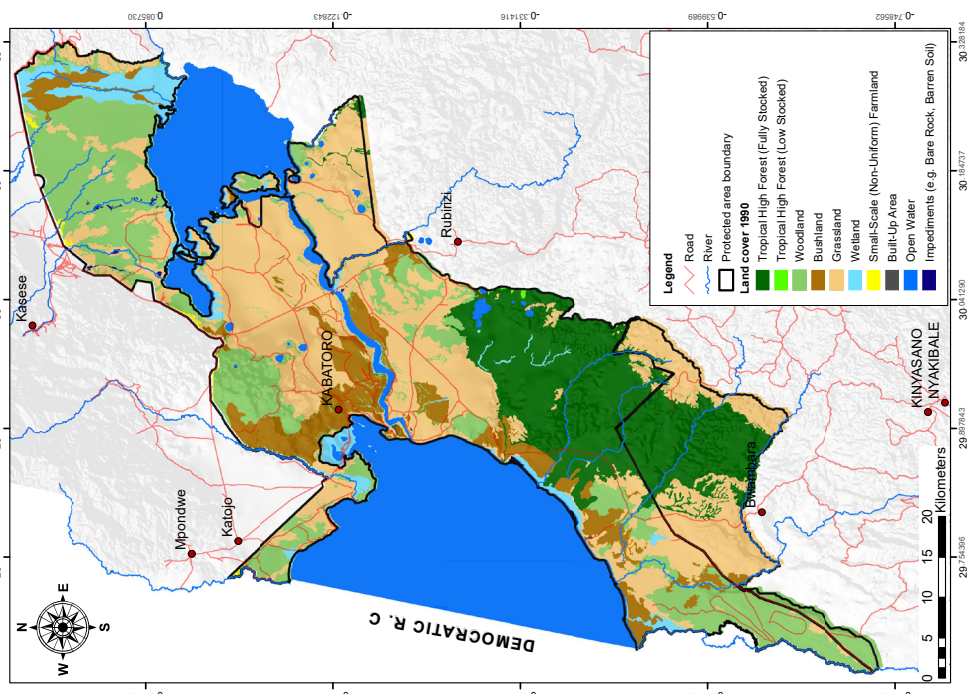


Figure.4: QEPA Land cover Map for 1990

RWENZORI MOUNTAINS NATIONAL PARK.

Figure.6: Vegetation cover in and around Rwenzori Mountains National Park

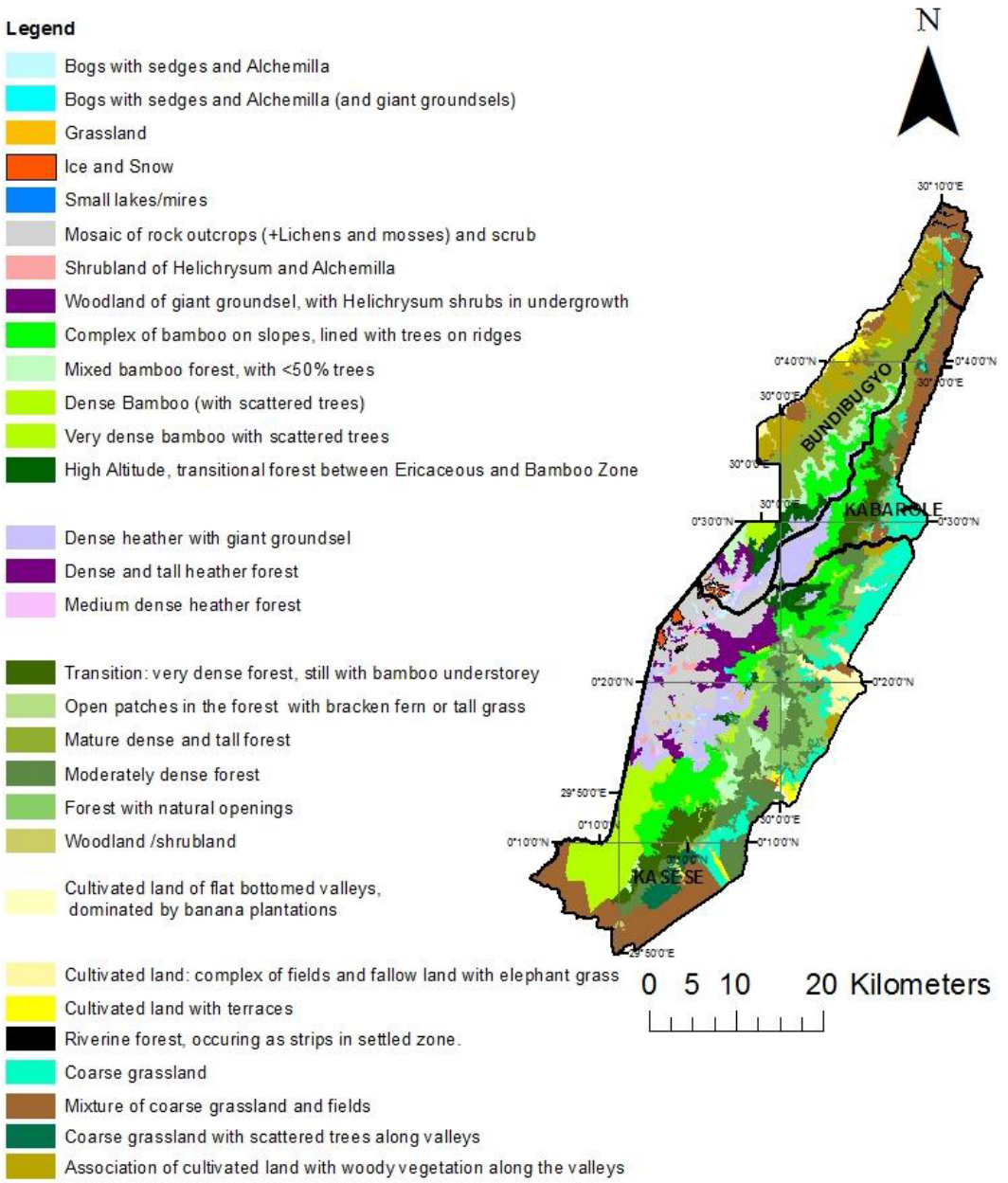
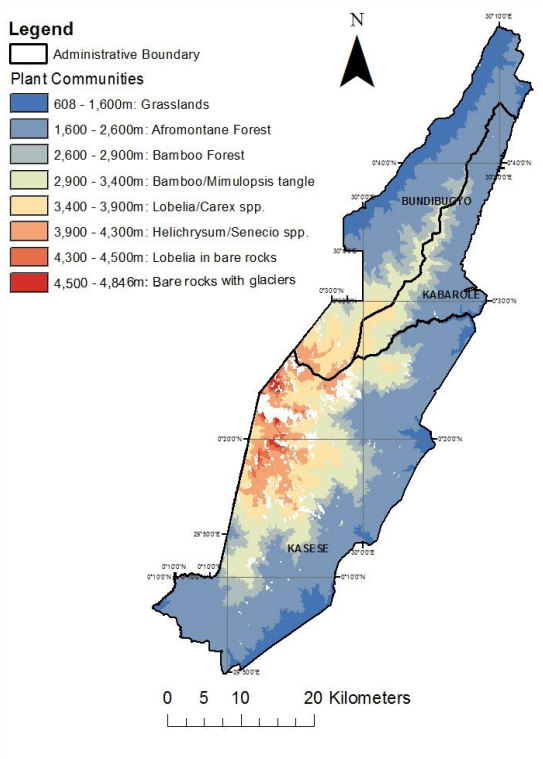
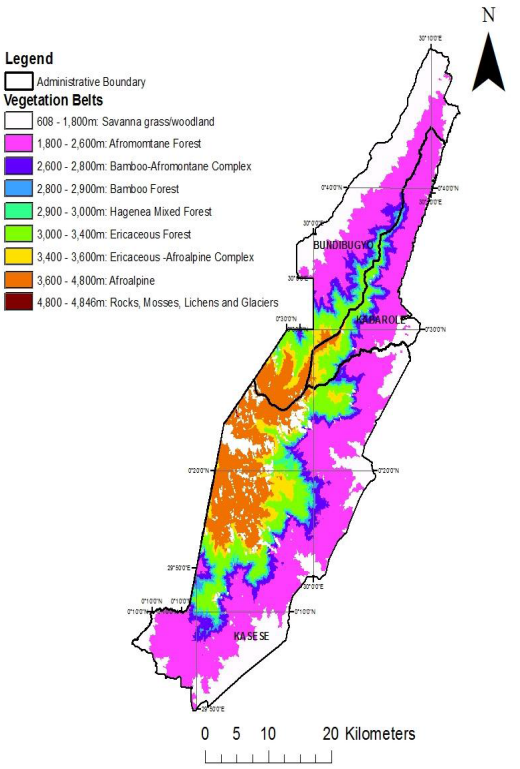


Figure.7: Vegetation zones in Rwenzori Mountain National Park



Showing location of dominant plant communities (from Osmaston2006 in UWA report 2013).

Figure.8: Vegetation belts in RMNP



Showing location of distinct plant communities (adapted from Plumptre, 1996: MUIENR 1999 in UWA report 2013).

Source: UWA report 2013

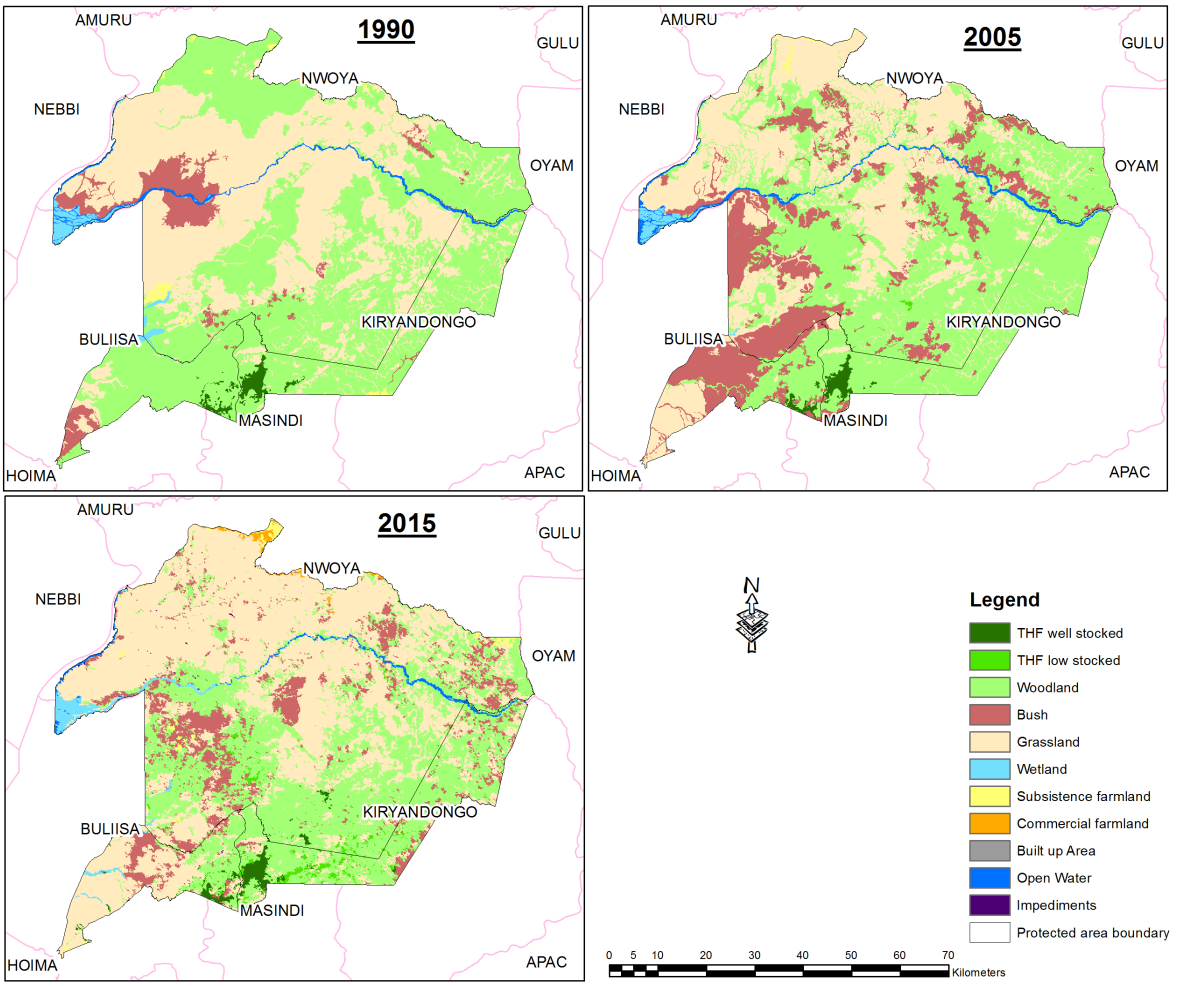
The common plant species in the park are *Symphonia globulifera* and *Prunus africana*. The other key species in the forest include *Podocarpus milanjianus*, *Arundinaria alpina*, *Albizia spp.* and *Dombeya spp.* (Forest Department, 1996).A variety of other plants such as *Grumilea megistocticta*, *Ensete edulis* and *Cyathea deckenii* occur

Above the Afromontane forest is a bamboo forest, previously up to 3,000 m, gradually replaced by *Mimulopsis elliotii*. Eventually Ericaceous forest grows on the narrow ridges and then *Helichrysum spp.* begins to appear. There are overlaps of plant species composition and distribution in ecotones between adjacent zones.Out of the 278 woody plant taxa found in the afro-alpine zone, 81% are endemic to East Africa (Lush, 1993 in UWA report, 2013). Most astonishing are the giant *Dendrosenecio, Erica* and *Lobelia spp.* The ecologically fragile Afro-alpine zone extends up to the snow line (C. 4,400 m) and is dominated by genera such as *Helichrysum* and *Alchemilla* (Howard, 1991; Osmaston, 2006).

MURCHISON FALLS NATIONAL PARK

The land cover in MFNP has been changing over time (Figure 9). There is transition from grassland to woodland in many parts of the park. The notable change has happened over the Tangi valley where the predominant woodland of 1990 has changed to grass/bush land by 2015. The vegetation in the mid western part of the park has changed from grassland to bush/woodland. The vegetation changes in the park may be attributed to increase in Elephant population, number of herbivores, incidences of fires and also due to climate change.

Figure.9: Land cover change over 25 years



Source: UWA report 2016)

2.3. WILDLIFE POPULATION ESTIMATES OVER THE YEARS

Wildlife populations are steadily building up in National Parks and Wildlife Reserves. Comprehensive surveys to determine the status of wildlife (medium - large mammals) in Uganda's savanna areas were carried out from the air courtesy of the Protected Area Assessment Programme in 1995 – 1996 and the results from these surveys provide baseline information for most protected areas. Populations have increased for some species for instance mountain Gorilla population increased from 292 in 1995 to over 400 in 2015, the Elephant population increased by over 1000% from 550 in 1995 to over 5,000 in 2014, Buffaloes increased from 7,000 in 1995 to over 36,953 in 2014, the Giraffe population increased from 153 individuals in 1995 to over 1064 in 2014 and the Chimpanzee population increased from 3, 300 in 1997 to 5,000 in 2003. However, for certain species such as Burchell's zebra, Hartebeest, Topi and Eland the increase has not been remarkable while Roan antelope and Bright's gazelle is still low. However, Roan antelope numbers increased between 2010 and 2017. The population of Beisa Oryx, Eastern Black rhino, Northern White rhino and the Lord derby's Eland seriously declined to extinction. Gorilla and chimpanzee inhabit forest ecosystems and no surveys were done in the forests at that period(Table 1)

Table.1: Population estimates of selected Medium to large mammals in Uganda

Species	1960s	1982-1983	1995-1996	1999-2003	2004-2006	2007-2010	2011-2014	2015-2017
Buffalo *Syncerus caffer*	60,000	25,000	18,000	17,800	30,308	21,565	36,953	37,054
Zebra *Equus burchelli boehmi*	10,000	5,500	3,200	2,800	6,062	11,814	11,888	11,897
Elephant *Loxodonta africana*	30,000	2,000	1,900	2,400	4,322	4,393	5,739	5,808
Rothschild's Giraffe *Giraffa camelopardalis rothschildi*	2,500	350	250	240	259	984	880	880
Hartebeest *Alcelaphus buselaphus*	25,000	18,000	2,600	3,400	4,439	4,099	9,667	9,841
Hippopotamus *Hippopotamus amphibius*	26,000	13,000	4,500	5,300	7,542	6,580	5,838	5,838
Impala *Aepyceros melampus*	12,000	19,000	6,000	3,000	4,705	33,565	33,565	33,565
Topi *Damaliscus lunatus*	15,000	6,000	600	450	1,669	845	2,222	2,222
Ugandan Kob *Kobus kob*	70,000	40,000	30,000	44,000	34,461	54,861	77,759	74,702
Waterbuck *Kobus ellipsiprymus defassa*	10,000	8,000	3,500	6,000	6,493	12,925	12,222	12,809
Common Eland *Tragelaphus oryx*	4,500	1,500	500	450	309	1,409	1,351	1,742
Bright's Gazelle *Nanger granti notata*	1,800	1,400	100	50	-	-	57	57
Roan Antelope *Sub-species-langheldi*	700	300	15	7	-	5	118	118
Beisa Oryx *Oryx beisa beisa*	2,000	200	-	-	-	-	-	-
Lord Derby's Eland *Taurotragus derbianus*	300	-	-	-	-	-	-	-
Northern White Rhino *Ceratotherium simum cottoni*	300	20	-	-	-	-	-	-
Eastern Black Rhino *Diceros bicornis*	400	150	-	-	-	-	-	-
Southern White Rhino *Ceratotherium simum simum*	-	-	-	-	8	11	17	22
Lion *Panthera leo*	-	-	-	-	-	408	493	493
Gorilla *Gorilla beringei beringei*	0	0	0	320	302	0	400	400
Chimpanzee *Pan troglodytes*	0	0	0	4,950	0	0	0	0

Gorilla numbers are records for Bwindi only

"-" implies that no observation was made of the particular species during the survey period

"0" No surveys were done for that species in that period.

2.4. POPULATION TRENDS OF SOME KEY WILDLIFE SPECIES IN INDIVIDUAL PROTECTED AREAS

2.4.1. Queen Elizabeth Protected Area (QENP, Kyambura WR and Kigezi WR)

The best documented animal population trends in Queen Elizabeth Protected Area are for large mammals, especially Elephants, hippos, Uganda kobs and Buffalos (Table 2).

Table.2: Medium-large mammal population in Queen Elizabeth Protected Area

	Species						
Year	Elephant	Buffalo	Hippo	Uganda kob	Topi	Waterbuck	Warthog
Pre-1973	2,500[a]	18,000[e]	11,000[e]	10,000[m]	5,000[f,l]	3,500[e]	4,000[e]
1976	1,200d			12,500n			
1980[c]	150	4,200	5,000	20,000	1,500	2,100	1,100
1988/1989[b]	400	5,000	2,200	18,000	400	1,500	1,600
1992[g]	500						
1995[h]	1,088	16,549	2,958	31,899	493	1,860	1,175
1999[i]	1,353	7,250	2,811	20,588	325	2,227	1,931
2000[j]	1,086	10,674	3,400	32,245	94	4,666	2,423
2001[j]					100		
2002[k]	998	6,807			157		
2004[o]	2,497	6,777	2,632	17,440	440	3,382	1,880
2006[p]	2,959	14,858	5,024	20,971	1,521	3,548	1,388
2010[q]	2,502	8,128	2,886	8,483	482	2,483	1,466
2012[r]	3,018	12,825	3,215	19,855	1,097	2,767	1,465
2014[s]	2,913	15,771	4,155	12,987	2,049	2,981	1,456

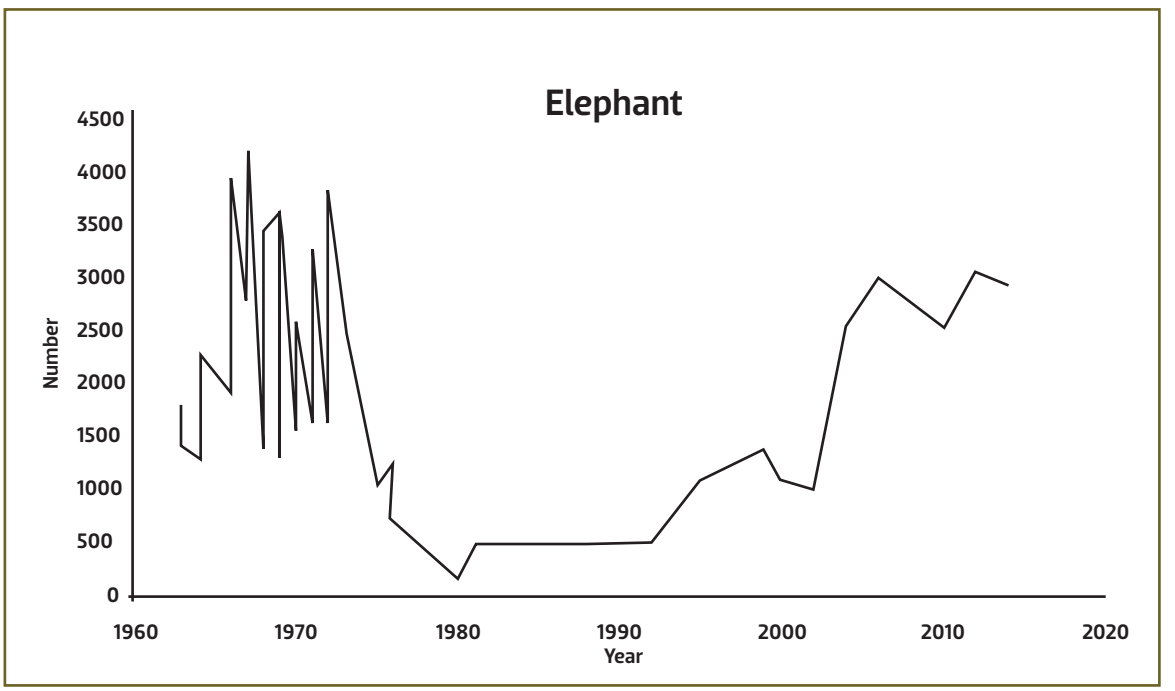
Sources: [a]Malpas (1980); [b]Olivier et al. (1989); [c]Douglas-Hamilton et al. (1980); [d]Douglas-Hamilton & Parker (1976); [e]Eltringham & Woodford (1973); [f]Edroma (1984); [g]Olivier (1992); [h]Lamprey and Michelmore (1996); [i]Lamprey (2000); [j]Lamprey (2001); [k]Rwetsiba et al.(2002); [l]NUTAE (1970); [m]Field (1968); [n]Modha and Eltringham (1976); [o]Rwetsiba et al.(2004); [p]Wanyama(2006); [q]Plumptre et al.(2010); [r]Wanyama et al.(2012); sWanyama et al.(2014).

Hippos were very numerous in QEPA during the 1950s and 1960s and Lake Edward had about 10,500 individuals by 1969 making it the largest population in the world. But by the late 1980's due to political instability, insecurity and heavy poaching, the numbers had reduced to only about 2,500. By 1990 the Hippo population had increased to 3,400 and the numbers as per the 2014 census are estimated at 4,155 (Table 2).

The numbers of Elephants fluctuated greatly during the 1960s. Observed Elephant population changes are partly a result of immigrations and emigrations, birth rates and death rates as well as heavy poaching of the 1970s (Buss, 1990).The highest recorded Elephant count in QEPA was in 1969 with 4,139 Elephants (Douglas-Hamilton et al 1980).According to Eltringham and Malpas (1980) and Douglas-Hamilton (1980), the number of Elephants in the park had been reduced to about 150 by 1980. However, by 1988 the Elephants had increased to 225 and by October 2000 the Elephant population in Ishasha sector alone was estimated at 700 with very relatively low individuals aged over 40 years. This could be attributed to better security within Uganda, immigrations and successful breeding.

The 2014 aerial survey estimated Elephant numbers at 2,913 and this increase may not only be attributed to improved management within Uganda but also to crossings from DRC where poaching has been wide spread. The Elephant numbers (Figure 10) have recovered to around the mean value of their 1960-1970s levels

Figure.10: Plot of numbers of Elephants for each year since 1963 in QEPA

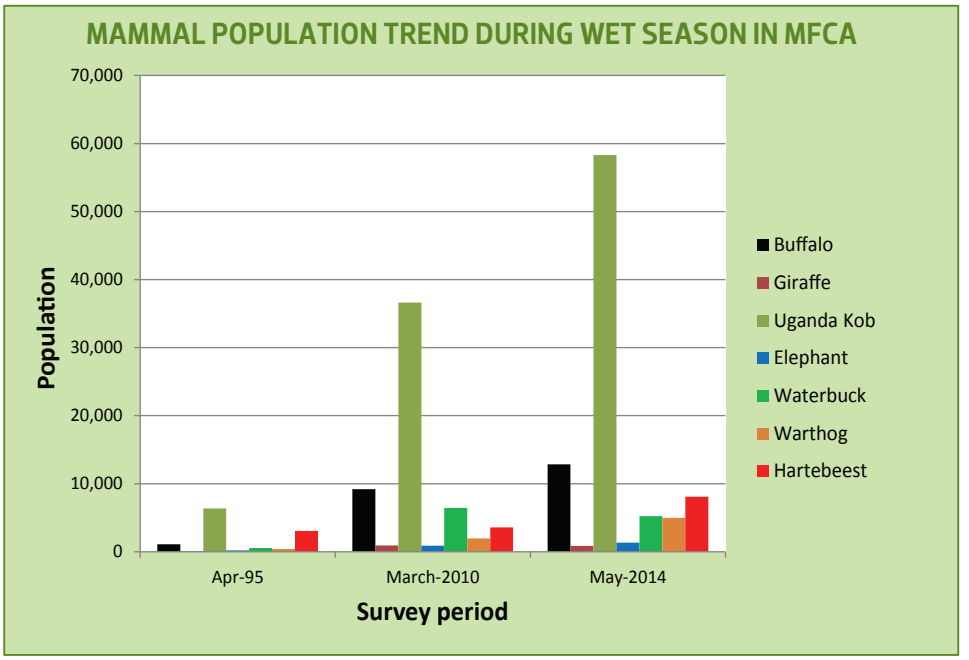


Source: UWA (2014).

2.4.2. Murchison Falls Protected Area (Murchson Falls NP, Bugungu WR and Karuma WR)

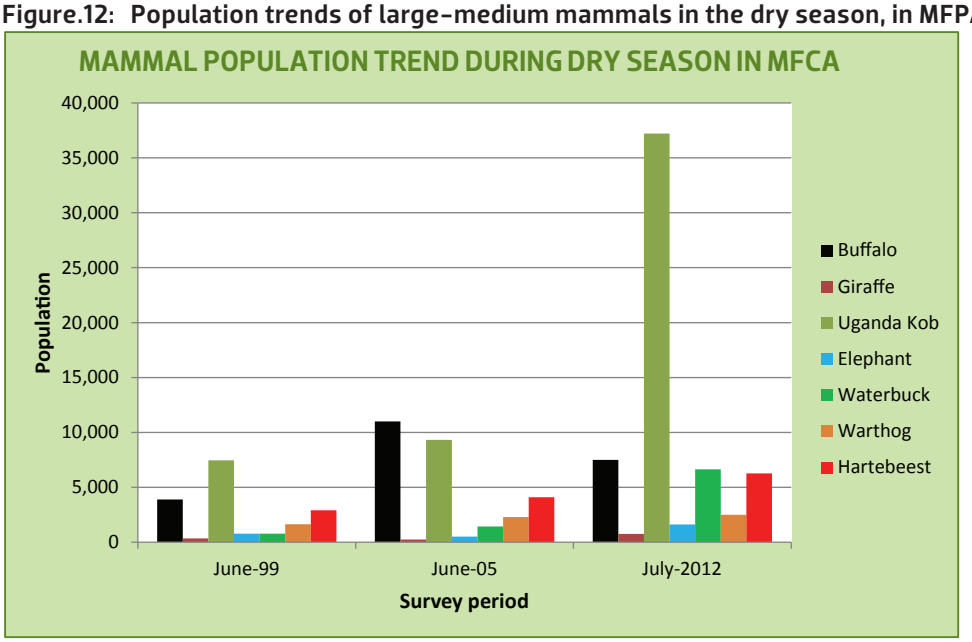
Wildlife population trends of key species are fairly well known in MFPA due to substantial census data recorded from the 1960s. The Elephant population within MFPA was estimated at 12,000 in the early 1960s. But by 1980 the Elephant population had reduced to 1,420 and to only 300 in the early and mid 1990's (Douglas-Hamilton et al 1980). Overall, based on the census results, animal populations in MFPA are steadily recovering (Figure 11 and12). Elephant, Uganda kob, Giraffe, Warthog, Hartebeest and Waterbuck show a positive recovery trend. However, it may also be true that where declines have occurred it could be due to a combined effect of natural factors such as diseases, predation, habitat changes, climatic changes, and human activities. MFPA experiences a bi-modal rainfall pattern with two seasons: March-May and August-November (NEMA 1998). Figures 11 and12 show the population trends of large mammal species in MFPA for the surveys conducted during the wet season (Figure 11) and the dry season (Figure 12). Overall, there was a positive trend for the two seasons (dry and wet)

Figure.11: Population trend of large-medium mammals in the wet season, MFPA.



Sources: [a]UNP (1971), Laws, Parker and Johnson (1976); [b]Malpas (1978), Douglas-Hamilton et al. (1980); [c]Olivier (1991); [d]Sommerlatte & Williamson (1995), Lamprey and Michelmore (1996); [e]Lamprey (2000); [f]Rwetsiba et al. (2002); [g]Rwetsiba and Wanyama (2005); [h]Rwetsiba and Wanyama (2010); [h]Rwetsiba et al. (2012); [i]Wanyama et al. (2014).

Figure.12: Population trends of large-medium mammals in the dry season, in MFPA.



Sources: [a]UNP (1971), Laws, Parker and Johnson (1976); [b]Malpas (1978), Douglas-Hamilton et al. (1980); [c]Olivier (1991); [d]Sommerlatte & Williamson (1995), Lamprey and Michelmore (1996); [e]Lamprey (2000); [f]Rwetsiba et al. (2002); [g]Rwetsiba and Wanyama

(2005); [h]Rwetsiba and Wanyama (2010); [h]Rwetsiba et al. (2012); [i]Wanyama et al. (2014).

2.4.3. Kidepo Valley National Park

Animal counts in Kidepo show stable trends of large mammals with some declines during the 1970s (Table 3). Cheetah, African hunting dog and striped hyena are occasionally seen in the park in very low numbers. The Elephant population in KVNP has remained stable and is estimated to be 407 (Wanyama et al 2014).

The results for the 2014 survey show that Jackson's Hartebeest (Table 3) numbers as well the Elephant numbers (Figure 13) have increased to the levels of the 1960s and 1970s while the number of Buffalo has surpassed that of the 1960s and 1970s. The numbers of other species such as Zebra and Rothschild Giraffe are still relatively low compared to the numbers recorded 1960s and 1970s, particularly when the total count is taken as an estimate of the true value (Wanyama et al. 2014). There are no records of ostrich numbers from previous aerial surveys to enable comparison.

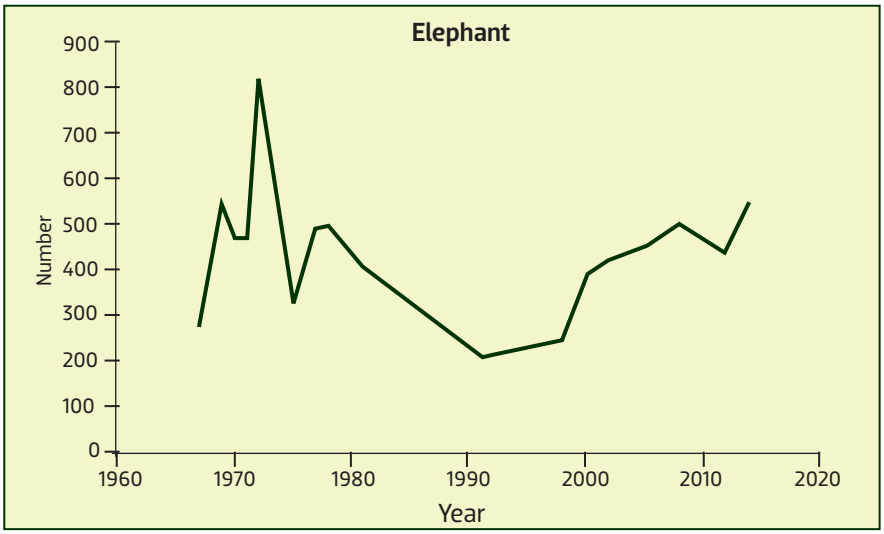
Table.3: Kidepo Valley National Park Wildlife population trends

YEAR	SPECIES									
	Elephant	Buffalo	Eland	Giraffe	Hartebeest	Oribi	Ostrich	Warthog	Waterbuck	Zebra
1967	277	–	–	72	–	–	–	–	–	262
1968	417	741	300	143	1,348	–	–	–	–	368
1969	540	–	–	–	–	–	–	–	–	–
1970	471	–	–	–	–	–	–	–	–	–
1971	470	2,000	–	400	3,000	–	–	–	–	651
1972	820	1,245	–	165	1,569	–	–	–	–	637
1975	333	–	–	76	–	–	–	–	–	449
1976		1,417	–	64	–	–	–	–	–	408
1977	492	1,071	–	143	1,409	–	–	–	–	484
1978	497	1,270	–	–	–	–	–	–	–	–
1981	411	564	200	160	1,400	–	–	–	–	450
1991	212	–	–	5	–	–	–	–	–	–
1992	215	–	–	8	–	–	–	–	–	–
1998	250	700	50	8	–	–	–	–	–	400
2000	390	1,500	–	8	130	–	–	–	–	300
2002	420	1,800	7	9	250	–	–	–	–	150
2005	454	2,750	13	14	338	39	–	42	–	94
2008	387	3,643	–	–	295	132	–	107	44	25
2012	440	3,912	17	17	524	19	58	25	178	75
2014	407	6,147	28	20	1,785	–	213	–	–	153

"–" implies that no observation was made of the particular species were recorded during the survey period

Source: Rwetsiba and Wanyama (2005); Wildlife Conservation Society (2008); Wanyama (2012); Wanyama et al (2014)

Figure.13: Plot of numbers of Elephants for each year since 1967 in KVNP.

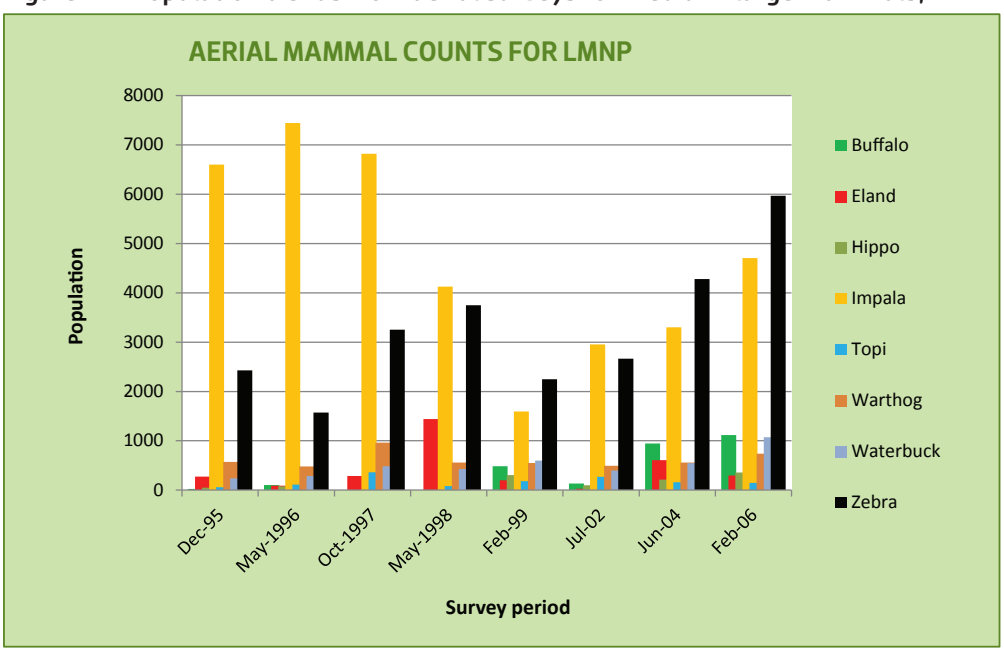


Source: Wanyamaet al. (2014)

2.4.4. Lake Mburo National Park

The 1995–1999 and, 2002, 2004 and 2006 aerial surveys (Figure14). The population of Impala was about 6,599 individuals in 1995 and rose to 7,442 in 1996 but declined to 6,817 individuals in 1997. Zebra showed an increase in numbers from 2,430 in 1995 to 5,968 in 2006. The changes in species populations between 1999 and 2002 could be attributed to the seasonal changes. The distribution of species during the wet and dry periods differ considerably due to water and pasture demands.

Figure.14: Population trends from aerial surveys for medium-large mammals, LMNP

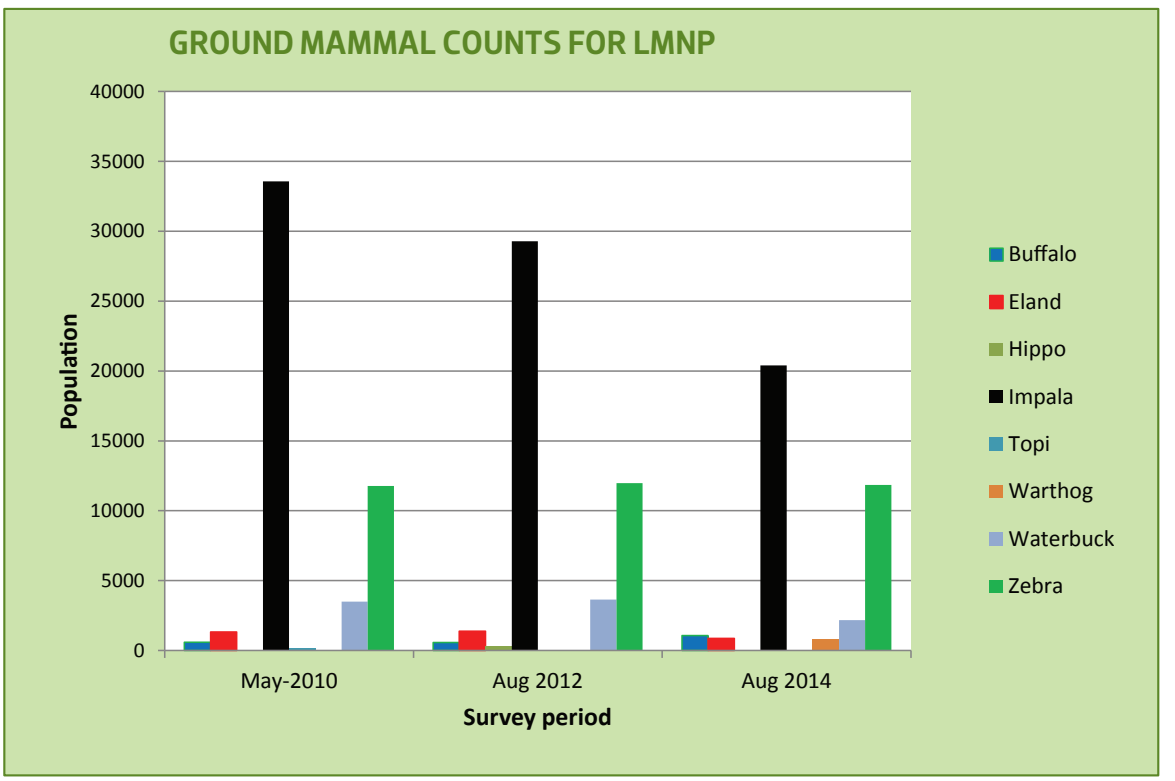


Sources: [a]Olivier unpublished data [b]Lamprey and Michelmore 1996: [c]PAAP/GTZ Impala Project (Averbeck and Lamprey, unpubl. data): [d]Lamprey (2000): [e]PAAP/UWA: [f]Rwetsiba and Tumwesigye (2004): [g]Rwetsiba and Wanyama (2006): [h]Rwetsiba, Wanyama and Kagoda: [i]Wanyama and Kisame (2012).

The 2010 ground counts results estimated 33,565 individuals of Impala compared to 4,705 in 2006 (Figure 15). This enormous change cannot be explained by birth or recruitment alone, and is likely to be the result of differences in methodological approaches that were applied in conducting the counts between 2006 and 2010. It is possible that there could have been an under estimation of species numbers using the aerial census method. Aerial census tends to under estimate species numbers in woodland vegetation due to canopy cover. LMNP has undergone a progressively shift in vegetation cover from predominantly savannah towards woodland savanna and bush land. Between 2012 and 2014, Impala population declined from 29,285 to 20,408 individuals. The population of Eland and Zebra population remained relatively stable for the years 2010, 2012 and 2014.

The population of Buffalo and Waterbuck remained stable between 2010 and 2012. The Buffalo population increased to 1,077 in 2014 whereas the Waterbuck population reduced from 3,644 in 2012 to 2,166 in 2014. The Warthog numbers also increased slightly between 2012 and 2014. LMNP has also experienced competition for water and pasture from cattle grazing in the park following prolonged droughts and this coupled with poaching could explain the declines in some of the animal populations. Impala during onset of rains get diarrhea but it is not has not been established whether some of the declines in Impala population observed are as a result of death due to diarrhea. Studies need to be carried out to confirm it.

Figure.15: Population trends from ground count for medium-large mammals, LMNP

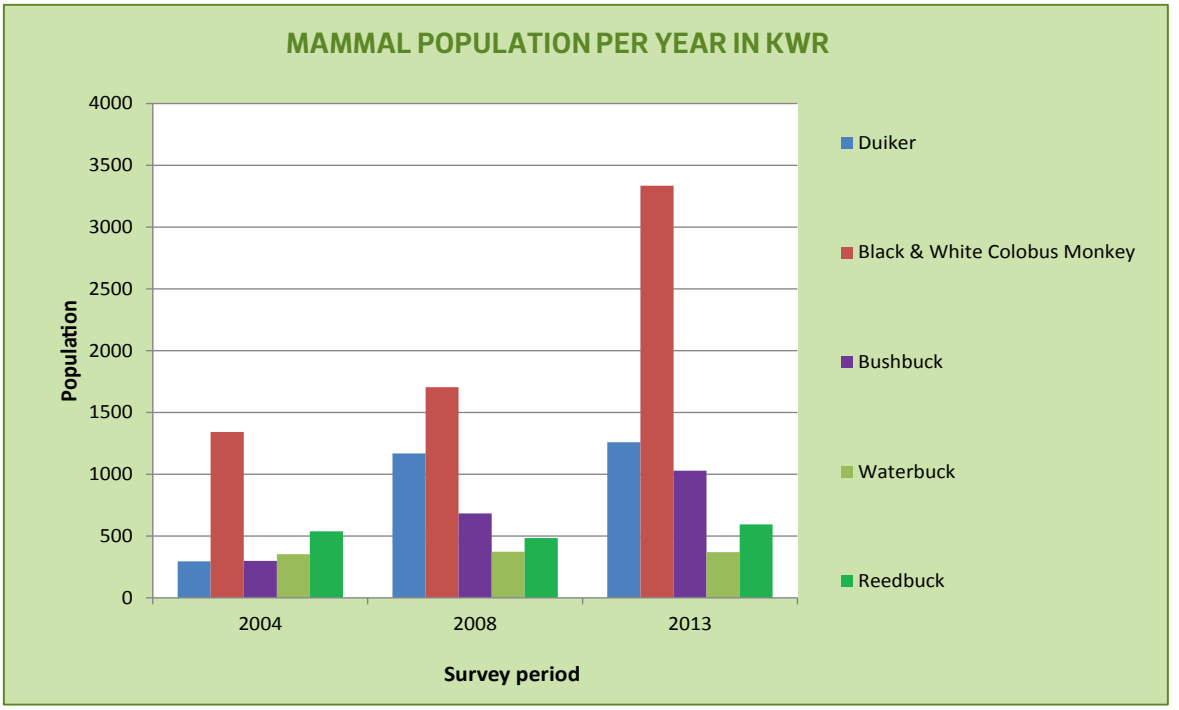


2.4.5. Katonga Wildlife Reserve

Trends of wildlife population in KTWR show a steady increase from 2004 to 2013 (Figure 16). Reedbucks and Duikers were fairly widely distributed and were observed to occur in groups of small numbers in most areas of the reserve. There has been an increase in the population of the Black and White colobus monkey from 1,342 in

2004 to 3,335 in 2013. The Duiker population rose from 295 in 2004 to 1,169 in 2008. However, between 2008 and 2013, the Duiker population remained stable. The Reedbuck and Waterbuck have more or less shown a stable growth in population over the years (Figure 16).The steady increment in the population size of a number of species over this period could be attributed to presence and regular patrols by the rangers within the reserve. The survey also revealed evidence of poaching in form of wire snares, dug pits, footpaths and burnt-out fire places thought to be used by poachers particularly in areas that are adjacent to community land and settlements inside the reserve. The presence of these settlements may be further evidence of the link between the neighboring communities and poaching activities in the reserve. In response UWA has instituted a number of interventions to counter the potential impact of these threats. For example, the land title holders whose cattle openly grazed inside the reserve were compensated and they have since vacated together with their herds of cattle. This will reduce the pressure and competition between the game and cattle for grass and water resources in the reserve.

Figure.16: Population trends for some of the species in Katonga Wildlife Reserve



Source: Wanyama and Kisame (2013)

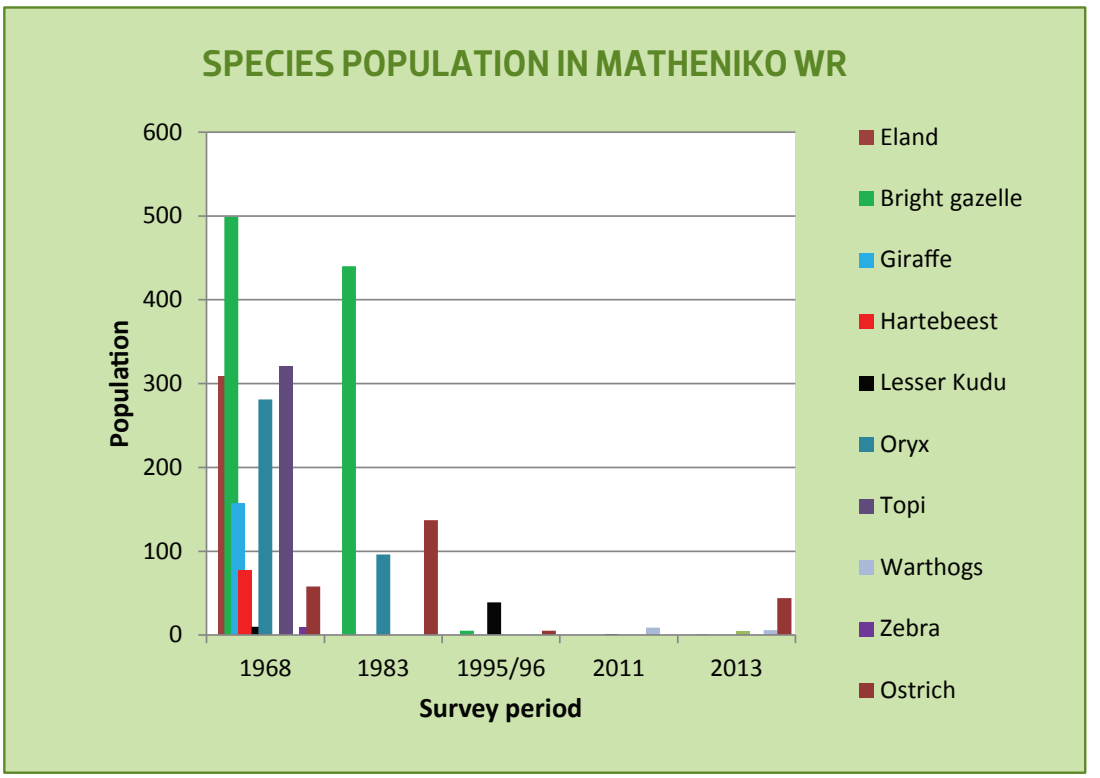
2.4.6. Matheniko and Bokora Wildlife Reserves

2.4.6.1. Matheniko Wildlife Reserve

According to the aerial census results of 1968, Topi, Giraffe, Hartebeest, Lesser kudu and Zebra were very abundant in Matheniko Wildlife Reserve. Overtime the population of Brights gazelle, Topi, Eland, Oryx, Giraffe, Hartebeest, Ostrich, Lesser kudu and the Zebra declined (figure 17). By 1995/96, the gazelle population d had dropped to 5 and then to 1 individual by 2013. Since 1983, there has been no record of Giraffe, Eland, Hartebeest, Topi, Zebra and Oryx in Matheniko WR. The disappearance of these species from the reserve can be attributed to the insurgency in the region and general lawlessness experienced between 1983 and 1995/96 in the Eastern

and Northern parts of Uganda. Wild animal populations in the reserve will take long to recover to the levels of 1960s because of the continued poaching by the Karimojong pastoralist both in Uganda and the Turkana of Kenya using automatic weapons during cattle rustling. In light of disarmament of the pastoralist communities and improved management of the reserve, the situation has positively changed even though the number of cattle that graze inside the reserve still exceeds that of large -meduim wildlife mammals and this has remained a big challenge to the management of the reserve. The census results of 2011 and 2013 indicate that very relatively low medium to large mammals such as Warthogs, Reedbucks, Lesser kudu and Bright gazelles still occur in Matheniko Wildlife Reserve.

Figure.17: Population estimate for species in Matheniko Wildlife Reserve



Sources: Game Department (1968); Eltringham and Malpas (1983); Lamprey and Michelmore (1996); Wanyama 2011); Wanyama and Kisame (2013).

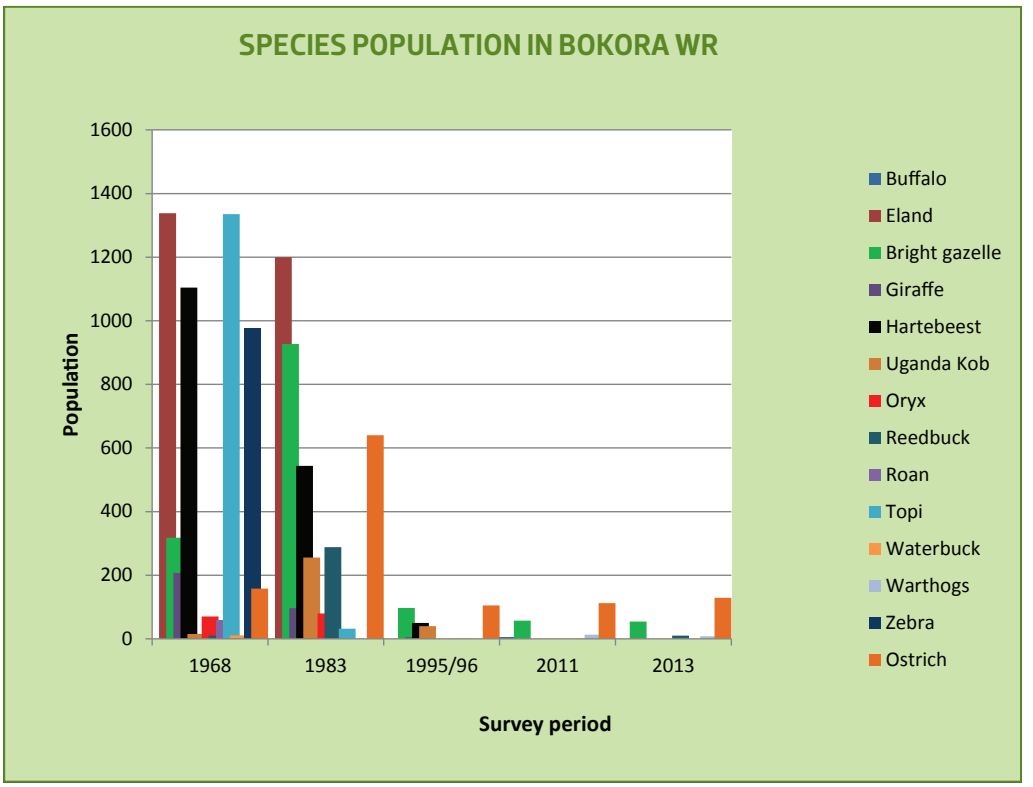
2.4.6.2. Bokora Wildlife Reserve

According to the aerial census of 1968, Eland and Topi were the most abundant with an estimate of 1,338 and 1,335 individuals respectively. Eland population declined to 1,200 and and Topi to 32 individuals by1983 (Figure 18). There was also a sharp decline in the population of Hartebeest, Zebra, Bright gazelle, Giraffe, Ostrich, Oryx, Roan antelope, Uganda kob, Waterbuck and Reedbuck.

Like in Matheniko Wildlife Reserve, the sharp decline of animal populations experienced between 1983 and 1995/96 was due to lawlessness in the region of Eastern and Northern parts of the Uganda. The animal populations of different species since then have also remained much lower than those of the levels of 1960s because of the continued poaching by the pastoralist Karamojong in Uganda and also the Turkana of Kenya using guns during cattle rustling. Similarly in light of disarmament of the pastoralist communities and improved manage-

ment of the reserve, the situation has positively changed even though the number of cattle that graze inside the reserve still exceeds that of large –medium wildlife mammals and this has remained a big challenge to the management of the reserve. The census results of 2011 and 2013 showed that large animals such as Ostriches, Warthogs, Reedbucks and Bright gazelles occur in very relatively low number as shown in Figure 18.

Figure.18: Population estimate for species in Bokora Wildlife Reserve



Sources: Game Department (1968); Eltringham and Malpas (1983); Lamprey and Michelmore (1996); Wanyama 2011); Wanyama and Kisame (2013).

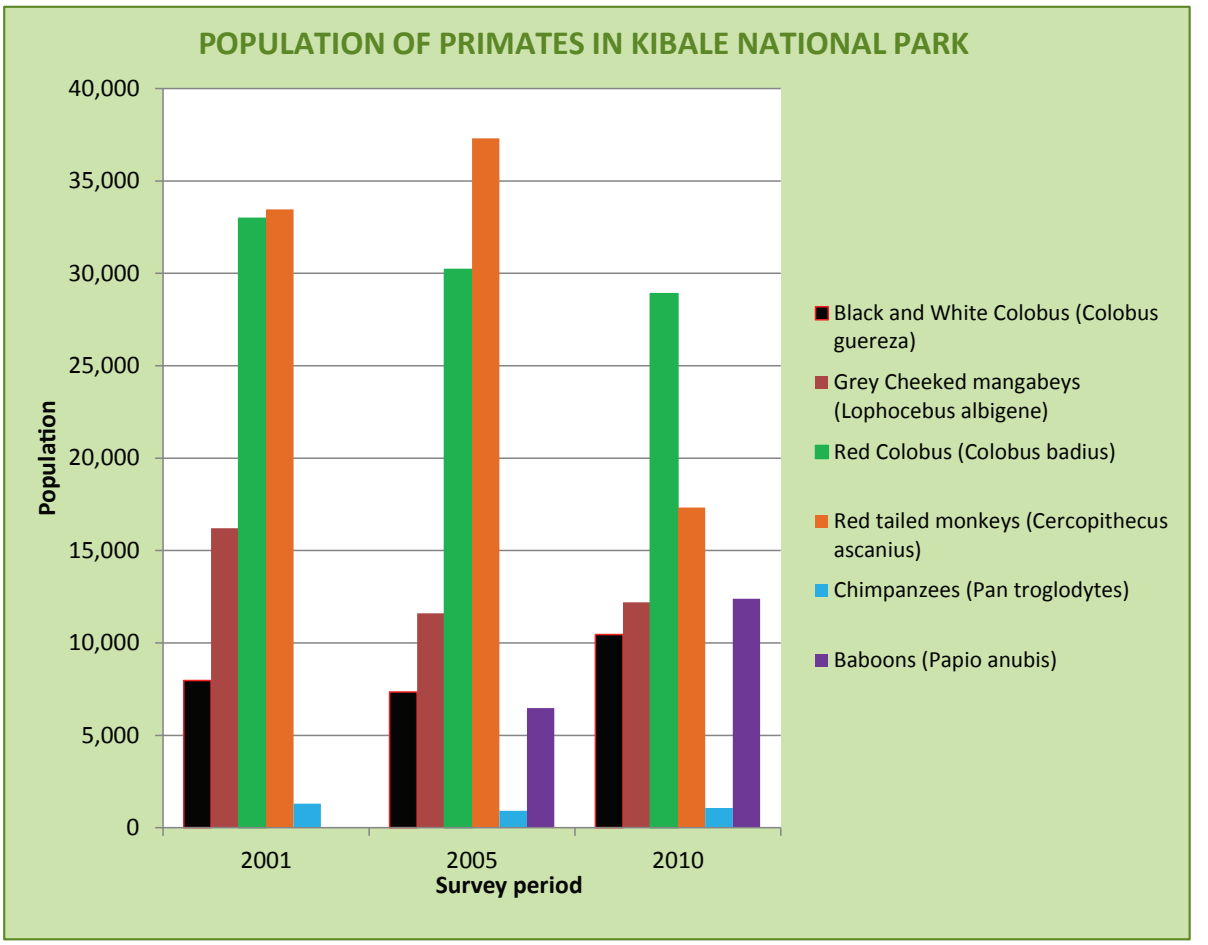
2.4.7. Kibale National Park

2.4.7.1. Primates in Kibale National Park

The 2001 census results estimated the Red tailed and Red colobus monkeys population in KNP to be 33,460 and 32,980 individuals respectively. These two species were also observed to be the most common in the park. This was followed by the Grey Cheeked Mangabeys and the Black and White colobus monkeys (Figure19). The population of the Red tailed rose to 37,312 in 2005 but then declined drastically to 17,324 in 2010 about half its population in 2005. The Grey Cheeked Mangabeys also showed a decline in numbers from 16,210 in 2001 to 11,603 in 2005 with a modest increase to 12,191individuals in 2010 (Figure 19).

The population of the Black and White colobus monkeys increased from 7,346 in 2005 to 10,459 in 2010. The Chimpanzee population has remained stable over the years. There were no records of Baboon sightings in 2001 census but sightings were made in the subsequent censuses in 2005 and 2010 and these sightings showed an increase in Baboon numbers.

Figure.19: Population estimate for primates in Kibale National Park



Sources: Wing and Buss 1970; Data from Plumptre et al. 2001; Data from Wanyama 2005 and 2010.

2.4.7.2. Chimpanzee population in Uganda

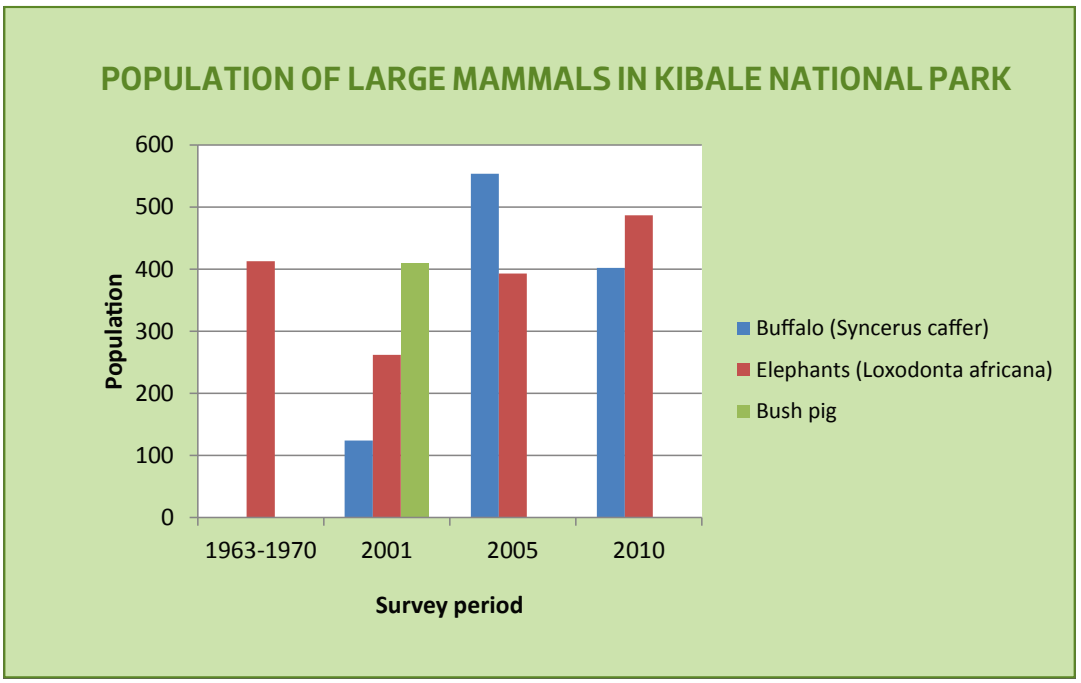
According to Edroma, Rosen and Miller (1997) much of the research on Chimpanzees had been focusing on ecological and behavioral studies rather than population and distribution surveys. Even then the research concentrated on Chimpanzees in Kibale National Park and Budongo Forest Reserve. Based on this, in 1999 the Jane Goodall Institute and the Wildlife Conservation Society commenced a four year program in collaboration with the Uganda

Wildlife Authority and the Uganda Forest Department, to evaluate the population status of Chimpanzees in Uganda. This was first countrywide census of Chimpanzee in Uganda. The census results came out in 2002. The census was conducted in 22 forests in western Uganda by scientists and workers from the JGI, WCS and UWA staff. A combination of line transects surveys and a reconnaissance walk method to census Chimpanzee nests was used because direct sightings of Chimpanzees are too relatively low to provide data for analysis. In this comprehensive census, Chimpanzees were estimated at 4,950 individuals in Uganda and this serves as a baseline for establishing trends of Chimpanzees in Uganda.

2.4.7.3. Population of other large mammals in Kibale National Park

The surveys of other large mammals carried out in 1963–1970 indicate that the Elephant population in KNP was 413 individuals (Figure 20). According to the 2001 census the numbers reduced to 262 individuals. By 2005 and 2010, the Elephant population had increased to 393 and 487 individuals respectively and this can be attributed to improved management of the park and law enforcement in particular combating Elephant poaching. For all the censuses in KNP, Bush pigs were recorded only in 2001 and were estimated at 400 individuals. Buffalos in 2001 were estimated at 124 individuals, 554 in 2005 and 402 individuals in 2010.

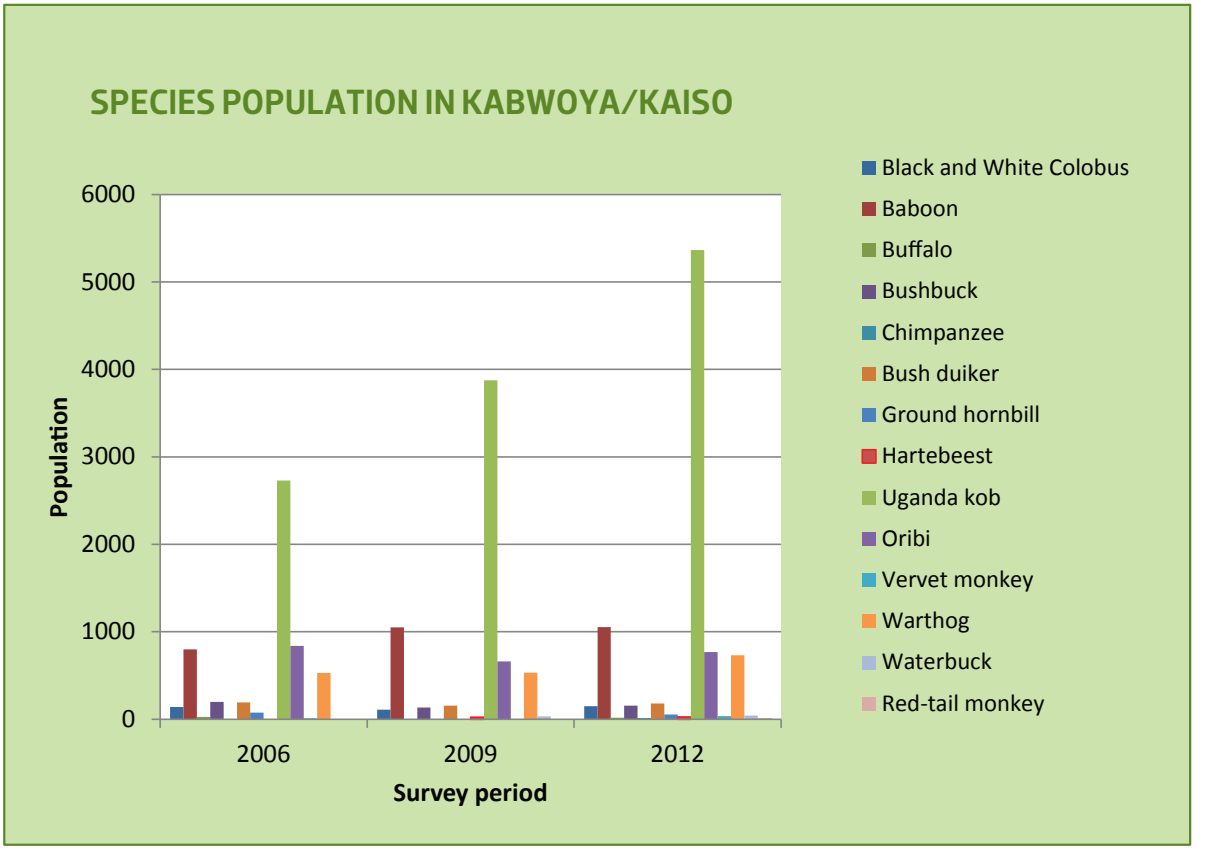
Figure.20: Population estimate for other large mammals in Kibale National Park



2.4.8. Kabwoya/Kaisotonya Wildlife Reserve

Figure 21 shows the results of the ground counts in Kabwoya and Kaiso Tonya. Uganda kob was estimated at 2,729 individuals in 2006 and 3,875 in 2009 and 5,363 in 2012. The progressive increase in numbers over the survey period is attributed to improved management of the reserve. The Baboon numbers rose from 798 in 2006 to 1,052 and between 2009 and 2012 the population remained stable. The Oribi population remained relatively stable between 2006 and 2012. The Warthog population remained stable at an average population of 534 between 2006 and 2009and then rose to 733 in 2012. The population of the rest of the species remained very low below 200 individuals in number. Over the years Chimpanzees were only recorded during the 2012 census.

Figure.21: Population estimate for species in Kabwoya/Kaisotonya Wildlife Reserves.



Sources: Richard H. Lamprey and Aggrey Rwetsiba 2006; A. J. Plumptre et al 2009; Fredrick Wanyama 2012

2.4.9. Toro–Semliki Wildlife Reserve

Aerial censuses conducted in the reserve in 1982 estimated Uganda kob at 3,460 and Waterbucks at 33 individuals. In 1995, only Uganda kob, Elephants and Waterbuck were recorded and the census results indicated declining populations especially for Elephants from a record of 211 individuals in 2002 to just 27 in 2015 (Table 4). Although the 1982 and 1995 censuses missed observations of Buffalos, subsequent surveys indicated a progressive increase in Buffalo populations from 219 individuals in 2002 to 449 in 2015.The large population of Uganda kob of 3,460 individuals observed in 1982 had declined drastically to 853 in 1995 with a modest increase to 867 in 2002. However, the numbers recovered considerably and had risen to 2,584 in 2013 and to 3,935 by 2015.This decline in the numbers between 1982 and 1995 could be due to poaching activities and the increase thereafter is attributed to the increased protection measures by UWA. Bush pigs were only recorded in 2010. This does not mean that Bush pigs did not occur in the reserve during the census periods but due to the behavioral and nocturnal nature of Bush pigs the census methods used could not easily capture them.

Table.4: Population estimates for some of the species in Toro-Semliki Wildlife Reserve

Species	Years					
	1982	1995	2002	2010	2013	2015
Buffalo	–	–	219	261	323	449
Elephant	–	25	211	47	33	27
Uganda kob	3,460	853	867	2,584	2,871	3,935
Waterbuck	33	5	58	135	48	112
Bushbuck	–	–	–	3	6	1
Bush pig	–		–	5	–	–
Reedbuck	–	–	–	8	3	–
Warthog	–	–	–	137	171	163

"–" implies that no observation was made of the particular species were recorded during the surgvey period

Sources: Wanyama, Muhabwe and Enyagu (2010); Wanyama (2013); Wanyama (2015)

2.5. POPULATION OF SOME OTHER KEY ANIMAL SPECIES

2.5.1. Lion population in Uganda

The present status of lions in Uganda is in isolated meta populations existing only in three of the ten national parks; Kidepo Valley, Queen Elizabeth and Murchison Falls National Parks. The population estimates by researchers and park staff in protected areas from 1977 to 2013 is shown Table 5.

Population surveys were conducted using total counts and audio calls following Ogutu and Dublin (1987) and Sutherland, (1996) in selected areas of Queen Elizabeth national park from 1997-1999 (Driciru, 1999), in Murchison Falls National Park from 2000 to 2002 (Driciru, 2003), and in Kidepo Valley national park from 2002 to 2004. Monitoring of the known groups of lions was done in Queen Elizabeth National Park from 2001 to 2004 (Siefert, 2003), and in Murchison Falls National Park from 2003 to 2004 (Okecha, 2004). Individual lions were identified following the methods of Pennyquick and Rudnai (1970), and Schaller, (1972), and identification cards and photo albums were made for coded individuals.

The lion population has experienced a steady decline due to indiscriminate killing by the local communities especially pastoralists, road accidents, habitat loss and diseases. Sensitivity analysis revealed that small lion populations are fragile to the above risk factors, and if not controlled, can lead to very dramatic decline of the population or even extinction. The population estimates may also vary depending on the method used in the survey.

Table.5: Lion population estimates in Uganda's wildlife protected areas

Protected Area	1977-1981[a]	1994-1996	1997-1999[b]	2000-2002[c]	2004[d]	2005	2010[e]	2013
QENP	400	–	185	206	200		144	
MFNP	–	–	–	181-467	350	263	132	215
KVNP	–	–	–	35-60	25		132	
LMNP	–	7	–	2	–	–	–	1
Toro-Semliki	–	–	–	5-15	–	–	–	1

"–" implies that no observation was made of the particular species were recorded during the surgvey period

Sources: [a]Din (1978) and Van Orsdol (1981); [b](Driciru 1999, 2005; Driciru, Siefert & Mapesa, (2005); [c]Uganda Large Predator Program (2000–2002); [d]Bauer & Van Der Merwe (2004); [e]Okot Omoya et al (2010)Tutilo Mudumba & Sophia Jingo (2013)

2.5.2. The Nile Crocodile Population Trends in MFNP

The number of Nile crocodiles has drastically declined since the last century. In Uganda, the Nile Crocodile was transferred to appendix 2 of CITES to allow ranching and restocking in the wildlife. The latest survey of crocodile population in MFNP was conducted in 2013 on the south bank, north bank and delta areas. Currently, there are 497 Nile crocodiles in MFNP. Most of the crocodiles are found on the Northern bank of River Nile. The survey undertaken in 2013 revealed that the juveniles accounted for 32% of all the crocodile population (Table 6). It is

anticipated that the adult population will increase in a relatively low years when the juveniles are sexually mature and are under proper monitoring and management.

Table.6: Population trend for the Nile crocodiles from 1969 to 2013 in MFNP

Year	Population Estimate	Data source
1969	595	Parker and Watson (1970)
1991	10 fold reduction (61)	Hutton (1991)
1995	230	Uganda Institute of Ecology (UIE) et al.(1995)
1996	316	Kaija et al.(1996)
2002	180	Isabirye – Basuta et al.(2002)
2013	659	Wanyama. F. and Ogwang. P. et al.(2013)

The population of Hippotamus has over the years increased in QEPA from 4789 in 2006 to 6654 individuals in 2018 (Table 7)

Table.7: Population trends of Hippopotamus amphibius of QEPA

Year	Population
2006	4789
2008	4856
2010	5233
2012	4726
2014	5792
2016	6547
2018	6654

2.5.3. Mountain Gorilla Population

Studies to document mountain Gorilla population trends in Bwindi Impenetrable National Park commenced in 1987 with 280 individuals being recorded. The population has continued to increase to a minimum of 400 individuals in 2011(Figure 22). Gorilla census is done every after five years. So Gorilla census in BINP commenced in March this year 2018 and the first sweep has been concluded.

Figure.22: Mt. Gorilla population trends of in Bwindi Impenetrable National Park

Data sources: Vedder & Aveling (1986); Sholley (1991); fMcNeilage et al. (2001; 2006), Jose Kalpers et al (2003); Guschanski et al. (2009), iMartha et al (2011)

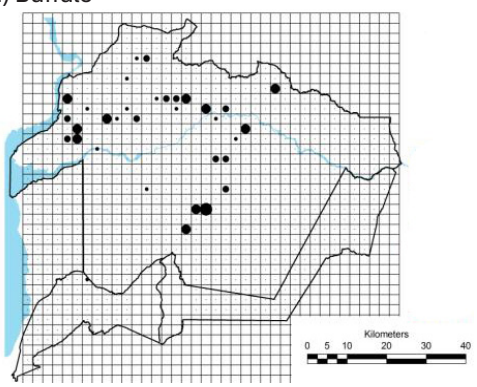
2.6. DISTRIBUTION MAPS OF KEY WILD ANIMALS

2.6.1. Murchison Falls Protected Area

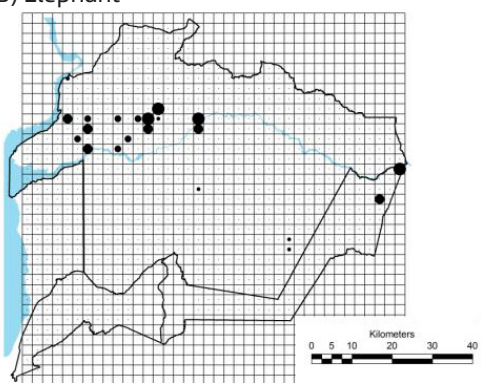
In the past 20 years most of the large mammals have been concentrated in the north west of MFPA. Figure 23 show that this is no longer the case because the numbers of animals are starting to increase in the north Eastern bank as well as the center of the park south of River Nile. Giraffe are confined to the Northern bank of the park but the other species occur on both banks, although relatively low Elephants were observed on the southern bank (Wanyama et al. 2014).

Figure.23: Relative densities of wild mammals in 2.5 x 2.5 km cell mapped in MFNP, 2014.

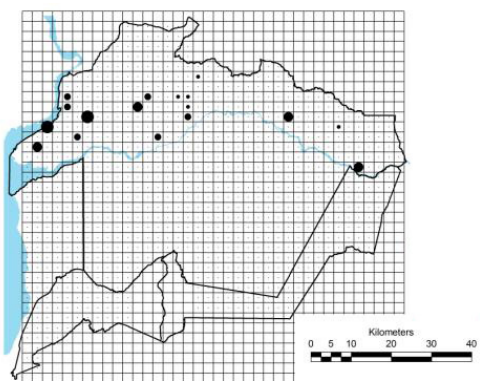
a) Buffalo



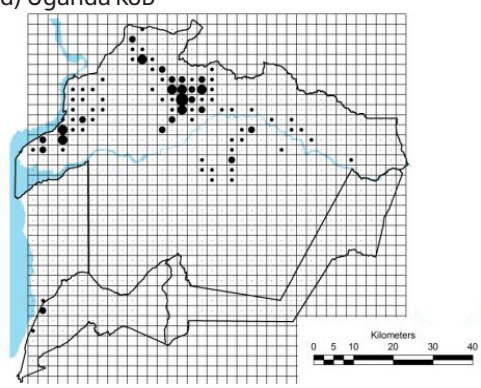
b) Elephant



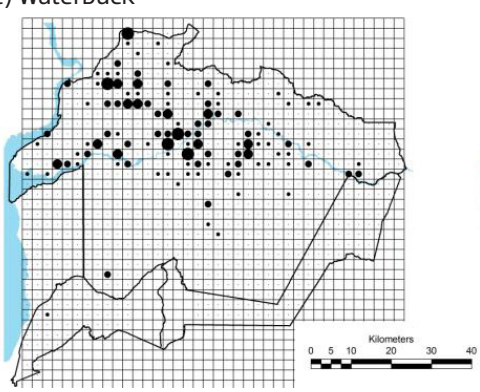
c) Giraffe



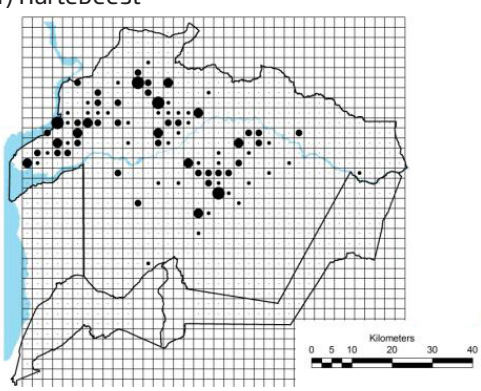
d) Uganda kob



e) Waterbuck



f) Hartebeest

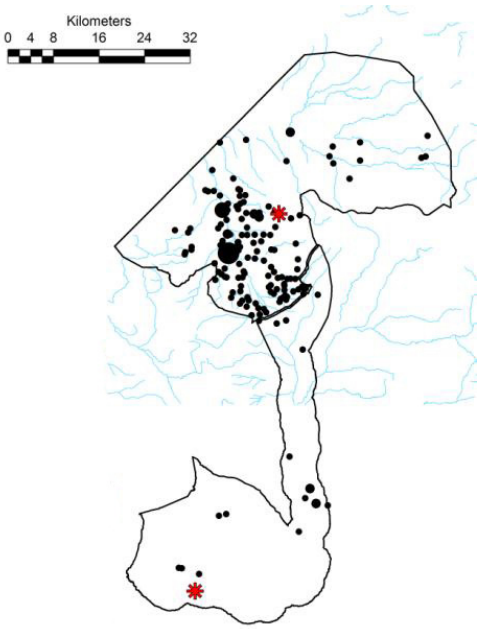


2.6.2. Kidepo Valley National Park

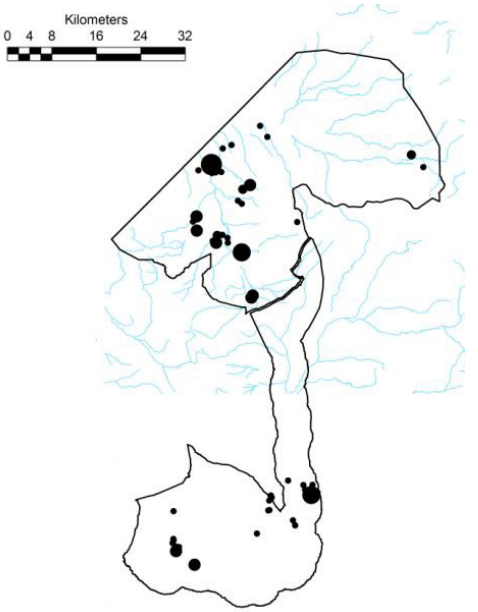
The location of the sightings of the species counted during the total count in Kidepo Valley National Parks (KVNP) is given in Figure 24. Where species were seen in the SRF, the distribution patterns are similar.

Figure.24: Distribution of wild mammals from total counts in KVNP 2014.

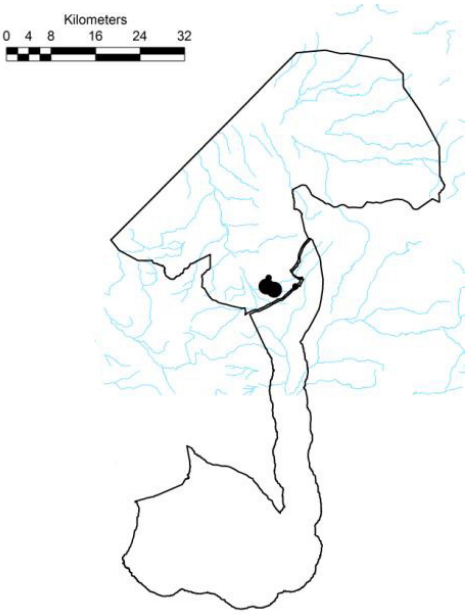
a) Buffalo



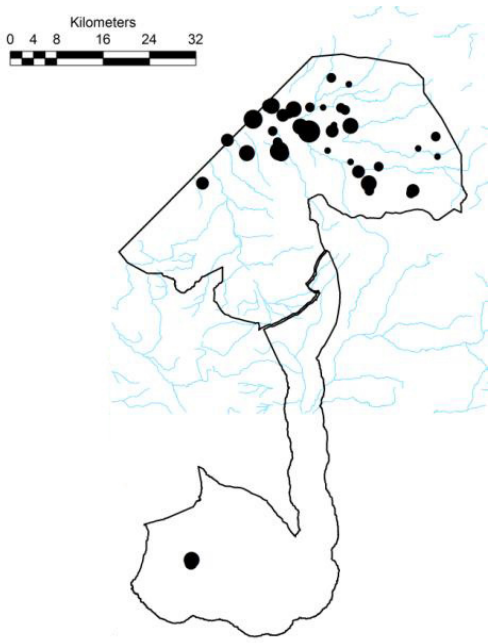
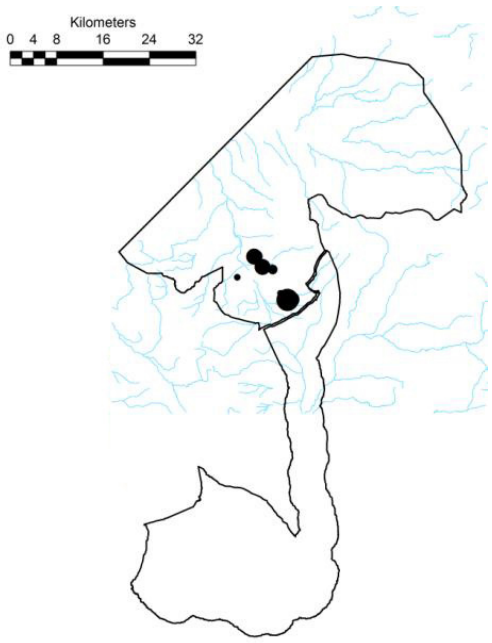
b) Elephants



c) Eland



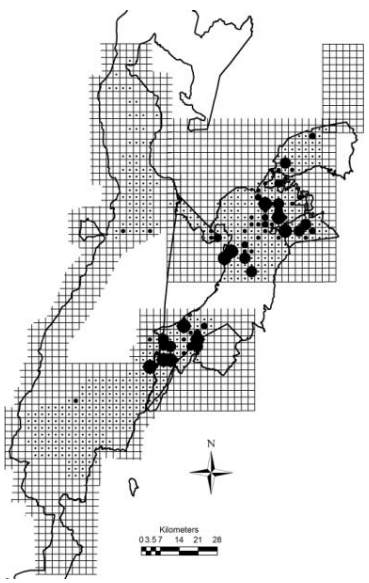
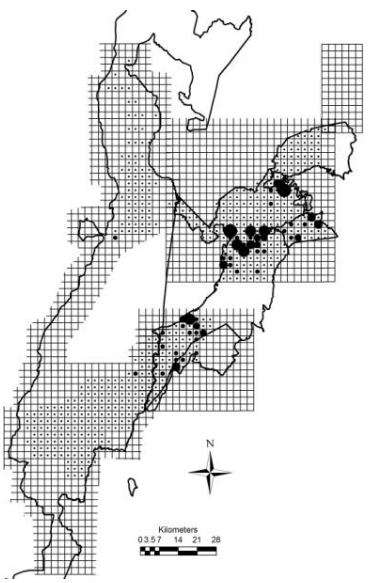
d) Giraffe

e) Ostrich	f) Zebra
	

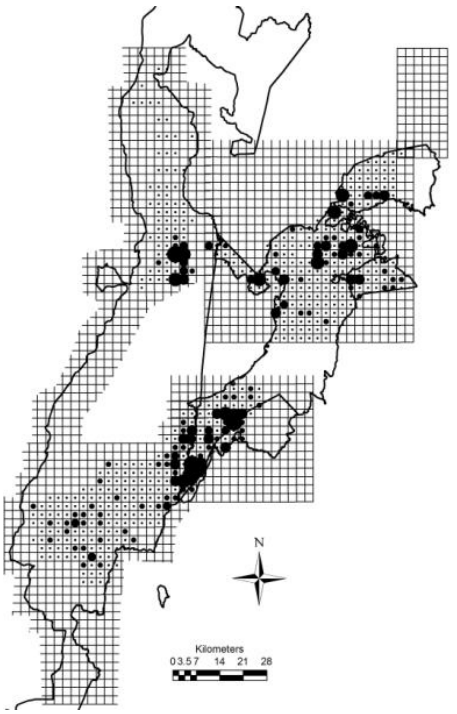
2.6.3. Queen Elizabeth Protected Area

The location of the sightings for some species counted during the SRF in Queen Elizabeth Protected Area is presented in Figure 25.

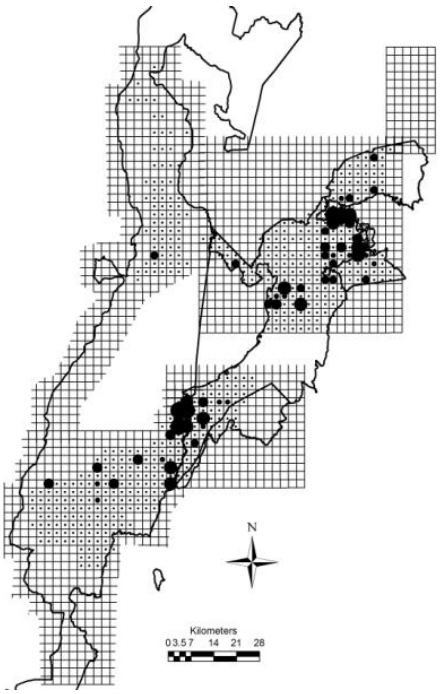
Figure.25: Distribution and relative wild mammals in QEPA, 2014

a) Buffalo	b) Elephant
	

e) Uganda kob



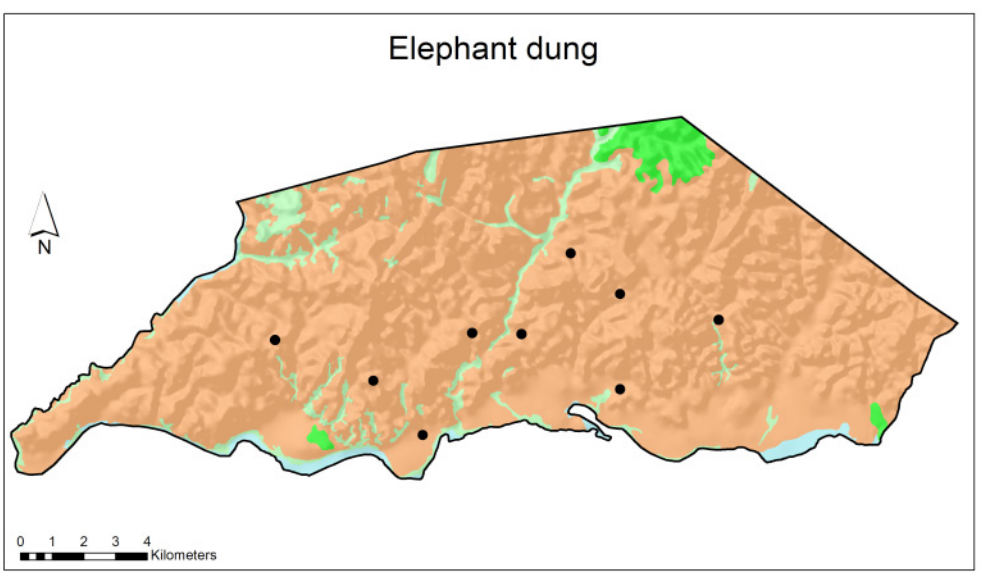
f) Warthog

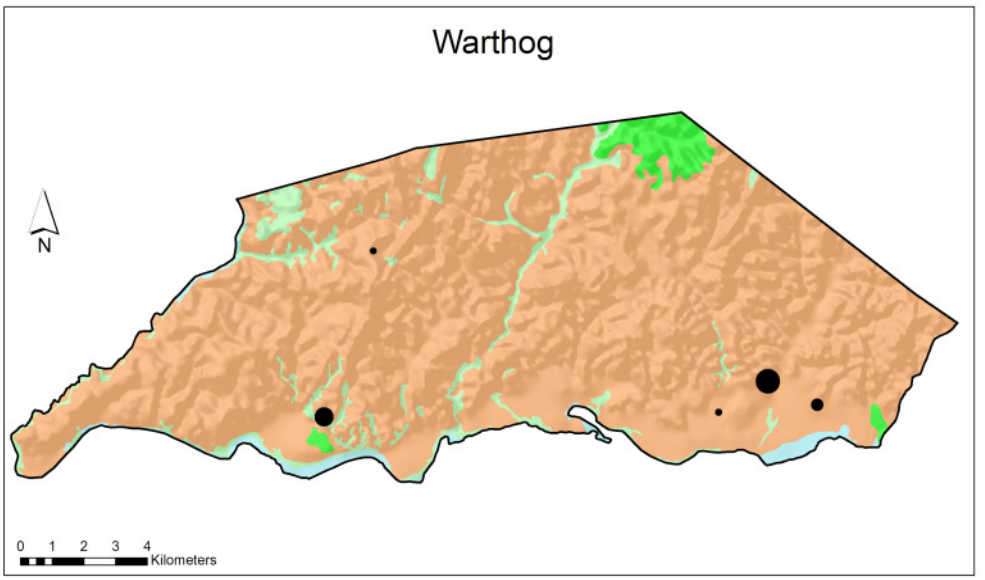


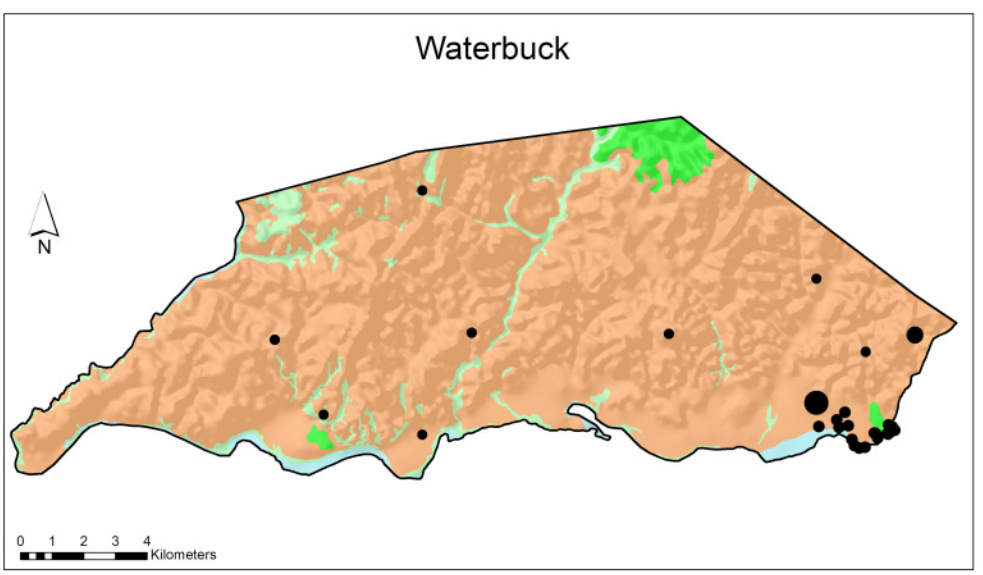
2.6.4. Katonga Wildlife Reserve

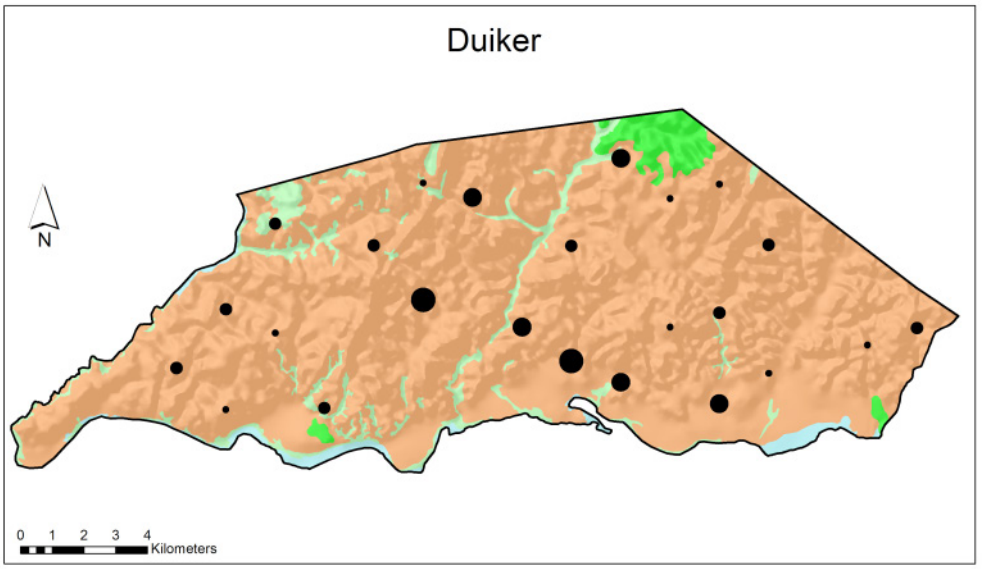
In Katonga Wildlife Reserve Elephants range covers about 51.75 square kilometers (Kisame and Wanyama 2015) mostly in the riverine forest and papyrus swamp in the areas of Kataraza along River Katonga. Black and White colobus monkeys, Bush Duikers and bushbuck were widely distributed more than the Waterbuck, Reedbuck, and Warthog encountered (Figure 26). Elephants were observed using their spoors.

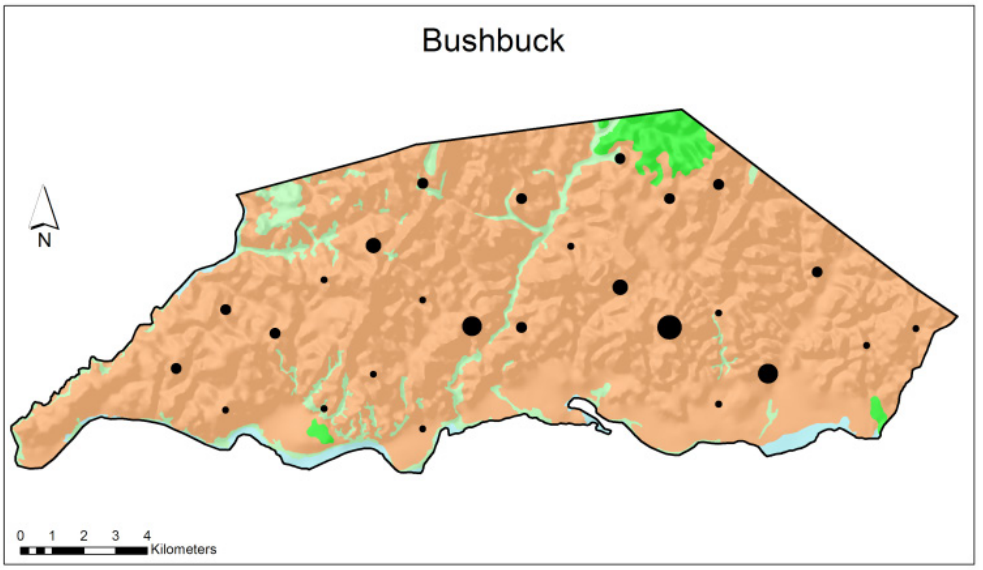
Figure.26: Distribution maps for wild mammals in Katonga Wildlife Reserve.




Warthog
N
0 1 2 3 4
Kilometers

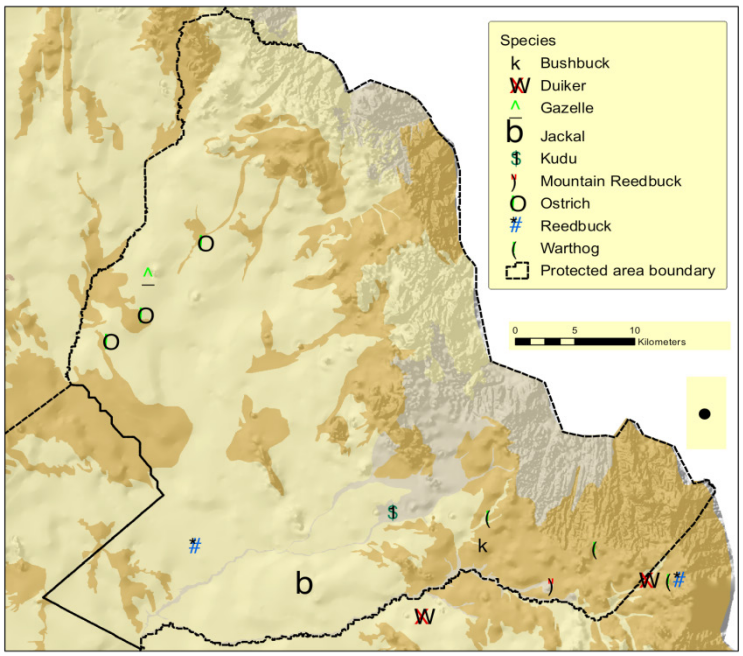

Waterbuck
N
0 1 2 3 4
Kilometers


Duiker
N
0 1 2 3 4
Kilometers


Bushbuck
N
0 1 2 3 4
Kilometers

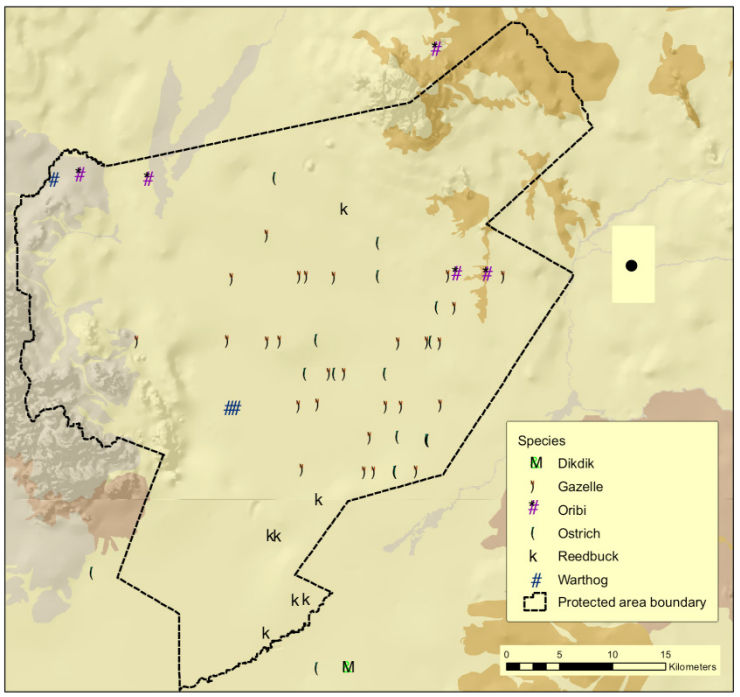
2.6.5. Matheniko Wildlife Reserve

Figure.27: Distribution of wild animals in Matheniko Wildlife Reserve.



2.6.6. Bokora wildlife Reserve

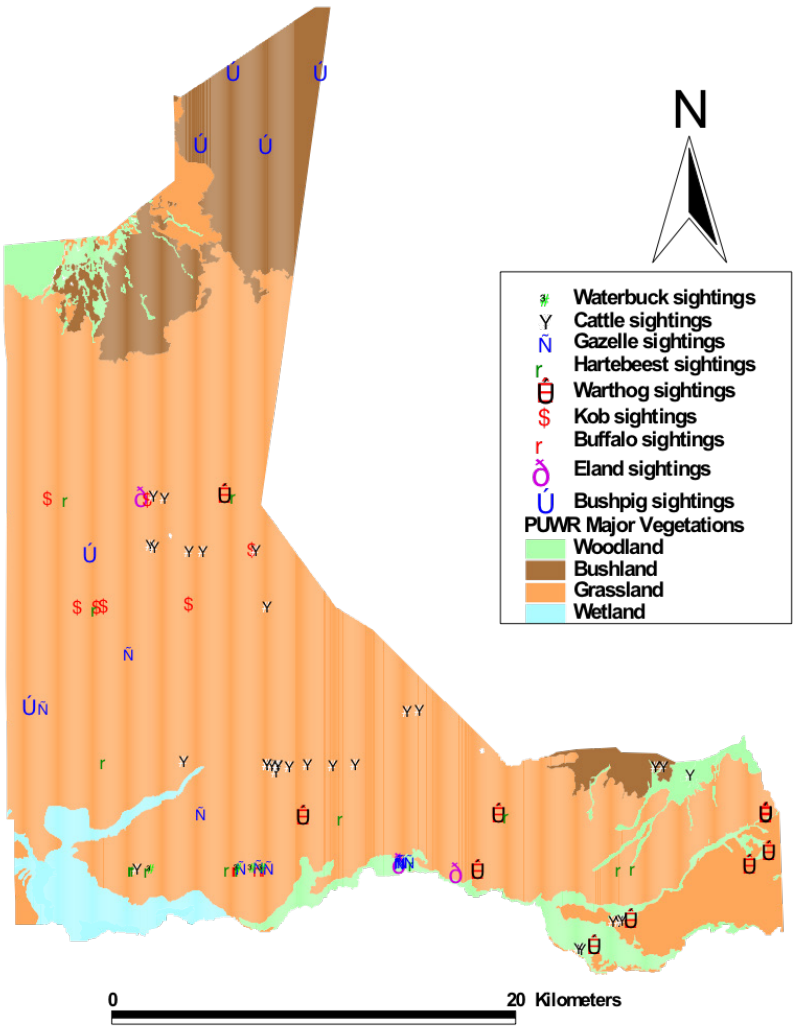
Figure.28: Wild animal distribution in Bokora Wildlife Reserve.



Wildlife Distribution based on Ground counts in Pian Upe Wildlife Reserve (PUWR)

The ground mammal counts undertaken in the reserve targeted ungulate species (hooved mammals) in PUWR. Recorded species include Warthogs, Hartebeests, Uganda kob, Eland, Buffalo, Waterbucks, Bright's gazelles and bush pigs. From the results, the grassland was the most common habitat type for large ungulates; eight large ungulates were encountered in this vegetation type. Five large ungulate species were encountered in woodland while one was encountered in bush land. Five of the species encountered in woodland were not recorded in bush land while one species encountered in bush land was not recorded in woodland. Furthermore, five of the species encountered in grassland were not recorded in bush land while two species encountered in grassland were not recorded in woodland and bush land at the same. One species encountered in the grassland was not recorded in the woodland suggesting differences in habitat preference (Figure 29) (Kisame 2014).

Figure.29: Distribution of large ungulates and cattle in major vegetation cover of PUWR



Source: (Kisame 2014).

2.6.7. Conservation Status of Birds in Uganda

Uganda has a total record of 1,057 species of birds(Table 8). Among this country list of species, about 190 are regular migrants mainly from the Palearctic region but also about 54 of these are intra-African migrants. The majority of the bird species in Uganda are residents and breed in the country (Adopted from- NatureUganda 2015: The State of Uganda's Birds 2014)

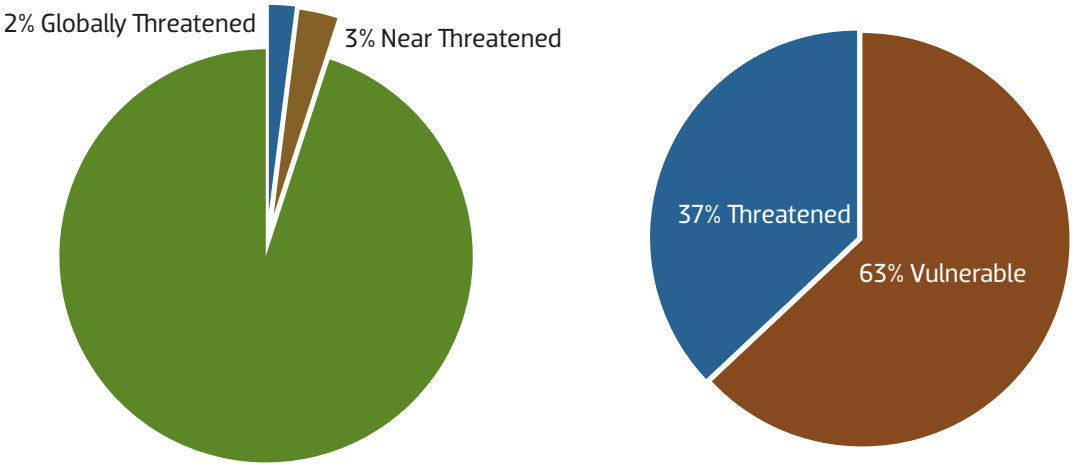
Table.8: Conservation Status of Birds in Uganda

TOTAL BIRD SPECIES	1,057
Extinct	0
Extinct in the Wild	0
Globally Threatened	24
Critically Endangered	0
Endangered	9
Vulnerable	15
Near Threatened	29
Least Concern	1,004
Data Deficient	0
Landbirds	847
Migratory Birds	236
Breeding Endemic	1
Waterbirds	140
CONSERVATION ACTION	
Species with International action plans	
Blue Swallow	
Grey-crowned Crane	
Grauer's Swamp Warbler	
Lappet-faced Vulture	
Shoebill	
Lesser Flamingo	
Madagascar Squacco Heron	
Species with national action plans	
Blue Swallow	
Grey-crowned Crane	
Species with projects implemented	
Grauer's Swamp Warbler (Current)	
Shoebill (Current)	
Grey-crowned Crane	
Fox's Weaver (Current)	
Lesser Flamingo	
Blue Swallow	
Bird Monitoring Programmes by NU	
Land birds Population Monitoring (BPM)	
Waterbirds Monitoring	
Provisional Carcass Vulture Counts	
Kampala Vulture Counts	
Raptor Counts	

Source: NEMA (2016); State of the Environment Report for Uganda 2014

Uganda has 24 (2%) globally threatened bird species and 29 (3%) near-threatened species and the rest of the species are of least concern (BirdLife International, 2014) (Figure 30).The globally threatened species include nine endangered species and 15 vulnerable species. The endangered species include the three vulture species, White-backed Vulture, Rüppell's Vulture and Hooded Vulture and the Grey-crowned Crane species.

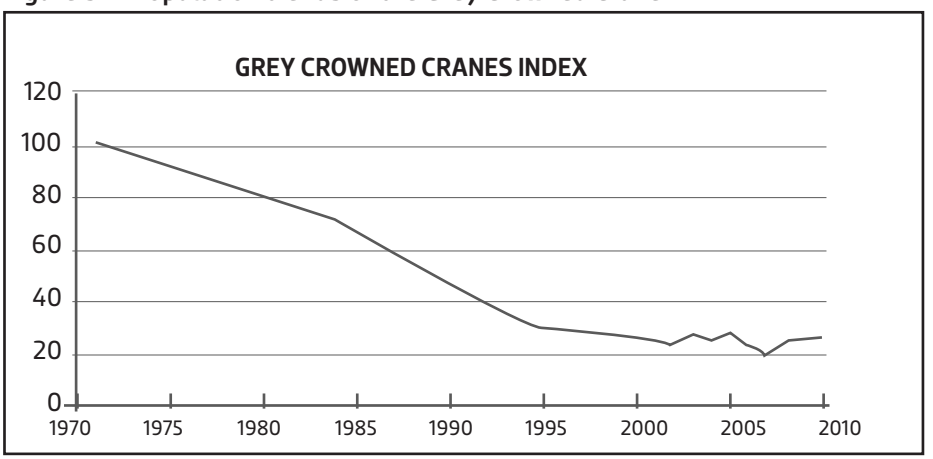
Figure.30: IUCN Red List Status for all birds (Left); Globally Threatened Birds (Right) in Uganda. [1]EN stands for endangered and [2]VU stands for vulnerable.



Source: Birdlife International (2014) Country Profile for Uganda.

The population of Uganda's national bird, the Grey-crowned Crane Balearica regulorum, has plummeted by 80% since the 1970s (Figure 31). Its population has reduced from more than 35,000 birds in the 1990s to less than 13,000 individuals by 2010 (Nature Uganda 2014).

Figure.31: Population trends of the Grey Crowned Crane



Source: Nature Uganda 2014

"1" Endangered refers to species of animal or plant that is seriously at risk of extinction.
"2" vulnerable specie is one which has been categorized by the International Union for Conservation of Nature as likely to become endangered unless the circumstances that are threatening its survival and reproduction improve

The Grey Crowned Crane is also on the decline globally and is listed as Endangered on the IUCN Red List. In

Uganda, its habitat (seasonally flooded wetlands) is seriously degraded and quickly disappearing. However, they are also under threat from illegal trade, use in witchcraft and domestication. Although records since 2000 show signs of recovery due to increased public awareness, a national crane species action plan has been developed and its implementation will help to protect the species. Globally threatened birds of Uganda have been enlisted (Table 9)

The action plan presents overviews of the species with a particular emphasis on status and threats. The plan identifies priority actions for immediate implementation to address threats of; wetland degradation, Crane capture/hunting/trapping for home use, sale and or traditional use, collision with power lines and communication lines, unnecessary human disturbance and proximity to breeding sites.

Table.9: Globally threatened Birds of Uganda: EN= Endangered, VU= Vulnerable

Scientific name	Common name	Red List Category
Acrocephalus griseldis	Basra Reed-warbler	EN
Apalis karamojae	Karamoja Apalis	VU
Ardeola idea	Madagascar Pond-heron	EN
Balaeniceps rex	Shoebill	VU
Balearica regulorum	Grey Crowned-crane	EN
Bradypterus graueri	Grauer's Swamp-warbler	EN
Bucorvus leadbeateri	Southern Ground-hornbill	VU
Chloropeta gracilirostris	Papyrus Yellow Warbler	VU
Circaetus beaudouini	Beaudouin's Snake-eagle	VU
Cryptospiza shelleyi	Shelley's Crimson-wing	VU
Eremomela turneri	Turner's Eremomela	EN
Falco fasciinucha	Taita Falcon	VU
Gyps africanus	White-backed Vulture	EN
Gyps rueppelli	Rüppell's Vulture	EN
Hirundo atrocaerulea	Blue Swallow	VU
Muscicapa lendu	Chapin's Flycatcher	VU
Necrosyrtes monachus	Hooded Vulture	EN
Polemaetus bellicosus	Martial Eagle	VU
Pseudocalyptomena graueri	African Green Broadbill	VU
Psittacus erithacus	Grey Parrot	VU
Ptilopachus nahani	Nahan's Partridge	EN
Sagittarius serpentarius	Secretarybird	VU
Torgos tracheliotos	Lappet-faced Vulture	VU
Trigonoceps occipitalis	White-headed Vulture	VU

Source: BirdLife International (2014) Country PROFILE: Uganda. Available from: http://www.birdlife.org/datazone/country/ugand Checked: 2018-05-23

The Uganda Bird Atlas (Carswell *et al.* 2005) categorises 18% of the species as forest interior species (FF), 12%

as forest dependent species (F) and 10% as forest edge species (f) based on habitat associations (Pomeroy, D. & Asasira, J. 2011). It further considers 22.5% of the total species as water birds.

2.6.8. Important Bird Areas (IBAs): Priority sites for conservation

Important Bird Areas (IBAs) are sites of global conservation importance. They are practical tools for conservation based on standard internationally agreed criteria. Uganda has identified 33 IBA sites and all the bird species are captured within these IBAs, which also capture 87% of all plants and animals, making them to be recognized globally as Key Biodiversity Areas (KBAs) (NatureUganda, 2011). The 33 IBAs occur in 10 National Parks, Wildlife Reserves under the management of UWA, 9 Forest Reserves under NFA, 10 wetlands under WMD and one rice Scheme owned by private farmer groups (NatureUganda, 2011). All the wetland IBAs have been designated as wetlands of international importance (Ramsar Sites) and these are among the 11 RAMSAR sites in Uganda. IBAs that occur outside protected areas, have been largely supported by a number of organizations including the local government, NGOs and the Civil society organizations. This, therefore, means that at least three quarters of IBAs in Uganda have considerable conservation efforts being implemented in them by a number of organizations including the government, NGOs and the Civil society organizations. Although these efforts continue to decline mainly due to reduction in funding support, their impact continues to increase as a result of the sensitization efforts at the sites. Currently, the most threatened IBA is Lutembe Bay, on the shores of Lake Victoria because it is being reclaimed and decimated for horticultural activities. The surrounding area has undergone high levels of conversion into agricultural land due to high human population densities, as well as increased commercial and industrial development.

2.6.9. Conservation Status of Amphibians and Reptiles in Uganda

Amphibians (Amphibia) and reptiles (Reptilia) are two classes of animals that are grouped together because they are considered ectothermic (derive heat from outside sources most commonly the sun). Amphibians include frogs, toads, newts and salamanders and make up over 5,500 different species. In Uganda, 80 species, 20 genera of amphibians and 1 order the Anura have been recorded. There are over 9000 species in Reptilia that include snakes, lizards, crocodiles and alligators, turtles and tortoises. In Uganda 175 species, 77 Genera, 19 families and 4 orders (the Chelonii, Crocodylia, Sauria & Serpentes) have been recorded (Daniel.F, Greenbaum.E, Lukwago.W, and Behangana.M, 2016) The conservation status of these two classes of animals is shown (Table 10)

Table.10: Conservation status of Amphibians and Reptiles in Uganda

IUCN STATUS	Amphibia	Reptilia
	No of species	No of species
CR = Critically Threatened	01 (*Arthroleptides dutoiti*)	06 (including *Trionyx triunguis*)
EN = Endangered	06	04
VU = Vulnerable	06	06
NT = Near Threatened	08	06
LC = Least Concern	48	73
DD = Data Defficient	11	80

Source: Hughes.D.F, Greenbaum.E, Lukwago.W, and Behangana.M, (2016)

CHAPTER 3

Factors Determining Animal Population Trends.

3 THREATS TO WILDLIFE CONSERVATION IN UGANDA

3.1. INTRODUCTION

The main threats to wildlife conservation in Uganda include human wildlife conflict, poaching, habitat loss, climate change, invasive species, diseases and parasites. The historical loss of wildlife species in the country has been considerable and the negative trends appear to be continuing for some species.

Poaching and over-hunting have in the past, contributed to the loss of the country species richness. For instance during the 1970s, elephant and buffalo populations declined drastically due to massive poaching (Aleper and Moe 2006). Most of the remaining large animals are mainly confined to protected areas, where their numbers are small but stable for some species or continue to decrease for others. However, in a relatively low number of cases (e.g. the mountain gorilla, elephant and kob), the trends show some increase partly because of improved management due to political stability (Pomeroy and Tushabe 2004).

Invasive plant species have contributed to degradation of natural habitats and displacement of native biodiversity. Changes in vegetation due to invasive species of acacia and other pasture grasses have been reported in Lake Mburo and Queen Elizabeth National parks (NARO 2002). In Lake Mburo National Park, the proliferation of Acacia hockii is considered a threat to the population of herbivorous animals because this species has transformed some areas that were previously open savannah into closed woodland ecosystems. Some naturally occurring species appear to be becoming invasive. In Queen Elizabeth National Park spear grass (Imperata cylindrica) and Dichrostachys spp are spreading across large areas of the park. Exotic plant species such as Lantana camara and Parthenium are also taking over parts of Queen Elizabeth National Park, resulting in limited feed availability and ecosystem destabilization.

3.2. POACHING

Animal poaching for various reasons is the most serious threat to wildlife population growth and sustainability in Uganda. Animals are poached for meat, wildlife products, and some species are also captured for trade. Poaching for international trade in trophies such as ivory, hippopotamus teeth, pangolin scales as well as live trade in these products also constitute serious threats. Populations of large mammal species declined drastically since the 1960s due to poaching. For instance throughout the 1970s, elephants in Uganda were intensively hunted for their ivory to supply an expanding international ivory market (Eltringham and Malpas 1980). Over the period 1979–1985, due to civil wars and political instability there was continued and increased slaughter of elephants and other wildlife in protected areas with automatic weapons (Edroma 1984). By 1980 the elephant population of Queen Elizabeth National Park had declined from the 1960s estimates of 2,500–4,000 to just 150, and of Murchison Falls National Park from 12,000 to 1,420 (Douglas-Hamilton et al 1980).

Government of Uganda developed and has been implementing initiatives and interventions to address wildlife trafficking and other kinds of wildlife poaching as outlined below;

i) Revision of the National wildlife law (Uganda Wildlife Act Cap.200). One of the biggest challenges in curbing wildlife crime in Uganda has been very low penalties given to wildlife offenders. This has been addressed during the review process of the Wildlife Act. The Draft Wildlife Amendment Bill has been approved by Cabinet and will be presented to Parliament for approval into law.

ii) Development and implementation of the national ivory action plan in response to the CITES recommendation following identification of Uganda as a possible source and transit country in the ivory trade chain. Uganda's national ivory action plan addresses five key areas of legislation, strengthening enforcement capacity, awareness raising, improved coordination and collaboration with relevant agencies at local, national, regional and international level as well as proper management of the country's ivory stockpiles.

iii) Strengthened capacity of Uganda Wildlife Authority through increased number of staff. Since 2013, 650 new rangers have been recruited and deployed in protected areas and other strategic areas. This has increased the wildlife protection force from about 900 to 1500 in a period of five years. In 2013, UWA established the first ever Intelligence Unit with 80 staff that were subsequently deployed in strategic locations to collect intelligence information on wildlife crime and prevent it before it happens. This effort has resulted in increased prosecutions and reduction in poaching in protected areas. In addition, UWA is in advanced stages of establishing a canine section within the Intelligence and Investigations Unit. Six detector (sniffer) dogs have been acquired and handlers have been provided with appropriate training. The Canine section is based at Entebbe International Airport specifically to help control wildlife trafficking through the airport and other areas where deployments will be made based on intelligence information. Besides these interventions, staff have been equipped with some tools and equipment including two strong field vehicles to facilitate operations against wildlife poaching.

iv) Enhanced patrols. Ranger patrols inside and outside protected areas have been intensified. Rangers are now better equipped to cover more sections of the conservation areas and collect relevant data to guide management in decision making. UWA has also been able to deploy staff in areas outside protected areas containing significant populations of wildlife specifically to curb poaching and intensify conservation awareness.

v) Deployment at strategic entry and exit points. A joint security team comprised of Uganda Peoples Defense Forces, Uganda Police Service, Uganda Wildlife Authority, Customs and Aviation Security has been instituted and deployed at Entebbe International Airport to inspect all consignments, cargo and passengers baggage so as to detect and curb illegal exports and imports wildlife products. As a result of this increased vigilance and monitoring, it is increasingly becoming more difficult to smuggle wildlife products out of Entebbe Airport. This strategy will be extended to all border/customs control ports.

vi) Recruitment and training of prosecutors. Prosecutors have been recruited and trained in wildlife prosecution skills and deployed in major Conservation Areas to handle cases of wildlife poaching within the Magisterial Jurisdictions therein. Prosecutors will be further facilitated by the Offenders Database that will keep profile information of wildlife offenders to help detect repeat offenders and secure maximum sentences for such offenders once arrested again for wildlife poaching.

3.3. HABITAT FRAGMENTATION AND DEGRADATION

Wildlife is a resource of cultural, ecological and economic significance. It is a renewable resource whose survival depends, among other factors, on the quality of habitats. The importance of habitats is derived from their ecological roles in provision of shelter, breeding places, dispersal and foraging grounds for a variety of wildlife species. Habitats also allow free movement of animals to other geographical localities with critical resources for wildlife survival and exchange of genetic materials. Wildlife habitats are therefore, critical components of ecological integrity and long-term survival of the ecosystem. Therefore, destruction or loss of wildlife habitats reduces their potential utility.

Figure.32: Land use pattern around Bwindi Impenetrable National Park.

In the context of Uganda, as is the case in many other countries, habitat loss continues to be one of the leading threats to wildlife conservation often in form of degradation, fragmentation or outright loss. Some of the factors that contribute to habitat loss in Uganda include population growth, human settlements, land tenure systems, agricultural expansion, development policies and inadequate enforcement of laws and policies.

In Uganda, rural communities have rapidly expanded settlements and other activities into wildlife areas, thus resulting in habitat alteration, degradation and human-wildlife conflicts. The protected areas of Uganda are threatened by expansion of agricultural activities from the edges into the national parks and wildlife reserves. Large areas of potential wildlife habitats outside protected areas have been fragmented and subjected to in-

compatible land use options (see Figure 32). Habitat fragmentation has created small islands of protected areas with no connectivity (Figure 1, 2 and 32).

National parks and wildlife reserves have increasingly come under pressure for degazettement due to demand for land for human settlement and farming. As a result wildlife habitats in Uganda have become insecure and threatened by agrarian settlements, ranching schemes or nomadic invasions of cattle. For instance the estimate of the livestock numbers in the Northern part of Queen Elizabeth National Park was 10,767 cattle and 428 sheep/goats. Both showed an increase in the 2006 estimates by 8,138 and 110 respectively (Plumptre, et al.2010).

3.4. CLIMATE CHANGE

Wildlife populations fluctuate seasonally and from year to year based on seasonal weather patterns. Climatic factors also regulate wildlife populations through changes in rainfall amounts, temperatures and levels of irradiation. These influence the quality and availability of food for wild animals resulting into high levels of inter and intra competition for food thereby affecting reproduction and survival rates and species shifts. Furthermore, climate change may be experienced in form of extreme weather events such as prolonged droughts and floods, disease outbreaks and proliferation of invasive species which lead to wildlife mortality.

Ponce-Reyes et al 2017, noted that due to climate change, many of the habitats in the Albertine Rift region where endemic and threatened species occur are predicted to decline in this area over the next 70 years unless species can adapt to warming temperatures, with predictions of 70% or more of habitat loss. 14 of Uganda's wildlife protected areas are found in the Albertine Rift, thereby constituting a significant portion of critical wildlife habitats that will be affected by changes in climate.

Wild animals and plants that are able to adjust are shifting their ranges to higher altitudes as a means of adapting to rising temperatures. For instance, the three horned chameleon found on the Rwenzori Mountains has shifted to higher altitudes as a result of increase in temperatures at the lower altitudes (UWA report 2013).

3.5. INVASIVE SPECIES

Exotic species have potentially serious impacts on indigenous species and thus species, habitat and ecosystem diversity. Exotic species have been known to introduce new diseases for which indigenous species have no resistance, or alter habitats. Exotic invasive species of plants can out compete native flora and make the habitat unsuitable for indigenous wild animals thereby affecting continued production of needed goods, services, and values from wildlife resources.

The spread of invasive species has become a major concern and challenge to wildlife conservation especially in protected areas. Awareness about the ecological and economic impacts of invasive species on wildlife and protected areas has grown over the past decade. It is now estimated that the spread of invasive species is second only to habitat loss, as the major cause of declining biodiversity inside and outside PAs

Major invasive species of concern in wildlife protected areas are Lantana camara, Dichrostachys cinerea, Parthenium hysterophorus, Imperata cylindrical,Leucaena leucocephala, Broussonetia papyrifera, Cymbopogon nardus, Senna spectabilis, Mimosa pigra, Acacia hockii and Vossia cuspidate.The spread of Dichrostachys cinerea, Parthenium hysterophorus,Lantana camara and Imperata cylindrical is worrying and has affected most of the suitable habitats for grazers in the parks (NARO 2002).

For instance, Dichrostachys cinerea is not a palatable shrub and is avoided by wildlife due to its sharp, hard thorns and since it dominates large areas of Queen Elizabeth National Park, it has reduced grazing space for the animals and lowered the park's carrying capacity for grazing wildlife species. Once D.cinerea has fully established, it locks up occupied areas restricting animal movements and ranger patrols; suffocates pasture grass and other plants remaining dominate in infested areas; as well as obscuring tourist views while on game drives. Furthermore, Lake Mburo National park which used to be an open savannah national park has now been severely invaded by Acacia hockii spp of trees with thickets turning it into a closed woodland.

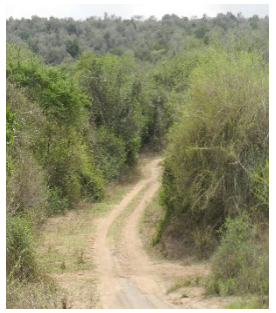
Resultantly, most invasive plant species have spread and grown into thickets that have changed wildlife habitats from open grasslands to closed woodlands. This has resulted into declining feed availability for animals, direct animal and human health problems, undesired mass migration of animals, disruption of animal breeding cycles, and large scale ecosystem destabilization.

Recognizing the urgent need for effective, efficient and sustainable management of invasive species in its protected areas, UWA entered into a cooperation agreement with the National Invasive Species Coordination Unit to pilot an integrated IAS management project for Acacia hockii in Lake Mburo National Park and, D. cinerea, C. ordarata and P. hysterophorus in Queen Elizabeth National Park. Drawing on various relevant invasive species management strategies, indigenous and foreign invasive species control success stories, and the understanding of the prevailing invasion situations, this pilot project was designed to implement integrated solutions to address the four key invasive species in the prioritized pilot protected areas initially for a period of one year.

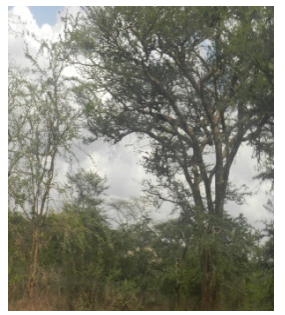
The pilot project adopted an integrated approach involving the application and use of mechanical, cultural and classical biological control approaches, on a host of selected priority invasive species. The aim of the proposed control strategies is to reduce the density, abundance and spread of the identified priority invasive species to keep them below an acceptable threshold. The proposed control methods can be used to attain eradication too.

Acaia hockii in Lake Mburo National Park.

Aerial view of acacia



Chocked game drive ways



Mature Acacia trees

Chocked game drive ways

Sickle bush and triffid weeds in Queen Elizabeth National Park

A mix of D. Cinerea and C. Ordorata

Concentration along Kazinga Channel

Triffid weed in QENP

D. Cinerea in QENP

3.6. PARASITES AND DISEASES

Parasites and diseases influence their hosts in different ways. For instance, they may cause death of the host due to direct lethal effect or an indirect effect. Direct lethal effects may occur if killing is part of the life cycle of the parasite or if the hosts and parasites have not developed equilibrium. Death by disease and parasitism may also be caused in combination with factors such as bad weather conditions, environmental pollution or human handling. Diseases and parasites also influence the behaviour of their hosts. For example, if the hosts are intermediate in the life cycle, alterations in behaviour may make them an easier prey for their predators, the final hosts. Diseases and parasites may also influence the reproductive success of the hosts.

In Uganda, cases of diseases recorded in wildlife include anthrax outbreak especially in hippos and Buffaloes, scabies in mountain Gorillas, skin disease in Giraffe, and brucellosis and canine distemper virus in lions. The impending threat of Avian flu is a big threat to wildlife conservation in Uganda. Experience from the outbreak of Anthrax in 2004 in Queen Elizabeth National Park (Environmental Brief No1, 2004) showed the potential impacts of such disease outbreaks. In 2004, an estimated 300 hippopotamuses in Uganda's Queen Elizabeth National Park died after drinking water contaminated with anthrax. The lethal bacteria can frequently be found in the pools of stagnant water that form during Uganda's dry season. There is a need for emergency measures to address the problem should it occur.

Figure.33: Disposing off of Hippo carcass due to Anthrax outbreak in QENP in 2003.
Source: UWA (2003)

3.7. HUMAN-WILDLIFE CONFLICT

In 1997, wildlife experts identified human-wildlife conflict as one of the major threats to conservation, and one of the most difficult problems that conservation manager's face in Africa (Hill, C., Osborn, F. and Plumptre, A.J. 2002). Human–wildlife conflicts occur when the needs of wildlife encroach on those of human populations or the needs of human populations encroach upon those of wildlife. In Uganda these conflicts have intensified overtime because of agricultural expansion and human settlements as a result of human population growth. The increasing human population has led to encroachment on wildlife conservation areas. A number of wildlife dispersal areas and corridors have been settled and conservation areas remain small isolated islands. These settlements and related developments have led to regular human-wildlife interactions causing crop and property destruction, wildlife and human attacks.

There has been an increase in cases of human – wildlife conflicts mainly emanating from crop destruction, livestock predation and human attacks by elephants, crocodiles, lions, leopards, chimpanzees, gorillas, baboons among others. Crop raiding compromises local food security, impacts on attitudes towards wildlife and reduces tolerance and support for conservation. Human- wildlife conflicts also emerge when individuals or communities invade wildlife conservation for poaching, illegal logging, cultivation, grazing and other related illegal resource access practices. Such activities negatively impact on habitats and survival of wildlife. For instance in retaliation, local people killed 11 lions (Panthera leo) in Queen Elizabeth National Park in March 2018. Poaching

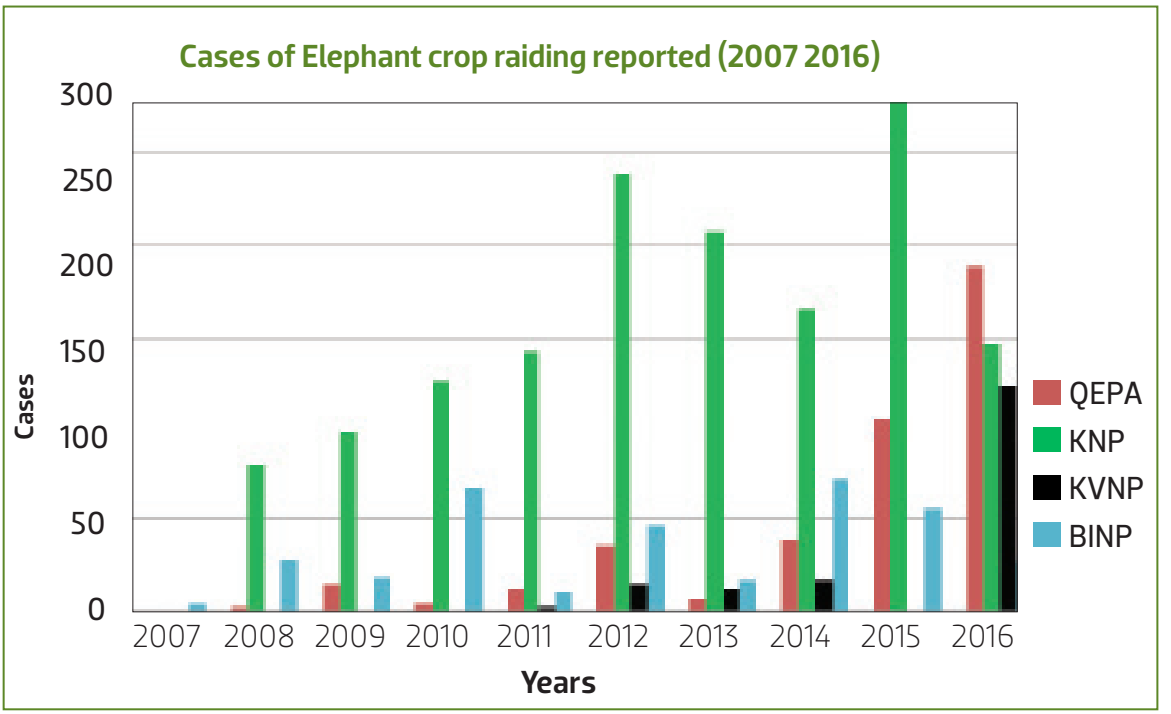
has also led to loss of human life where rangers and other conservation cadres have been killed or injured in line of duty. Also fatal cases of chimpanzee-human attacks have been occurring mainly targeting children and women around Kibale National Park. Other cases have occurred around the Bunyoro region (Masindi, Hoima, Kagadi, Kakumiro and Kibaale districts). Over 30 cases of crocodile-human attacks have occurred and reported around Mayuge, Kasese, Mpigi, Nakasongola districts among others. Cases involving elephants, lions, hippos and buffaloes have occurred across a number of districts.

Interventions to address the challenge include; strengthening the UWA community conservation sub-directorate through enhanced funding, staffing, capacity development and cooperation with other line departments, institutions and agencies. There is also need to streamline cross-border cooperation, increase the capacity of district local governments and local communities to mitigate/manage conflicts, promote alternative livelihood projects, raising public awareness and enhance research and monitoring.

In an effort to address the challenges, UWA has so far developed and to a certain extent implemented the "Strategy for Problem Animal Management and Vermin Control" (2001). The strategy provided for establishment of a Problem Animal Control Unit based at L. Mburo National Park. However, the unit's operational has remained highly constrained by inadequate staff, skills and facilitation. Human – Wildlife Management Strategy (2018-2022) for UWA is still in draft form. The strategy is aimed at guiding implementation of numerous interventions to minimise losses. The strategy provides an elaborate mechanism for resolving conflicts through; strengthening the community conservation sub-directorate through enhanced funding, staffing, capacity development and cooperation with other line departments, institutions and agencies. It also highlights the need to streamline cross-border cooperation, increase the capacity of district local governments and local communities to mitigate/manage conflicts, promote alternative livelihood projects, raising public awareness and enhance research and monitoring.

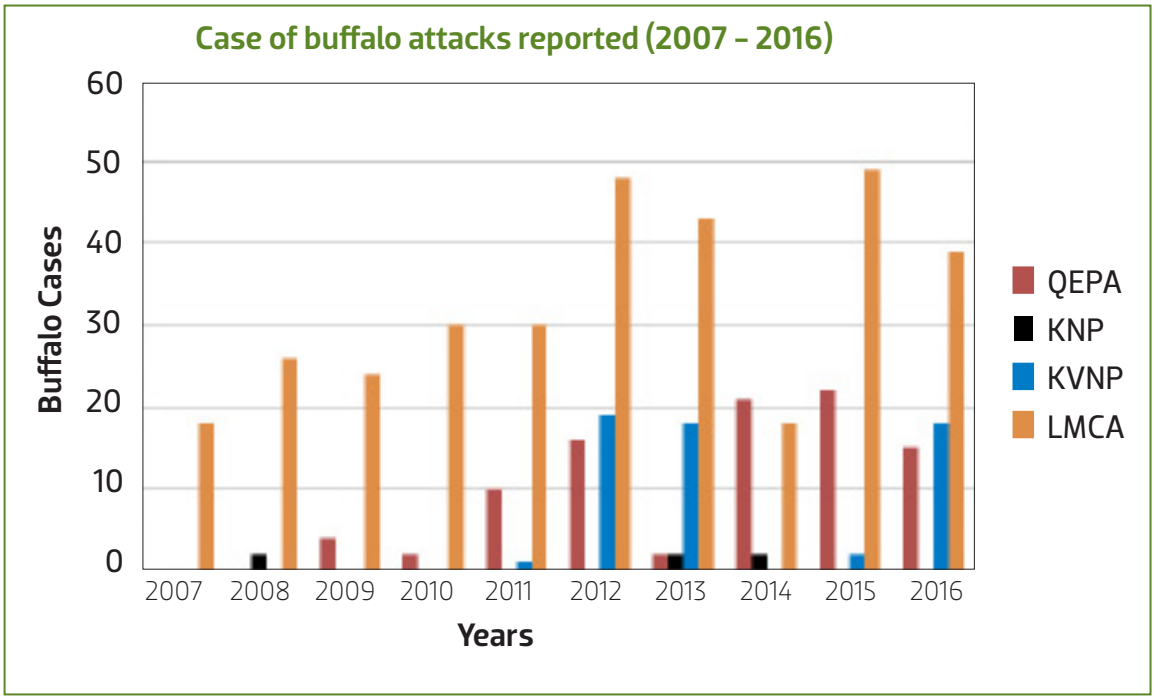
Despite the growing challenge of human-wildlife conflict especially around protected areas, little remains known about the actual magnitude of the problem. Limited studies have been undertaken to quantify the actual losses. Different interventions have been implemented but with varying degrees of effectiveness. The high variability of human wildlife conflicts and inadequate database hamper efforts to address this highly complex challenge. To address the challenge, there is need to examine and understand the spatial distribution, frequency and extent of crop loss and property damage as well as human attacks. There is need to implement focused mitigation measures that reduce losses and improve relationships between conservation managers and local people.

Figure.34: Cases of elephant crop raiding reported (2007–2016):



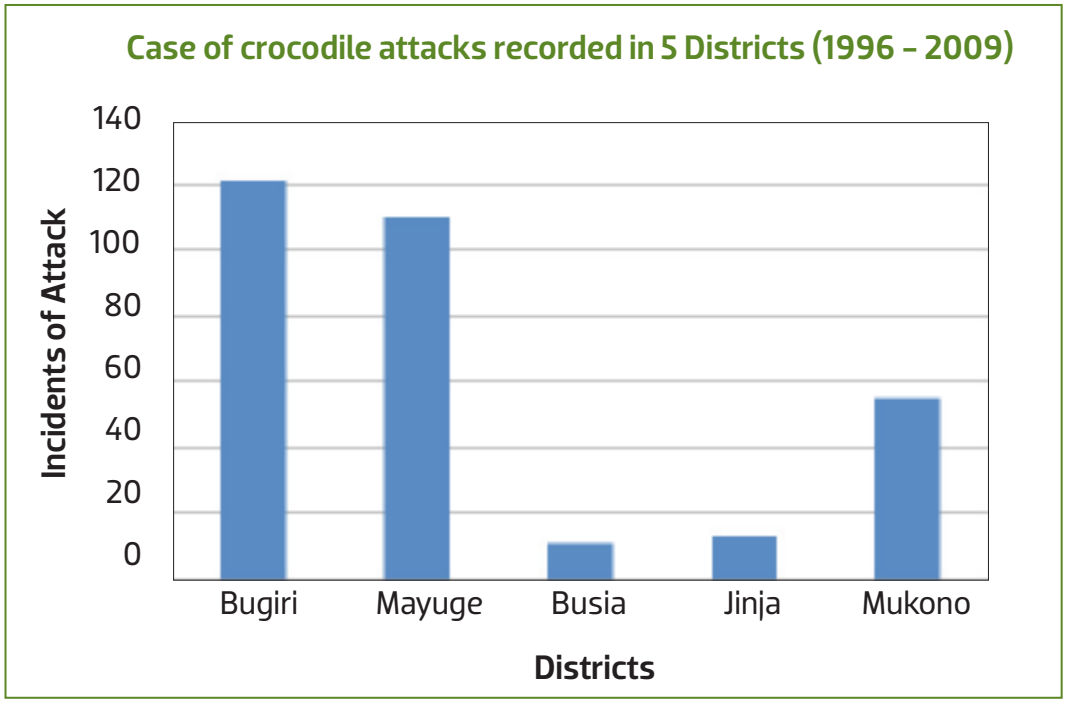
Source: CA Problem Animal Reports

Figure.35: Cases of buffalo attacks reported (2007–2016):



Source: CA Problem Animal Reports

Figure.36: Cases of Crocodile attack recorded in 5 Districts (1996-2009)



Source: CA Problem Animal Reports

CHAPTER 4

Significance of Wildlife Sector to National Economy

4 SIGNIFICANCE OF WILDLIFE SECTOR TO NATIONAL ECONOMY

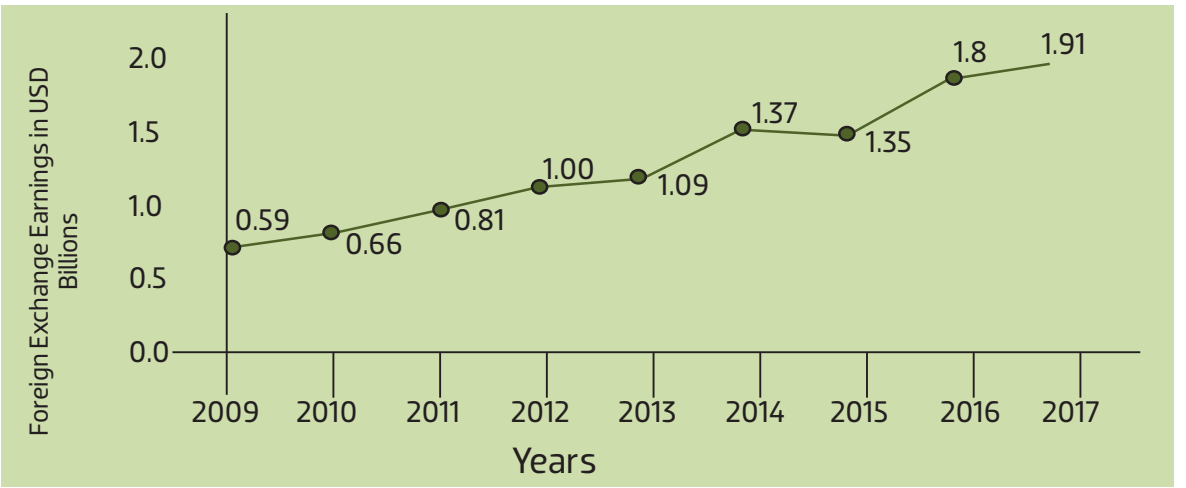
4.1. INTRODUCTION

Uganda has nature–based tourism as a one of the key pillars for economic development. The tourism sector is therefore largely focused on the country's landscape and wildlife, with national parks, wildlife reserves and natural tropical forests making up the bulk of the tourist attractions. It is a major driver of employment, investment and foreign exchange earnings. In the Vision 2040 for Uganda, the tourism sector is not only envisaged as one of the four economic growth drivers to spur economic transformation, but also relied upon as a mechanism to alleviate poverty, generate revenue for the government and contribute to wildlife conservation. The tourism sector is recognized in the National Development Plan (NDP) 2015/16–2019/20 (NDP II) as one of the fastest growing service sectors of the economy and a major foreign exchange earner.

4.2. CONTRIBUTION OF TOURISM TO THE ECONOMY

The tourism sector has significantly contributed to national economic growth and development since it was streamlined by the National Resistance Movement in 1986. For instance, foreign exchange earnings grew from US$ 375 million in 2006 to US$ 1,914 million in 2017 (WTTC, 2018) as shown in Figure 37. These contributions were generated from investment, the supply chain and induced income impacts. The indirect contributions came from construction of tourist hotels and accommodation, tourism related government expenditure like tourism marketing and promotion, domestic purchases of goods and services dealing with tourists such as food and cleaning as well as services from travel agents. In 2017, the sector also generated 229,000 jobs directly (WTTC, 2018). The direct job creation includes employment by hotels, travel agents, airlines and other transportation services (excluding commuter services), restaurant and leisure industries directly supported by tourists. Total contribution to employment (including wider effects from investment, the supply chain and induced income impacts) was estimated at 605,500 jobs in 2017 (WTTC, 2018).

Figure.37: Contribution of Tourism to Foreign Exchange Earnings (US$ bn).



Source: WTTC 2018

The sector is already making significant contribution to foreign exchange earnings and could potentially significantly improve Uganda's economic status (Tables 10 and 11).

Table.10: Economic importance of wildlife sector to Ugandan economy

S/N	Year	2009	2010	2011	2012	2013	2014	2015	2016	2017
1	Total contribution of travel to GDP (UGX bn)	2,778	3,201	4,325	5,189	5,619	6,395.5	2,982.1	6,171.5	6,888.5
2	Direct contribution of travel& tourism to GDP (UGX bn)	1,157	1,366	1,884	2,231	2,402	2,762.5	7270.5	2,423.6	2,699.1
3	Tourism foreign exchange earnings USD(millions)	594	662	805	1.003	1.085	1.366	1.350	1.8	1.914
4	Visitor Exports (UGX bn)	1,325.1	1,666.3	2,379.7	2,826.2	3,036	3,549.3		2,592.9	3,060.1
5	Direct number of employees in tourism sector (jobs)	173,000	189,800	203,200	189,900	227,500	247,100	464,500	191,000	229,000
6	Total contribution of travel& tourism to employment (jobs)	426,800	456,700	487,300	475,900	551,100	592,500	708,000	504,000	605,500

Source: WTTC, 2018

Figure.38: Estimates and forecast of tourism's contribution to the Ugandan economy, 2011 and 2021

	2011			2021		
	U$ million	% of Total	Growth	U$ million	% of Total	Growth
Direct contribution to GDP	682	3.2	8.9	1198	3.1	5.8
Total contribution to GDP	1628	7.6	7.7	2887	7.4	5.9
Direct contribution to Employment	181	2.7	5.6	250	2.6	3.3
Total contribution to employment	447	6.6	4.4	625	6.4	3.4
Visitors Export	743	14.6	10.9	1282	13.3	5.6
Domestic Spending	397	1.9	5.9	703	1.8	5.9
Leisure Spending	398	2.8	-3.5	720	1.8	6.2
Business Spending	752	3.5	17.1	1275	3.2	5.4
Capital Investment	216	4.6	3.6	355	4.4	5.1

[1]2011 constant prices and exchange rate; [2]2011 real growth adjusted for inflation (%); [3]20111-2021 annualised real growth adjusted for inflation (%); [4]'000 jobs.

Source: World Travel & Tourism council 2011

4.3. REVENUE SHARING WITH COMMUNITIES AND OTHER FORMS OF CONTRIBUTION BY THE TOURISM SECTOR

UWA shares 20 percent of park entrance fees with local communities surrounding wildlife protected where tourism revenue is generated. The goal for revenue sharing is for the communities living adjacent to protected areas to derive benefits from tourism and conservation and thus be more committed to conservation. The shared revenue is managed by the respective District Local Governments and is used to fund livelihood and public goods projects decided upon by the beneficiary communities. It has also been noted that as a result of more revenue shared, there was reduction in illegal activities, resulting into a positive impact on conservation and environmental management (MTWA, 2014). Communities also benefit directly from tourism through community based tourism enterprise initiatives that have been established since 1998 under Uganda Community Tourism Association (UCOTA) and Community Based Tourism Initiative (COBATI). There are about 60 community initiatives under UCOTA.

Wildlife has also contributed to the wellbeing of the country through other aspects such as a) Cultural importance; In Uganda there are a number of cultural sites in wildlife protected areas and some tribes use wildlife species as their totems, b) Ecological functions; protected areas serve as water catchments areas, control floods among others c) Aesthetic values; which promotes tourism as part of the economic pillars of the country d) Education values; by studying wildlife, scientists have gained valuable knowledge about various life processes and discovered important medical products and d) Gene banks; wildlife resources contain large gene pool for the scientists to carry out breeding programs in Uganda particularly in the agriculture sector.

Other Services provided by wildlife resources include protection of water resources, soil formation, climate amelioration by forests and recovery from natural disasters. In recent decades, ecosystem services have been incorporated into national economies because of their contribution to humanity and wildlife. Uganda is amongst the countries whose economies depend heavily on nature.

Despite the positive forecasts for increased contribution of the wildlife sector to the national economy, challenges regarding the narrow base of this contribution still persist and will need to be addressed in the immediate to the medium term. For instance, 10% of Uganda's total area is allocated to protected areas but almost 83.3% of protect area revenue comes from only three wildlife national parks (Bwindi Impenetrable, Murchison Falls and Queen Elizabeth National Parks) of which 51% comes from the sale of gorilla tracking permits. The rest of the protected areas come largely as cost centers. This is because many of these protected areas have a limited range of products to attract substantial tourist numbers or to increase tourists' length of stay and expenditure. Addressing this challenge will require product redesign and diversification, improving visitor services and infrastructure as well as strengthening marketing and promotional strategies of the range of attractions on offer in all the protected area (Prosper Consult (U) Ltd.).

CHAPTER 5

Conclusion and Recommendations

5 CONCLUSION AND RECOMMENDATIONS

5.1. CONCLUSION

The report provides baseline information on patterns and trends of key wildlife species in the country such as mammals, reptiles, birds and amphibians especially in the protected areas. It highlights favorable policies, gaps and opportunities to conserve and sustainably utilize wildlife in Uganda.

Following political stability in the country since the late 1980s, the government and wildlife management structures in particular, have instituted enhanced conservation initiatives and protection measures. Animal populations have increased for some species for instance, the population of mountain gorillas increased from 292 in 1995 to over 400 in 2015, the elephant population increased by over 1000% from 550 in 1995 to over 5,000 in 2014. Over the same period, buffaloes numbers increased from 7,000 to over 36,953, giraffe population increased from 153 individuals to over 1064. The chimpanzee population increased from 3, 300 in 1997 to 5,000 in 2003.

However, the reports also points out considerable information gaps for most wildlife species including information on the state of habitats and ecosystems. Further studies on the distribution, abundance and threats of species need to be carried out particularly for species that are data deficient and those not yet assessed. The scope of the studies should be expanded geographically to include all protected areas, farmland, public land, wetlands and private forests. There is need to expand the lists to include all taxonomic groups, most importantly the full range of plants. Wildlife censuses that have been conducted to date are mainly limited to wildlife protected areas and don't cover all taxa. Up-to-date data on wildlife population trends and distribution patterns across the country would help to establish key factors that influence population trends and distribution patterns in space and time of a given species.

The report also highlights threats to wildlife conservation namely habitat degradation and fragmentation, human wildlife conflicts, poaching, invasive species among others. Although UWA continues to respond and address these threats, a lot more needs to be done at political and technical level adopting a multi-sectoral approach in view of the nature, scope and complexity of the threats that confront conservation efforts and long-term sustainability of the wildlife resource. These efforts will need to be expanded and strengthened to ensure that the impact of the threats on wildlife sustainability, national economy and other associated benefits, are progressively curtailed and ultimately eliminated altogether.

Revenue sharing programs continue to generate positive benefits to the communities neighboring protected areas whilst also raising awareness and appreciation of wildlife conservation efforts in these areas. Nonetheless, the rapidly expanding populations in the communities and the associated habitat fragmentation appear to pose additional challenges in form of increased incidents of human-wildlife conflicts in some protected areas. These challenges will need urgent attention if the existence and management of protected areas end up being perceived as a burden on the livelihoods of the surrounding communities.

Tourist numbers and tourism revenues for Uganda are generally increasing, making the tourism sector an important engine for socio–economic transformation of the country. However, if wildlife populations and their habitat are shrinking then the tourism sector, as a key driver of economic growth will be severely impaired. In addition, whilst wildlife-based tourism generates substantial contributions to the national economy, the sector continues to receive very low annual budgetary allocations thereby hampering prospects for increased growth and revenue from the sector.

5.2. RECOMMENDATIONS

5.2.1. Threats to wildlife conservation

Wildlife face a variety of threats that include poaching, habitat loss, climate change, and invasive/exotic species, among others. If the wildlife resource of Uganda is to survive, UWA, working with relevant government sectors, conservation organisations and other key stakeholders must urgently address the range of threats highlighted in Chapter 3 of this report.

5.2.1.1. Poaching

Animal poaching for various reasons is the most serious threat influencing wildlife population decline in Uganda. UWA has applied a number of interventions to address poaching inside and outside the protected areas however, these interventions need to be enhanced and strengthened. As a start, there is a need for consolidation of on-going UWA efforts especially focused on expanding engagement of relevant stakeholders including political leadership and local communities to address this challenge. In addition, multi-agency wildlife sensitization targeting the judiciary, the police, the army, customs and other law enforcement agencies to secure their buy-in and support for wildlife conservation is one of the critical tools that need to be strengthened. Other strategies include institutional capacity building such as provision of adequate staffing, specialised training, appropriate tools and equipment of the special intelligence and investigation units of UWA to enhance their capacities to gather information about poaching and other illegal activities and prevent these before they occur.

UWA should also endeavor to strengthen, incentivise and expand the existing network of informants to help combat the illegal trade in high-value species especially for ivory, other trophies and wild meat. Given the covert nature of elephant hunting, for example, the limited time hunters spend within park boundaries and the short period of time between an elephant being killed and its tusks being sold, gathering actionable intelligence is critical to improving the chances of arresting hunters and collecting enough evidence to secure convictions. Not only can intelligence-led enforcement help improve crime detection but it can also act as an extra deterrent, as hunters know there is a greater chance of being arrested and successfully prosecuted. For intelligence-led law enforcement to be successful, improving people-park relations is a key step in developing effective informant networks at each site (Travers, H et al. 2017). This action needs to be supported by a corresponding significant intensification of efforts to mitigate human-wildlife conflicts and to increase benefits from wildlife conservation.

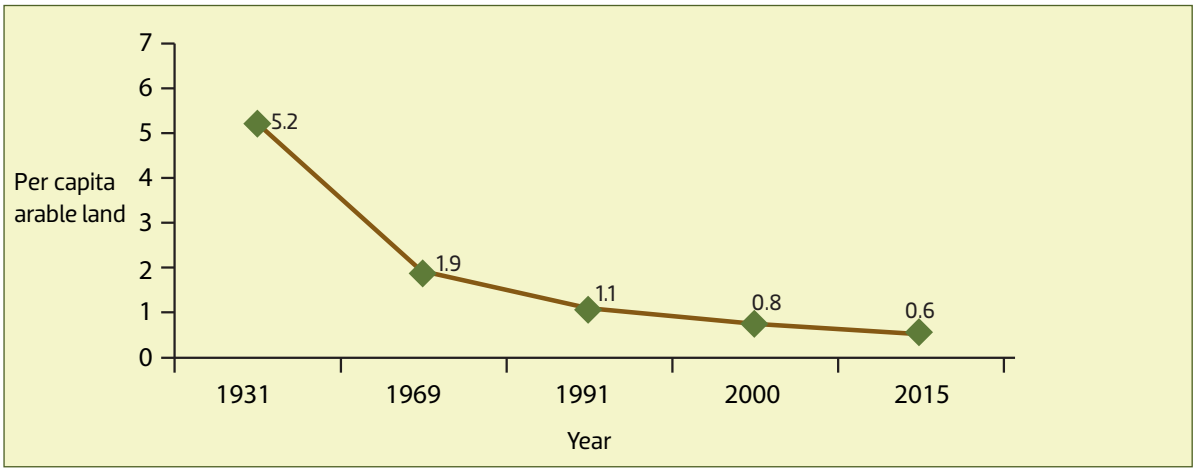
Working with the judiciary to operationalise and maintain offender database and the use of the data to support prosecutions in addition to improving reporting of successful prosecutions will in the long-term serve as valuable tools in curbing the gravity of poaching as a threat to wildlife conservation. UWA should therefore move quickly to implement these tools.

Whilst intensifying enforcement effort is crucial, ultimately it will likely prove to be an inadequate long term strategy with which to conserve high value species. This is because: regulatory approaches are being overwhelmed by the drivers of poaching and trade, financial incentives for poaching are increasing due to rising prices and growing relative poverty between areas of supply and centers of demand, and aggressive enforcement of trade controls, in particular bans, can increase profits and lead to the involvement of organized criminals with the capacity to operate even under increased enforcement effort. With prices for high value wildlife rising, the interventions need to go beyond regulation and to the extent possible, new and bold strategies will be needed

to supplement existing approaches. In the immediate future, intervention efforts should focus on providing incentives and building capacity within local communities to conserve wildlife. In the medium term, the new interventions should be targeted at driving prices down by reexamining sustainable off take mechanisms such as regulated trade, ranching and wildlife farming, using economic levers such as taxation to fund conservation efforts, and in the long term reducing demand through social marketing programs (Daniel W.S. et al; 2013)

5.2.1.2. Habitat loss, fragmentation and degradation.

Figure.39: Arable land per capita for the period 1931–2015.



Source: NEMA, 2000

Habitat loss and especially habitat fragmentation lead to degradation, destruction, or alteration of once continuous habitat. This transformation eliminates buffer zones and migratory corridors that ordinarily allow free movement of animals to other geographical localities with critical resources for survival of wildlife and exchange of genetic materials. Humans are the main cause of habitat loss due to increased human population, settlements and conversion of land for agriculture, farming and other consumptive practices. For instance, based on estimated land area of 194,000 sq. km and population census data since the 1960s, land has become increasingly scarce as the country's population continues to increase. According to the 2014 human population census results, the population in Uganda has maintained an upward trend growing from 9.5 million in 1960 to 34.9 million in 2014 (UBOS, 2015). Figure 32 shows the decline of arable land size per capita from 1931 to 2015.

As highlighted in Section 3.2 of this report, habitat loss, fragmentation and degradation are some of the leading threats to wildlife in protected areas. The increasing human population and the consequent demand for land will likely contribute to increase in human wildlife conflicts, a possible decline in local support for wildlife conservation efforts and ultimately, the continued survival of wildlife in protected areas will be severely threatened. Provision of adequate conservation status to critical wildlife habitats, addressing the problem of human population growth, adoption of poverty reduction strategies that are conservation-friendly and discouraging some destructive development policies are some of the key measures to mitigate the problem. Other measures entail full involvement of the local communities in conservation work, provision of adequate economic incentives, participatory land use planning and undertaking relevant research to generate information to guide making informed strategies for poverty eradication. Given the nature of the problem, if a lasting solution is to be realized, habitat loss should be viewed as a multi-sectoral rather than a single sectoral issue. Therefore,

UWA should actively continue to engage and mobilize relevant stakeholders to play an active role in halting and pre-empting the problem. Some of the management strategies that should be considered to address the threat of habitat loss as a result of human population increase and activities include:

i) Adoption of poverty reduction policies/strategies that are conservation-friendly

To reduce the pressures on natural resources and habitats, alternative strategies for reduction of encroaching into wildlife habitats should be adopted. Since land shortage is ascribed to poor farming practices, more equitable and efficient use of the land already under cultivation should be adopted as one of the strategies. The strategy should entail implementation of activities that support the agricultural sector – e.g. subsidizing farming inputs, providing credits and access to markets, and controlling problem animals. Furthermore, alternative livelihood strategies such as small business enterprises and ecotourism should also be supported and encouraged. In order to reduce heavy dependency on fuel wood the government should progressively support and expand for the long-term alternative and affordable energy (e.g. biogas, solar and electricity). In the short-term, agro-forestry/afforestation programs should be encouraged to provide local people with fuel wood supplies.

ii) Making human population growth a priority agenda

Although human population growth is one of the underlying causes of threats to wildlife habitats and ecosystems in Uganda, it barely receives adequate attention in the current conservation policies. Unless proactive intervention policies are sought, the pressure on land and resources will increase. Population increase will also diminish the effectiveness of some current strategies for wildlife conservation and exacerbate the conflicts. For example, human population increase may decrease the share of wildlife-related benefits to local communities and therefore defeat the aim of the strategy i.e. motivating people to refrain from destructive activities. Possible strategies to address human population growth should include developing and implementing active policies aimed at reducing immigrants from other areas by limiting population-pull factors; adopting family planning measures (to minimize the problem of natural increase); and formulating special policies to depopulate the area (e.g. by obligating all administrative regions in Uganda to absorb and employ the youth from communities around protected areas).

iii) Enhancing conservation education and research

Lack of basic knowledge about the values of wildlife conservation and understanding of the long-term consequences of their actions especially the destruction of habitats and the wildlife therein also constitute an underlying threat to the wildlife resource. The provision of appropriate conservation education and awareness raisingis therefore, a critical component of any efforts to mitigate the impacts of this threat. Accordingly, these efforts should focus on educating people about the value of wildlife and their habitats, the consequences of habitat destruction/loss and ways of mitigating the problem.

In addition, research programs are vital in generating information needed for controlling and reversing habitat destruction. Research should focus on establishing the reasons why local people exhibit a particular unsustainable behavior; identifying the (alternative) livelihood strategies with minimal impact on habitats; evaluating the efficacy, implementation constraints and social acceptability of the alternative land uses and strategies against those threatening the ecological integrity and; identifying new wildlife corridors and habitats along with the potential effects associated with environmental change and human use.

iv) Involving local communities, instituting participatory land use planning and providing adequate conservation incentives

For decades, conservation has been pursued against the interests of local people and, therefore, resulted into loss of trust, hostility and local resentment. Of recent, efforts to involve local people have been adopted, although these remain inadequate and passive. In addition, full participation is still lacking but the on-going efforts are nonetheless actively pursuing achievement of this target in the medium term. Genuine and effective participation requires empowering of local people to take part in designing, planning, decision making, implementation, benefit sharing, monitoring and evaluation. The process takes time because it requires changing the attitudes of the local communities as well as undertaking capacity building activities to equip local people with relevant knowledge and negotiation skills

Since 1996, UWA has been working with local communities and the local governments to develop and pilot new modalities for benefit sharing to ensure that the costs and benefits are evenly distributed and that the benefits are also better targeted to offset the conservation-induced costs. Local communities have been identifying and implementing projects using revenue sharing (i.e. 20% of the park entrance fee) and this has contributed to better understanding and appreciation of wildlife conservation by the local communities and the local governments. Furthermore UWA has been undertaking a number of collaboration programs with local communities such as regulated resource access, sport hunting concessions outside protected areas involving private sector players, promoting and supporting tourism activities on community lands, among others.

5.2.1.3. Climate change

Wildlife and habitats across the country have experienced to varying degrees, the various effects of climate change and the associated extreme weather events such as prolonged drought in some protected areas. Although the nature and magnitude of the changes are yet to be fully determined, some of the impacts have manifested in the form of habitat modification, forage availability, and increased water scarcity in some of the wildlife protected areas. In addition, the potential for increase in wildlife diseases due to the impacts of changes in climate cannot be overlooked. Human-wildlife conflict takes various forms outside protected areas - from poaching, livestock killing, and crop destruction to habitat encroachment. Climate change impacts like droughts, habitat loss and spread of diseases has the potential to lead to increased conflicts in wildlife areas.

These changes and their impacts on ecosystems will likely become more severe and far-reaching in the years ahead. Therefore, research is urgently needed to explain and increase understanding of the effects of climate change in Uganda on wildlife conservation prior to development and application of appropriate mitigation measures and adaptive management of wildlife resources in Uganda. In particular, funding support will be required to undertake specific studies aimed at determining traits that make wildlife species and habitats more resilient or vulnerable to changes in climate and also implementing projects that have the potential to reduce vulnerability of species to climate change impacts.

5.2.1.4. Invasive species

Invasive species can wreak havoc on native populations of wildlife by displacing them or altering their habitat. Uganda Wildlife Authority, in collaboration with other government agencies and line ministries, partner institutions and other stakeholders, need to proactively, and effectively respond to the invasive species challenge in Wildlife Protected Areas (PAs).

Some of the country's wildlife protected areas have experienced a rapid infestation and spread of a range of invasive species notably Acacial hockii in Lake Mburo National Park, Dicrostachys cinerea, Chromelaena ordorata, Opuntia Vulgaris, Imperata cylindrica and Parthenium hystorophorus in Queen Elizabeth National Park. For instance, Dichrostachys cinerea is not a palatable shrub and is avoided by wildlife due to its sharp and hard thorns. It now dominates large areas of QENP and has consequently reduced grazing space for the animals and lowered the park's carrying capacity for grazing wildlife species. Once Dichrostachys cinerea has fully established, it locks up occupied areas restricting animal movements and ranger patrols; suffocates pasture grass and other plants thereby becomes dominant in infested areas. It also obscures tourist viewing experience while on game drives. Furthermore, Lake Mburo National park which used to be an open savannah national park has now been severely invaded by Acacia hockii spp of treeswith thickets turning it into a closed woodland.

The spreading infestation of invasive alien species has resulted into declining feed availability for animals, undesired mass migration of animals, disruption of animal breeding cycles, decline in animal populations and large scale ecosystem destabilization. Recognizing the urgent need for effective, efficient and sustainable management of invasive species in wildlife protected areas, UWA contracted the National Invasive Species Coordination Unit to pilot an integrated IAS management project for selected IAS in LMNP (Acacia hockii) and QENP (D. cinerea, C. ordarata and P. hysterophorus). Drawing on various relevant IAS management strategies, indigenous and foreign IAS control success stories, and the understanding of the prevailing invasion situations, this pilot project has been implementing an integrated approach involving the application and use of mechanical, cultural and classical biological control interventions, on a host of selected priority IAS. The target is to clear 300 acres in each park within a period of one year (i.e June 2017 to June 2018). Based on the lessons learnt, achievements and available funds, the program will continue in the two parks and will also be rolled out to other protected areas.

However, much as UWA has aggressively embarked on the active management of established and spreading invasive species there is an urgent need to prevent new invasions, early detection and rapid response of new invaders.

There is also an urgent need for UWA to undertake capacity development initiatives focusing on staff training, research and trials, education and outreach programs, early detection and rapid response protocols, inventory and mapping, restoration and collaboration.

These effort will require provision of adequate and predictable budgetary allocations to sustain the success of the ongoing and planned interventions and thus the sustainability of the protected area habitats and their wildlife populations.

5.2.1.5. Parasites and diseases

The three basic forms of management strategies for wildlife diseases include prevention of introduction of disease, control of existing disease as well as eradication. In this context, the focus of UWA should be directed at the management of disease agents, host population, habitat or be focused on human activities. The veterinary unit of UWA should be strengthened through provision of appropriate equipment including mobile clinics and the associated transport for rapid response capacity as well as laboratories for diagnosis of wildlife diseases. There is need for staff recruitment for positions at various levels and training in relevant skill sets. UWA needs to work with both local and international institutions and experts to address the parasites and disease threat to wildlife drawing on the collective expertise, lessons learned and best practices of similar work in other parts of Africa and elsewhere in the world.

5.2.1.6. Enhancing approaches and capacities for Human-Wildlife Conflict Management

A study conducted by the Institute of Tropical Forest Conservation (ITFC) in 2012 on human-wildlife conflict management in the Greater Virunga Landscape (ITFC 2013) that included seven of Uganda's protected areas (Semuliki, Rwenzori Mountains, Queen Elizabeth, Bwindi Impenetrable and Mgahinga Gorilla National Parks, as well as Kyambura and Kigezi Wildlife reserves)generated considerable insights regarding the nature and scope of the conflicts as well as the divergence of approaches in addressing these conflicts within the region. The study also proposed a number of recommendations at policy and operational levels to progressively eliminate incidences of human-wildlife conflicts in protected areas within the individual protected areas and across the Greater Virunga region as well.

In the context of Uganda, the management challenges identified by the study in the seven protected areas and the range of recommendations proposed for the consideration of UWA are particularly relevant to the current circumstance and should therefore be taken on board in the on-going efforts to formulate a comprehensive human-wildlife conflict strategy for implementation across the country's protected area network. Some of the key management challenges identified by the study include:

i) Lack of systematic documentation of the nature, extent and impacts of human-wildlife-conflicts and thus lack of baseline data to support informed policy and operational decisions and approaches to address the problem.

ii) Multiple and often uncoordinated management approaches and interventions particularly in the context of community engagement and participation, compensation schemes and their administration, as well as institutional appreciation of the cost effectiveness of the various management strategies and interventions;

iii) Conflicting land use policies and practices that lead to expansion of agriculture and human settlements in areas adjacent to wildlife protected areas and the management of expectations of the local communities in these areas.

iv) Limited institutional capacity and financial resources to respond to conflicts and provide long-term policy and management interventions

The ITFC study highlighted the limited focus of some institutional approaches to address the problem and thus the need to acknowledge the fact that lasting benefits will be realized only when emphasis is placed on the interests and role of the communities themselves, and on the longer-term process of managing and maintaining the interventions.

The range of recommendations proposed by the ITFC study are reproduced here specifically for UWA to ensure that as a start, they inform current efforts to address the identified conflicts in protected areas. In addition and in view of the level of specificity articulated in specific recommendations for each of the 5 protected areas covered by the study, UWA should ensure that the suggested recommendations are to the extent possible, duly integrated in the formulation of a comprehensive human-wildlife conflict strategy for implementation across the country both inside and outside wildlife protect areas. The suggested recommendations (ITFC 2013) include:

i. Community members affected by problem animals (and by extension the intervention) should be clearly and urgently identified. They should be the focus of all discussions.

ii. Revenue sharing funds should be channeled into issues that are directly linked to wildlife such as the Human-Wildlife Conflict prevention and mitigation measures as a matter of priority rather than common good

community projects like building schools, roads, and health centers, etc. as is currently the case;

iii. A special fund should be created for compensating human injuries and deaths. These are not so common but need to be promptly addressed;

iv. No Human–Wildlife Conflict intervention should be implemented without full participation of the local community whom it is intended to assist. This could make the selection process of a preventive and mitigation intervention implementation take long but is a necessary evil to make the intervention a success.

v. Monitoring data collection and analysis especially recording of animal raids, where they occur, and amount of damage need to be improved. Data held about Human–Wildlife Conflict are frequently old or one off, suggesting that there is no clear system for analysing the data collected in the field. The recording of data is taken for granted, and there is little or no interest in scientifically understanding animal excursions in the field. The net result of this situation is that there is in essence no baseline data collection system currently in place that can be used to reduce or assess Human–Wildlife Conflict and increase management performance over time. This information gap must be closed;

vi. There is need to train and motivate a few selected people from the local community based groups to participate in the data recording. In Volcanoes, Rwanda, those selected few that collect the data are paid a small incentive fee. This assists in understanding what is happening in the field, assists in decision making, allowing park management to follow trends in the interventions, and use the information obtained to communicate to other stakeholders, including donors on the successes and failures of interventions.

vii. Scientific research need to be undertaken on changes in the vegetation inside and outside the protected areas – biomass, nutrient status, structure etc. to understand why some wildlife like gorillas that previously used not to come out of the forest are doing so now. Although research on Human–Wildlife Conflict does not directly prevent or mitigate conflicts, it forms an integral part of almost any 'package' of counter measures, actions or schemes, and should be one of the first courses of action.

viii. It is imperative that guidelines and policy for responding to human–gorilla conflicts be developed from the lessons learned so far and the current collaborative approach be institutionalised through appropriate partnership/cooperation instruments (eg. MoUs) with the concerned community groups and local governments

ix. For any compensation scheme to be successful, the following need to be in place before the scheme is implemented (Nyhus et al. 2003): prompt and fair payment, sufficient and sustainable funds, clear rules and guidelines, including strong institutional support and site specificity to cater for differences in raiding species and culture specific issues.

x. Efforts to resolve conflicts that might become more severe and widespread in time and space, will require multi–pronged long–term strategies that go beyond the conflict–zone around the protected areas:

xi. First, there is need for a compensation scheme to be locally administered. To try to avoid the pitfalls of centralized compensation (low government funding, resources to verify rising claims, monetary inflation etc) the model should be designed to operate around community–based organizations that are partially based on community–funded financial schemes as is being done in Tanzania (Hoarse 2012). This would quicken the compensation process and the local people would view the compensation as fair as it will be based on local circumstances. The idea of consolation fund has been piloted in Queen Elizabeth Protected Area where park management and local authorities agreed to save five percent of the annual revenue sharing money

to purposely cater for human injuries and deaths. If the consolation money is not spent in a given year, it is ploughed back into the revenue sharing account. This experiment needs to be carefully studied, improved and made into policy;

xii. Second, there is need to formulate land use policies or reform existing ones to discourage agricultural expansion, and human settlement in lands adjacent to protected areas and establish wildlife corridors between the protected areas. The long-term success of such strategy is highly dependent upon local community support. For example, in Tanzania, the government, with donor and NGO support is attempting to reconnect the nine largest blocks of forest in East Usambara Mountains by means of wildlife corridors (Newmark 2002). These corridors will be established by extending forest reserve boundaries and regenerating forest within existing gaps. Also, the African Wildlife Foundation through their Heartlands Program (Muruthi 2005) and Wildlife Conservation Society through their landscape-wide conservation initiative (WCS 2009) are focusing on protecting dispersal zones and establishing corridors among protected areas through the creation of partnerships with local communities, government authorities and other non-government organizations. Implementation of such policies is expected to reduce or even eliminate Human-Wildlife Conflict completely;

xiii. Lastly, there is need to look into ways vermin and problem animals can be made to instead generate revenue. Activities like sport hunting of these animals or adding value to trophies derived from these animals need to be explored. The revenue generated would go directly to the local people affected. A case in point is the sport hunting scheme of specific species found on local farmers' land around Lake Mburo National Park. This scheme needs to be studied to judge its impact on conservation and local community attitudes towards wildlife.

5.2.2. Studies on trends of vegetation cover and habitat changes

Changes in the quality and quantity of vegetation cover have implications for the sustainability of wildlife species within the country's protected area network. The report points out that vegetation cover change observed in some of the national parks and wildlife reserves appears to be driven by extreme weather events especially prolonged drought, invasive alien species, low numbers of large herbivores and in some cases by illegal or conflicting practices such as cattle grazing inside protected areas as well as uncontrolled fire outbreaks by poachers. There are no datasets to provide an accurate picture of the exact nature, extent, source and trends in vegetation cover and habitat modification changes as highlighted in the report. There is a need therefore, to conduct studies on vegetation cover in wildlife protected areas to provide a ready, ecologically up-to-date data on habitat and ecosystem extent and health on on-going basis. This will require the support of ecological modelers, statisticians and GIS experts to produce time series vegetation cover maps to establish land cover changes as a basis for identifying and implementing appropriate interventions to mitigate the negative impacts of the observed changes.

5.2.3. Conducting Non-Detrimental Findings Studies

Uganda is a signatory to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The Convention also establishes the species listing called appendices I, II and III which categorises species according to their vulnerability to extinction due to international trade. Trade is regulated under such listings. According to the listings II, III and IV, parties shall only allow trade in the specimens of the species included in accordance with its provisions. Articles III and IV require that, for specimens of species on these appendices,

an export permit shall be granted only when a Scientific Authority of the State of export has advised that such export will not be detrimental to the survival of the species being traded. In Uganda, a number of companies were licensed from 2000 to-date to trade in wildlife species. However most quotas are based on subjective judgment and lack detailed ecological data to guide the issuing of the quotas. Therefore there is an urgent need to conduct Non-Detrimental Findings (NDFs) species traded to provide the relevant scientific data on which issuance of quotas for trade should be based. This is to ensure setting of sustainable quotas.

In addition, further studies are required to expand the geographic scope of wildlife surveys to cover all protected areas, farmland, public land, wetlands, private forests and other taxonomic groups. Therefore there is need for increased budget allocation to undertake regular and consistent wildlife censuses inside and outside protected areas for all taxa.

5.2.4. Development and implementation of Species Specific Action Plans for endangered and threatened species.

Species Action Plans provide a blueprint for assessing the status, ecology, threats, current conservation measures, and priority actions to address the threats to the species in question. In the context of Uganda, as is the case elsewhere in other countries, these action plans provide a common framework for collective and prioritized action by UWA, relevant government sectors and other key partners including conservation organisations and local communities. These plans must be implemented and must therefore receive adequate funding if they are to be effective tools for stimulating the formulation of the necessary policy frameworks, allocation of the requisite resources as well as practical implementation on the ground.

Some species action plans in use by UWA such as the Mountain Gorilla Species Action Plan, the Chimpanzee Species Action Plan, the Carnivores Species Action Plan, among others, have expired. The Elephant Species Conservation Action Plan and the Grey Crowned Crane Species Action Plan are still valid but their implementation is very limited due to inadequate funding. It is imperative for UWA to mobilize and secure sufficient funds for the development and implementation of species action plans in order to save the species threatened with decline or extinction.

In particular, and as pointed out in the preceding sections of this report, the grey crowned crane, a flagship species of great political significance in Uganda, is under severe threat due to increasing degradation of its habitat, illegal trade and in some case, domestication. The species action plan for this national bird requires priority funding support and implementation to ensure the survival of this species.

The case for the development and implementation of a new species action plan for the mountain gorilla is all the more urgent in view the fact that this species is listed as critically endangered and is also endemic in Bwindi Impenetrable National Park and the Virunga Massif. Yet this premier flagship tourism product for the country generates about 80% of UWA's total annual revenue. Recent estimates put the economic value of gorilla tourism in Uganda at up to US$34.3 million (World Bank 2018) which constitutes a significant contribution to the country's GDP. The transboundary nature of the gorilla's home range places additional pressure on the continued survival of this species because of the on-going and protracted political instability and armed conflicts, human encroachment, poaching and habitat degradation in the neighboring Democratic Republic of Congo.

Although the population of the elephant, an iconic species for conservation and tourism continues to enjoy a steady growth since the 1990s, this positive trend is nonetheless threatened by poaching and especially the international trade in ivory. In addition, habitat loss due to the expansion of agriculture, human settlements

and encroachment in wildlife dispersal areas has increased incidences of human-wildlife interaction and conflicts. Taken together, these threats could reverse the positive gains regarding the security and protection of the elephant populations in the country. In this regard, the implementation of the priority actions set out in the Elephant Species Conservation Action Plan must be undertaken as a matter of urgency, especially priority actions to address poaching and habitat loss, among others. UWA must therefore, use this action plan to leverage the necessary funding support from its internal resources, government budgetary allocations as well as from external funding sources to effect the immediate implementation of the action plan.

5.2.5. Capacity building

Monitoring the status and trends of wildlife species inside and outside the country's protected areas is critical to their conservation and management. The information and data gaps highlighted in the preceding sections of this report point to an immediate need for institutional capacity building for long-term wildlife research and inventories. Accordingly, the UWA Monitoring and Research Unit needs to be well equipped and facilitated to carry out regular wildlife surveys in order to generate credible and up-to-date data and information for enhanced wildlife conservation and management activities. In addition, it will be necessary for staff of the Unit to receive specialized training in data collection, interpretation, analysis and reporting writing specifically to produce high quality technical reports and publications for a diverse user audience within the country and elsewhere at international level. In particular, the skill sets that will need to be enhanced through targeted training for UWA staff include, but not limited to the following:

i) Integrated environmental assessment and reporting: as opposed to the traditional sectoral reporting. UWA technical publication processes stand to benefit from acquisition of relevant skills and knowledge of conceptual and methodological aspects of integrated assessment and reporting namely; producing and communicating future-oriented, policy-relevant information analysing environmental change, trends, causes and impacts, policy responses in the context of future scenarios, identifying emerging issues that require national and international attention and providing options for policy-making and action planning.

ii) Data management issues: the specific required data management skills can be further categorised under data assembly and management (collection, assembly, quality control, and structuring); data handling (manipulation, integration in database and database management systems); data analysis and product generation. In cases where relevant UWA technical staff do not require this capacity, it will still be necessary for these staff to acquire the necessary skills to interface with those specialised partner institutions that have well established data management capacity and track record. This is a long-term undertaking and will require careful consideration in the formulation of the proposed capacity development strategy.

iii) Environmental/biodiversity indicators: the development and incorporation of appropriate indicators in the reporting process is also a key area that requires developing and strengthening.

iv) Scenario and modeling: scenarios support informed action by providing insights into the scope of the possible. They also can illustrate the role of human activities in shaping the future, as well as the links among issues, such as development patterns, environmental change and human impacts . It will be necessary for UWA to acquire knowledge and skills to develop scenarios as integral components of specific reporting processes that go beyond the generation of wildlife status reports but also focus on their analysis in terms of the impact they would have on existing policies or of the kinds of policies that would be needed in order for a particular scenario to unfold.

v) Institutional networking: institutional networking and partnerships will be critical to the success of UWA technical report production processes, with the assumption that the partners will continue to collaborate and provide specialized support inputs into these processes. In this regard, the existing networking and partnership arrangements between UWA and relevant national and international institutions will thus need to be enhanced. It is also important for UWA Technical staff to collaborate with academic institutions, researchers and experts from various disciplines to enhance internal capacities to undertake research and inventories for all species, to address invasive alien species, climate change mitigation and adaptation and other headline threats. This kind of partnership will help to fill data gaps and generate timely scientific information needed for developing informed management strategies and also for taking appropriate actions such as setting science-based quotas

5.2.6. Enhancing the contribution of wildlife tourism to national economic development

Tourism is a significant and growing contributor to global economies through job creation, revenue generation, and infrastructure development. Nature-based tourism and, more specifically, wildlife tourism are thriving in many countries, especially in Asia and Africa. However, wildlife and the habitats on which this type of tourism is based are increasingly threatened by rising human populations, economic activity, illegal poaching, and lack of funding (World Bank 2018). If wildlife tourism is therefore expected to continue to play a key role as an engine of economic and social transformation in the lives of the citizens of Uganda, the current challenges in the tourism industry need to be addressed as a matter of institutional focus, direction and attention.

In the context of Uganda, and as highlighted in UWA's draft Product Review and Marketing Plan 2017-2018 (Prosper Consult (U) Ltd.) the country's rich tourism potential, given its natural, historical and cultural diversity, is vastly under-utilized. The Country's performance falls significantly short of its peers in the Eastern Africa region, in terms of leisure tourist arrivals (both international and domestic) and tourist receipts. Although the country attracted close to 1.32 million international arrivals in total in 2015, the majority of these came for non leisure activities. It is estimated that less than 200,000 of the arrivals are leisure visitors who consume wildlife products (UBOS, 2016). Many reasons are advanced to explain this inadequate sector performance, among them are; the poor country image, violent political history of the country, destination access constraints, inadequate and at times lack of infrastructure to support tourism, limited range of products, lack of capacity in human resources within the sector, high cost of tourism services and products and, most especially, limited marketing of the vast wildlife tourism potential both internationally and domestically.

Although the country's tourism is nature based and tourism arrivals in the country has significantly increased to over 1,250,000 arrivals in 2016, the proportion of foreign visitors (big spenders) going to wildlife protected areas is still low (19.6%) posing a challenge to UWA's potential to fully finance its annual budget. In view of the foregoing therefore, UWA needs to re-engineer, consolidate, position, market and further promote protected areas as prime tourism destination. In addition, UWA needs to diversify tourism products for income generation as well as improve on services for visitors in protected area. Accordingly, UWA must urgently finalise the draft wildlife tourism marketing plan and catalyze the necessary resources for its immediate implementation with the express aim of improving visibility and popularity of the existing and potential wildlife tourism products and services within the protected areas.

5.2.7. Sustainable wildlife tourism to support protected area conservation and national development

The tourism sector is the largest, global, market-based contributor to financing protected-area systems in many countries. To deliver environmental and economic benefits to protected areas (World Bank 2018), UWA will need to to explore innovative tourism partnerships and investments to secure sustainable funding mechanisms that protect wildlife species inside and outside protected areas whilst improving livelihoods of the adjacent local communities. Well-planned, sustainably run tourism operations enhance the perceived value of wildlife animals, reduce poaching, and increase investments in protected areas and reserves.

Sustainable wildlife tourism should therefore, be considered as a potential tool for development and conservation efforts, taking into consideration the fact that it may not necessarily be appropriate for all protected areas or local communities. It requires a long-term commitment and careful management. Global case studies and research reveal that location, accessibility, market demand, marketing, presence of infrastructure, finance, and governance, as well as the costs and benefits to the wildlife, environment, and communities, are major considerations (World Bank 2018)

To be successful, sustainable wildlife tourism requires the right enabling conditions. Private-sector involvement is often a critical success factor for granting communities access to markets and finance. Communities often need partners who can provide the capital and expertise to help develop their natural assets (land and/or wildlife) into marketable tourism experiences. However, investors face questions of risk, financial viability, and management of community relations.

Effective planning, management skills, technology use, and stakeholder collaboration are required to deliver sustainable wildlife tourism's economic and development benefits while minimizing potential adverse environmental and social impacts. Whereas tourism provides income-generating opportunities for communities, it must be properly developed and marketed to target consumers. New technologies such as travel booking websites, social media marketing, and mobile apps give local communities and entrepreneurs opportunities to connect directly with consumers. Still, communities need greater access to, understanding of, and capability with these tools to fully leverage their power. Adaptive management techniques with ongoing monitoring are required to help communities engage, manage growth, optimize benefit sharing, and better understand limitations.

In view of the foregoing key priority areas of support, UWA must urgently provide increased budgetary allocations and financial support to these priorities by undertaking the necessary internal programmatic and budgetary adjustments as well as through enhanced resource mobilization efforts targeting external sources.

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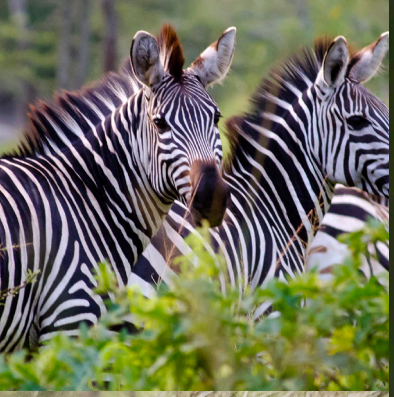






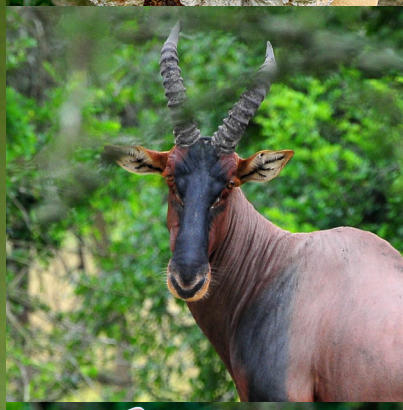
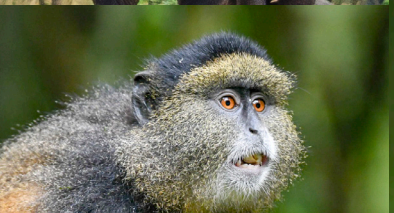


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