





NAIROBI NATIONAL PARK

TOTAL GROUND WILDLIFE CENSUS



Compiled by Daniel Muteti & Elphas Bitok

Wildlife Research and Training Institute December, 2021

EXECUTIVE SUMMARY

The Nairobi National Park (NNP) total ground wildlife census was undertaken on 12th December, 2021 to establish the spatial distribution of various key wildlife species and their population trends over the last decade to establish how the wildlife is faring in the face of expanding anthropogenic developments in Nairobi city and its metropolis. Seven census teams were constituted to undertake the survey based on the park's 15 traditional counting blocks designed on the basis of the road circuits and main habitat types. Each team consisted of at least 4 persons; a team leader, a driver and 2 spotters equipped with necessary survey equipment to undertake the survey in allocated blocks.

A total of 55 species of wild animals including 19 large herbivore species, 3 carnivore species, 3 primate species, 3 reptile species, and 27 avian species were counted during the survey. Impalas were the most abundant (n=1412), followed by common zebra (n=676), Coke's hartebeests (n=570) and buffalo (n=441) respectively. Masai ostrich (n=201) was the most abundant avifauna species recorded while 23 lions were sighted during the survey. Other IUCN-listed species observed during the census were black rhino (n=4), white rhino (n=16), Masai giraffe (N=147), Grey-crowned crane (n=2), White-backed vulture (n=18), and Kori bustard (n=2).

Even though it was expected that most ungulate herds would have moved to the higher grounds of Athi basin-Kitengela plains during the wet season when the census was undertaken, large assemblages of different grazers recorded in the previously mowed sites in block N1 and N15 suggest that implementation of habitat improvements envisaged in the NNP Management Plan (2020-2030) would go a long way in retaining the NNP wildlife population inside the park.

ACKNOWLEDGEMENTS

We would like to acknowledge all the parties that played a role in actualizing this noble cause. We are indebted to Wildlife Research and Training Institute for personnel and financial support, Friends of Nairobi National Park (FONNAP) for availing personnel and transport at no cost and Kenya Wildlife Service for availing personnel, transport and waiving park entry fees for participants. It is our sincere hope that this partnership will continue to flourish for the common good of NNP. Finally, to all those who participated in anyway and have not been mentioned, we thank you for your contribution that ensured a successful wildlife survey.

TABLE OF CONTENTS

EXECUTIVE SUMMARY1
ACKNOWLEDGEMENTS
TABLE OF CONTENTS
LIST OF FIGURES4
1.0 INTRODUCTION
1.1 Survey goal and objectives5
2.0 STUDY AREA
3.0 MATERIALS AND METHODS
3.1 Data Analysis
4.0 RESULTS
4.1 Buffalo and Lion
4.2 Impala and Coke's hartebeest11
4.3 Grant gazelle and Thomson gazelle12
4.4 Zebra and Wildebeest
4.5 Hippopotamus and waterbuck13
4.6 Masai Giraffe and Eland13
4.7 Black and White Rhinos14
4.8 Warthogs and Baboons14
4.9 Ostrich and Helmeted guinea fowl15
4.10 Marabou Stork and White Backed Vulture15
5.0 DISCUSSION
6.0 CONCLUSION AND RECOMMENDATIONS21
7.0 REFERENCES

LIST OF FIGURES

Figure 1: Nairobi National Park	7
Figure 2: NNP ground census blocks	8
Figure 3: Part of the large buffalo herd recorded in a mowed site in N15	11
Figure 4: Distribution of buffalo (A) and lion (B)	11
Figure 5: Distribution of impala (A) and Coke's hartebeest (B)	12
Figure 6: Distribution of Grant gazelle (A) and Thomson gazelle (B)	12
Figure 7: Distribution of common zebra (A) and wildebeest (B)	13
Figure 8: Distribution of hippo (A) and waterbuck (B)	13
Figure 9: Distribution of Masai giraffe (A) and Eland (B)	14
Figure 10: Distribution of Black rhino (A) and White rhino (B)	14
Figure 11: Distribution of warthog (A) and baboon (B)	15
Figure 12: Distribution of ostrich (A) and Helmeted guinea fowl (B)	15
Figure 13: Distribution of Marabou stork (A) and White-backed vulture (B)	16
Figure 14: Buffalo (A) and Lion (B) population trends in NNP	17
Figure 15: Impala (left) and Coke's hartebeest (right) population trends in NNP	18
Figure 16: Grant gazelle (left) and Coke's Thomson gazelle (right) population trends in NNP	18
Figure 17: Zebra (left) and Wildebeest (right) population trends in NNP	19
Figure 18: Masai giraffe (left) and Eland (right) population trends in NNP	19
Figure 19: Warthog (left) and Baboon (right) population trends in NNP	20
Figure 20: Waterbuck (left) and Hippo (right) population trends in NNP	20

1.0 INTRODUCTION

Regular monitoring of wildlife populations is an important activity in conservation of biodiversity. Adaptive management and conservation of landscapes require regular surveys of wildlife abundance, their distributions, and their relation to human activities (Lindenmayer & Likens 2009). For all stakeholders to manage their wildlife populations effectively, they need to know how many animals they have (population size), where these animals are found (spatial distribution) and when (temporal distribution; WWF, 2000). This information will improve problem animal management activities, increase the productivity of wildlife-based enterprises (e.g. tourism/ecotourism) and contribute to improve management of wildlife habitats.

It is important to count wildlife regularly so as to ascertain how the various species are faring on under varying bio-physical environmental conditions. Though under normal circumstances wildlife numbers do not change rapidly, knowing their population trends and distribution gives a better understanding of their ecological dynamics that guides park management to make informed management decisions and take corrective action where necessary. These counts track changes (or trends) in species numbers and distribution over time. Consistent figures of wildlife population estimates in the long-term are used as a key indicators of success or failure in conservation.

Because of the park's proximity to Nairobi city and its suburbs to the south, the park experiences immense ecological pressures emanating from the surrounding sea of humanity. The wildlife population monitoring is therefore important in understanding how anthropogenic activities in the neighbourhood influence the ecology of NNP wildlife. The monitoring of wildlife populations has been undertaken consistently after every two months for over two decades in NNP. This noble cause has been a collaborative venture between Kenya Wildlife Service (KWS) and FONNAP. It had always been spearheaded by the NNP research team (under the former BR&P in KWS, but now under the recently established Wildlife Research and Training Institute-WRTI) in collaboration with NNP management. The wildlife monitoring has helped to maintain a consistent wildlife database for NNP the last twenty (20) years.

1.1 Survey goal and objectives

The goal of this wildlife survey was to collect long-term data to determine how NNP wildlife populations are faring on in the face of ever increasing challenges associated with rapid urbanization. The objectives were:

- 1. To determine wildlife numbers and distribution in NNP
- 2. To determine seasonal changes in wildlife numbers and distribution
- 3. To recommend corrective management actions where needed

2.0 STUDY AREA

Nairobi National Park was established in the year 1946 as the first National park in the country and in East Africa and covers a total area of 117Km2. It is located only at 10Km from the Nairobi–the capital city of the country (Figure 1). It is a protected core zone for a wider Athi-Kapiti Ecosystem comprising approximately 2000Km2.

The Park is characterized by a wide range of vegetation types which include grassland, open dwarf tree grassland (dominated by *Acacia drepanolobium*), open dwarf tree grassland (dominated by *Acacia melifera*), forest glades, dense tall forest, open tall riverine woodland, scattered low-tall grassland, open low shrubland and riverine vegetation (KWS, 2020). The grasslands cover the largest area of the park (34 km²), followed by open dwarf tree grassland and open low shrubland which cover nearly 25 km² and 18 km² respectively. Ecologically, the park is intimately linked to the Kitengela- AthiKapiti plains, which adjoin it to the southern unfenced park boundary, forming a single ecological unit.

The park has over 50 species of mammals and boasts of over 400 species of birds making Nairobi the birding capital of the world. Most of the park's birds are resident species that breed in the park. Palearctic migrants often visit NNP or pass through it between October and April. Of Kenya's 76 diurnal raptor species, 57 (75%) have been sighted in NNP. The park is also home to over 60 herpetofuana (reptiles and amphibians) species. Of all the reptiles, snakes comprise about 23 species, 18 species of lizards, four species of chelonians (terrapins and tortoises) and one crocodile species. The amphibians (16 species) are all frogs and toads.

A wildebeest migration that had over 30,000 animals in the 1960s has completely collapsed with a mere 200 currently using the park. Warthog (*Phacochoerus africanus*), waterbuck (*Kobus ellipsiprymnus*), hartebeest (*Alcelaphus buselaphus cokii*), and gazelle populations have declined by about 70%, down to one-third of what they were just forty years ago. From the bimonthly ground surveys, it is estimated that 70-80% of the park's animals roam outside of the park boundaries to the southern dispersal area especially during wet season. Unfortunately, those corridors linking the park to the greater Athi-Kapiti plains have been obstructed by development, urban sprawl and land subdivision and sale or totally blocked by fences.

The park has several rivers and artificial dams that provide surface water for wildlife all year round. These water bodies support wetland habitats that in turn support diverse aquatic biodiversity and provide diverse wildlife resources for over 100 mammal species, with the park being a rhino breeding sanctuary and an important biodiversity area (IBA).



Figure 1: Nairobi National Park

3.0 MATERIALS AND METHODS

Seven census teams were constituted to undertake the survey based on the park's fifteen (15) traditional counting blocks designed on the basis of the road circuits and main habitat types. They included four vehicles from KWS and three from FONNAP. Each team consisted of at least 4 persons; a team leader, a driver and 2 spotters. Four teams that used the KWS vehicles were led by experience WRTI scientists while the FONNAP teams were led by experienced veteran members.

The survey took place on 12th December, 2021 and the fieldwork commenced as early as 0615 hours, with most teams completing the allocated blocks past noon. Equipped with a pair of binoculars, GPS unit, block maps and writing material, each team drove along the road circuits in their blocks recording actual animals seen during the survey.



Figure 2: NNP ground census blocks

3.1 Data Analysis

The recorded data were first digitized from the hard copy records and cleaned to remove any glaring inconsistencies. The verified data then was entered into a Geographic Information System (GIS) environment for analysis. Species summaries and distribution maps were then generated. In addition, trends over time for key species were analyzed.

4.0 RESULTS

The results of the census are summarized in table 1 below indicating species numbers counted per block and overall totals. In total, 4407 individual animals of various species were counted; 3848 being mammals, 15 reptiles and 544 birds.

SPECIES	N1	N2	N3	N4	N5	N6	N7	N8	N9	N10	N11	N12	N13	N14	N15	TOTAL
EVEN TOED UNGULATES																
Buffalo	30					1	5	5				5	39	6	350	441
Bushbuck									1					3	1	5
Suni														2	4	6
Duiker- Bush/Grey/Common					5											
bush, drey, common															1	6
Eland				3		1	1				4		7			16
Bohor Reedbuck												2				2
chandler/Mountain Reedbuck			1													1
Grant Gazelle	2		2			34	43	11		25		8				125
Thomson's Gazelle		8	20	27		1	10	88								125
Maasai Giraffe	1					36	24	29		4	25	20	8			154
Coke's Hartebeest	33	54	41	101	51	40	107			14	21	58	50			147
Waterbuck									4	15						570
Wildebeest						2	1	71		10						19
Mather						2	-							12		74
Wartnog			4	2		3	2	1		1		41	4	12		70
Impala	2		2	61	51	4 96	92	293	1	104	166	100	392	1	11	22
	20		2	01	51			GUIATE	- ¹	104	100	100	552	1	25	1412
Black Bhino										1		2	1			
White Rhipo	7			3						-		-	-			4
	,			5								0				16
Burchell's Zebra	40		12	11	11	190	186	174			16	10	26			676
Dahara	1	1	1	1	1	•	RIMAT	ES	1	1	1	1	22	1		
Baboon													23	21		44
Sykes Monkey														2		2
Vervet Monkey								2	8							10
						CA	RNIVO	RES								
Black-backed Jackal		2														2
Lion	4			4			5			6		2			2	23
Civet																
														1		1
			•				REPTILE	S								<u>.</u>

Table 1: Wildlife numbers and distribution recorded during the census

Crocodile		2					2	1							7	12
Terrapin									2						,	2
Leopard Tortoise													1			
BIRDS																
Ostrich	22	7	4	2	17	27	12	11		9	11	53	25			201
Yellow N. Spurfowl				5		27	10					3				13
Helmeted G. fowl	4		2			3	6	2	5	12	15	6	31		2	88
Crowned Crane												2				2
Kori Bustard															2	2
Hartlaub's bustard												2				2
White B. Bustard			1													1
White B. Go-away bird							1									1
African spoon bill						1	5									
Heron (black headed)	1			1												0
Egyptian Goose	17					22	10	2					2		3	56
Marabou stork						1	10	23								25
Grey heron	1												1			2
White Back Vulture	1							4	8			3		2		18
Sacred Ibis	3						10									13
Hammer cop									2							2
Blacksmiths plover	11						2								7	20
superb starling	3															3
Emerald Spotted Wood Dove							50									50
Black crowned Night Heron						7										7
Thick Knee												4				4
Tawny Eagle	2															2
crowned crane	2															2
Hadada ibis	15															15
Yellow billed stork						1	3									4
Pelican	220	70		244	425	470	2	747	24	101	25.0	227	640	50	445	2
TOTAL	229	73	89	216	135	4/0	596	/1/	31	191	258	327	610	50	415	4407

4.1 Buffalo and Lion

During the census, 441 buffalos were recorded (Table 1). Majority (79.4%) were found in N15 within a forest glade where they were recorded grazing (Figure 3). Block N13 and N1 had 8.8% and 6.8% of all the buffaloes recorded respectively. N14 had 1.36% of the buffalo population while N7, N8 and N12 had 1.13% each. Only one individual was recorded in N6 while none was recorded in the rest of the blocks (Figure 4A).



Figure 3: Part of the large buffalo herd recorded in a mowed site in N15

The survey recorded a total of 23 lions in only six blocks with majority of them (n=6) in N10 followed by N7 with 5 while N1 and N4 had four each. N12 and N15 each had two individuals (Figure 4B). While buffaloes form an important lion prey base, concentration of the largest lion pride in N10 where no buffaloes were recorded indicates less preference for buffalo uptake by lions of NNP compared to other prey species



Figure 4: Distribution of buffalo (A) and lion (B)

4.2 Impala and Coke's hartebeest

These two species were widely distributed in the park with impala (n=1412) occurring in all blocks except N2 while Coke's hartebeests (n=570) were distributed across most of the blocks except N8, N9, N14 and N15 (Figure 5). Just like during the national wildlife census of June 2021, impala was the most abundant species recorded during the census, meaning it is the species with the largest population in NNP. Highest concentrations were observed in N13 (n=392: 27.76%) and N8 (n=293: 20.76%). Coke's hartebeests highest concentrations were recorded in blocks N7 (n=107: 18.77%) and N4 (n=101: 17.72%. other blocks with substantial Coke's hartebeest population were N12 (10.18%), N2 (9.47%), N5 (8.95%) and N13 (8.77%). Both impala and Coke's hartebeest were observed to co-occur within the same herds or near each other. Their large populations suggest that these species are residents of the park who do not migrate south into the Kitengela plains during rainy season.



Figure 5: Distribution of impala (A) and Coke's hartebeest (B)

4.3 Grant gazelle and Thomson gazelle

During the survey, a total of 125 Grant gazelles and 154 Thomson gazelles were recorded. Grant gazelles were only found in seven blocks while Thomson's were in six (Figure 6). Majority of the Grant gazelles were concentrated to the south of NNP in block N7 (n=43: 34.4%) and N6 (n=34: 27.2%) as well as in block N10 (n=25). Thomson gazelles were concentrated in block N8 (n=88: 57.1%) to the south of NNP along the unfenced Mbagathi River boundary. The other blocks where Thomson's gazelles were recorded in substantial numbers were N4 (n=27: 17.5%) and N3 (n=20: 13%). The distribution patterns of both species suggest that they migrate southwards during wet season to concentrate most of their activities outside the park thus explaining the low numbers recorded during the survey. They previously been observed to graze together Sheep & Goat ranch. have in



Figure 6: Distribution of Grant gazelle (A) and Thomson gazelle (B)

4.4 Zebra and Wildebeest

A total of 676 zebras and 74 wildebeests were recorded during the survey. The highest concentration of the two species was in the Athi basin blocks south of NNP where they seem to be heading to the Kitengela plains outside the park (Figure 7). However, unlike the wildebeest that are purely migratory, some substantial Zebra population has concentrated its activities in N1 at the previously mowed site where they are found during both dry and rainy seasons.

Majority of the zebras were in three blocks (N6, N7 and N8). Block N6 had the highest numbers (n=190: 28.11%) followed by N7 (186: 27.51%) then N8 (n=174: 25.74%) individuals.

Majority of the wildebeests (95.95%: n=71) were in block N8 suggesting that the larger population was already outside the park.



Figure 7: Distribution of common zebra (A) and wildebeest (B)

4.5 Hippopotamus and waterbuck

During the survey a total of 22 hippos were recorded in the park's wetlands half (50%, n=11) of which were in Nagolomon dam in block N15 (Figure 8A). The other substantial hippo populations were in N7 (22.73%, n=5) and N6 (18.18, n= 4). However, for waterbucks, the population of 19 individuals was only found in block N10 (78.9%, n=15) and N9 (21.1%, n=4). The data and the spatial distribution of waterbucks suggest that NNP has only one herd of the species with low numbers (Figure 8B).



Figure 8: Distribution of hippo (A) and waterbuck (B)

4.6 Masai Giraffe and Eland

The exact number (n=147) Masai giraffes sighted during the June 2021 national wildlife survey was recorded during the census. The giraffes were found in 9 blocks, with the majority (24.49%, n=36) being in block N6 and 19.73% (n=29) in block N8 while N11 had 17.01% (n=25) of the population. They were mainly concentrated to the south of the park and the central part (Figure 9A) where preferred browse *Acacia species* dominate the vegetation. While the NNP dispersal area to the south across the Mbagathi River is inhabited by some giraffes, the data suggests the population of 147 individuals may have permanent residence inside the park.

16 elands were observed in only five blocks, mainly along Mbagathi River in block N13 (43.75%, n=7) and adjacent block N11 (25%, n=4). The low numbers compared to the 89 recorded in June 2021, and their spatial distribution suggest majority of the elands had already moved outside the park through the open southern boundary (Figure 9B).



Figure 9: Distribution of Masai giraffe (A) and Eland (B)

4.7 Black and White Rhinos

Majority of the black rhinos (50%, n=2) sighted were found in the rhino valley in block N12, while the other 2 were recorded in blocks N10 and N13 each (Figure 10A). A total of 16 White rhinos were also counted, majority (n=7) seen grazing in the mowed site in block N1 and another 6 individuals walking into block N12 from N1 (Figure 10B). The data suggests that implementation of habitat improvement techniques as prescribed in NNP Management Plan 2020-2030 (KWS, 2020) would actually attract and retain more grazers in the park.



Figure 10: Distribution of Black rhino (A) and White rhino (B)

4.8 Warthogs and Baboons

The survey recorded 70 warthogs and 44 baboons. The baboons were only found in two blocks (N13 and N14) with 23 (52.27%) and 21 (47.72%) individuals respectively (Figure 11A). Unlike the baboons, the warthogs were sparsely distributed throughout the park (Figure 11B) with observations in 9 blocks. Block N12 had the highest concentration (58.57%, n=41) of warthogs counted while block N14 had the second highest number of 12 individuals (17.14%). In block N6, only 3 (4.29%) individuals were counted. Blocks N1 and N3 had similar number

of warthogs (n=4, 5.71% each). The data suggests warthogs are well adapted to the various habitat types represented in NNP.



Figure 11: Distribution of warthog (A) and baboon (B)

4.9 Ostrich and Helmeted guinea fowl

Among the avifauna in the park, ostrich was the most common species with 201 individuals recorded in 13 out of the 15 blocks. More than a quarter of them (26.37%, n= 53) were in block N12 while N6 had the second highest population (13.43%, n=27) while N13 had 25 individuals (12.44%, Figure 12A). The high number of ostriches recorded and their wide distribution is indicative a thriving stable population.

Like the ostrich, helmeted guinea fowls (n=88) were counted in 11 blocks with block N13 having the majority at 31 (35.23%) individuals while block N11 was second with 15 (17.04%) birds (Figure 12B). Block N10 had 12 (13.64%), while blocks N7 and N12 had 6 individuals recorded in each block. Though few individual guinea fowls (n=88) were sighted compared to the data of the national wildlife census of June 2021 (n=425), the spatial distribution all across the park is suggestive of a stable and thriving population.



Figure 12: Distribution of ostrich (A) and Helmeted guinea fowl (B)

4.10 Marabou Stork and White Backed Vulture

The Marabou storks counted during the survey were 25 with 92% of them in block N8 and one each in blocks N6 and N7 (Figure 13A). Increasing number of the species recently seen inside NNP suggests Marabou storks may have relocated into the park after losing their roosting sites around Nyayo stadium along Uhuru highway to the construction of the Nairobi

expressway currently under construction. A total of 18 white-back vultures were counted during the survey with majority of them being recorded in block N9 (44.44%, n= 8) while block N8 had 22.22% (n=4, Figure 13B). This species is highly vulnerable to poisoning that has spiked within its range in Kajiado County in the recent past. Availability of safe roosting sites for this species inside NNP provides some hope that the species shall persist in the park in the long term.



Figure 13: Distribution of Marabou stork (A) and White-backed vulture (B)

4.11 Other Species

Several species of other ungulates were observed during the survey. These included bushbuck (n=6), Suni (n=6), common duikers (n=6) and Bohor reedbuck (n=2) as well a Mountain reedbuck (n=1). Among other primates seen were 10 Vervet monkeys and 2 Sykes monkeys. Black-backed jackal (n=2) and civet (n=2) were the other carnivores sighted during the census. Among the reptiles sighted were crocodile (n=12), Terrapins (n=2) and leopard tortoise. Most of the crocodiles were in Nagolomon dam in Block N15. Other 27 species of birds were counted during the survey with the most common being Egyptian goose (n=56), Emerald spotted wood doves (n=50), blacksmith plover (n=20), Yellow-necked spur fowl (n=13), Hadada ibis (n=15), Sacred ibis (n=13) and African Spoon bill (n=6). A pair of the endangered Grey-crowned crane as well as the Kori bustard (n=2) were also sighted among other avifauna indicated in table 1.

5.0 DISCUSSION

Over the last decade, most wildlife numbers in the park have shown a general decline except for a few species among them being impala, Coke's hartebeest and Masai giraffe whose populations have remained stable. The results of this count indicate that majority of the buffaloes moved away from the open grasslands into the forest and thickets making it difficult to see them. This is indicative of depressed rainy season. NNP buffalo population has remained stable in the last decade with an annual growth rate of 3.38% except for the population variability seen in figure 14A influenced by changes in weather patterns during the surveys.

During the survey there was an unusually high sightings of lions (=23) in the park (Figure 14B). The park's lions are normally elusive and difficult to see and only 3 of them were counted in June 2021 while in December 2020, seventeen individuals were recorded. The appearance of such a big number at once suggests the lion population is doing well and increasing.



Figure 14: Buffalo (A) and Lion (B) population trends in NNP

NNP impala population has shown a steady growth at a rate of 9.8% per annum (Figure 15A). As in December 2020, it was the most common species sighted during the census accounting for 32% of all individual animals seen. They were widespread throughout the park and their presence in large numbers throughout the year indicate the species is a permanent resident in the park. They play a crucial ecological role within the park by keeping the grass and herbs short. They are also important large carnivore prey base. Data from routine monitoring in the park shows impalas congregate in large numbers in the mowed site in block N1 and at the artificial saltlicks.

Coke's hartebeest population observed in NNP keeps fluctuating in the last ten years despite the fact that it is one of the abundant ungulates in the park (Figure 15B). The population variability can be associated with seasonal migration across the unfenced southern boundary. However, as compared to the same period in 2020 (n=471), this count recorded some increase in numbers. They closely associate with impalas inside the park, often being sighted in mixed herds or very close to each other. The species is also an important prey base for the park's large carnivores.



Figure 15: Impala (left) and Coke's hartebeest (right) population trends in NNP

NNP Grant gazelle population has remained stable in the last decade and increasing at a rate of 3.35% per annum (Figure 16A). Their low numbers in the park however, means majority of them reside outside across the unfenced southern boundary.

Thomson gazelle population has remained virtually stagnant in NNP with a slight annual growth rate of 0.04% per annum in the last decade. The population variability seen in figure 16B below and the low numbers consistently counted in the park indicates that the population remains vulnerable. This is supported by the fact during same period in 2020, almost similar numbers were counted (n=125). However, majority of the Thomson gazelles are resident outside NNP in the Kitengela plains across the unfenced southern park boundary. Unlike inside NNP, Grant gazelles and Thomson gazelles are often found grazing together where they co-occur.



Figure 16: Grant gazelle (left) and Coke's Thomson gazelle (right) population trends in NNP

Zebra population in the park over the last ten years shows a declining trend at a rate of 6.41% per annum clearly portrayed in figure 17A below and a drop in numbers as compared to similar count in 2020 (n=838). Wildebeest population seems to have peaked in 2017 then went down thereafter (Figure 17B). The numbers remain terribly low inside the park and exhibit an overall population decline at a rate of 3.85% per annum in the last decade, with a

sharp decline as compared to December 2020 count (n=199). Being migrant species, both zebras and wildebeest cross over to the Kitengela plains during the rainy season. However, depressed numbers return into the park each year than those that went out. This strongly indicates existing and ever growing commercial bush meat poaching in the Kitengela plains.



Figure 17: Zebra (left) and Wildebeest (right) population trends in NNP

Masai giraffe population has remained stable (Figure 18A) in NNP over the last decade exhibiting an annual growth at a rate of 1.86%. However, this count recorded some increase as compared to same period in 2020 (=147). The consistency in giraffe numbers recorded over the decade indicate that they largely remain inside the park throughout the year. Unlike giraffe, eland population has continued to dwindle (Figure 18B) over the last decade declining at a rate of 19.33% per annum. This decline is notable between December 2020 (n=38) and this count. This trend in eland population mirrors that of zebra. These are the common species targeted by commercial bush meat poachers.



Figure 18: Masai giraffe (left) and Eland (right) population trends in NNP

Since 2010, warthog has shown a general increasing trend (Figure 19A) at a rate of 9.42% per annum. The highest number of warthogs so far recorded in the last decade is 70 individuals sighted during this census up from 25 during same period in 2020. They are an important food source for the park's large carnivores.

Baboon population has oscillated in NNP in the last decade, peaking in 2014 and 2020 (Figure 19B). The general trend shows population decline at a rate of 3.12% per annum in the last

decade. Given the ecology of baboons, this decline may not necessarily mean the species is declining, but rather may be relocating to other sites outside the park where easy pickings are available.



Figure 19: Warthog (left) and Baboon (right) population trends in NNP

The waterbuck population shows an increasing trend (Figure 20A) since 2010 at a rate of 4.27% per annum. At 19 individuals however, the numbers are still too low and require boosting the population to increase the genetic diversity.

Hippos are doing well in NNP with an annual population growth rate of 24.36% in the last decade (Figure 20B). So far the highest number recorded was 32 individuals counted during the June 2021 national wildlife census (Muteti & Bitok, 2021). The population was boosted by hippos brought in from Ruai sewage plant and Tatu city. They largely reside in Nagolomon and Athi basin dams though some individuals has previoually been sighted at Hyena dam and along Mbagathi River.



Figure 20: Waterbuck (left) and Hippo (right) population trends in NNP

6.0 CONCLUSION AND RECOMMENDATIONS

Ground census are highly influenced by site road network and visibility dictated by vegetation and weather as well as personnel experience. As such, the results of this survey are a minimum count. However, the minimum count has been a constant over the decade making the data to be representative of the NNP wildlife population based on this method. An aerial census is superior due to improved sightings and would certainly yield to a better representative wildlife population for NNP.

It is notable from the results that some species such the warthog, hippo, impala and waterbuck are showing positive growing rates. However, the rapidly declining numbers of elands and zebras should be a source of management concern.

Continuous training of participants and use raised vehicles during the ground surveys would go a long way in improving the data accuracy. Data geo-referencing would also enable development distribution maps based on actual animal location other than block location. Such mapping would allow for spatial relation analyses.

From the census, following are the management recommendations:

- 1. Make habitat improvements (mowing, burning and saltlick supplementation) a routine activity for NNP
- 2. Boost waterbuck, wildebeest and eland populations
- 3. Invest more in covert and overt operations in the larger Athi-Kapiti plains to counter commercial bush meat poaching

7.0 REFERENCES

KWS (2020). Nairobi National Park Management Plan, 2020-2030. The Kenya Gazette Vol. CXX111-No.4

Lindenmayer, D. B. & Likens, G. E. (2009) Adaptive monitoring: a new paradigm for long-term research and monitoring. Tree 24, 482–487.

Muteti D. and Bitok E. (2021). National Wildlife Census- Nairobi National Park Ground Total Wildlife Survey. Unpublished report

WWF-World Wide Fund for Nature (2000) Counting Wildlife Manual – Wildlife Management Series.