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Quota Setting for Sustainable Utilization Game Animals for Sport Hunting in Ethiopia: The Case of Munessa Kukke Controlled Hunting Area, Oromia Regional State, Ethiopia

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Abstract
Sustainable utilization of wildlife resources is assured through implementing efficient and regulated consumption strategy. Therefore, to ensure the sustainability of the wildlife resources of the controlled hunting areas, timely follow ups, monitoring and evaluation to take proper measures is very essential. Accordingly, the objective of this study is to assess wild animals' population, habitat condition, and set hunting quota in Munessa Kukke Controlled hunting area. Line transects are used to conduct the wildlife census as per the habitat nature of the area. Six lines transect ranging from 2.5km to 5.5km were randomly selected covering 22km length in total. In this case perpendicular sighting distance of 150 meters on both sides of the line transects covering 300 meters in total was used to count forest and thicket animals. All larger mammals encountered along the transects were counted and recorded on the census sheet. Counts were made every morning at dawn from 6:00 AM to 10:00 AM hours.Regarding the distribution of the wild animals Mountain Nyala, and Colobus Black and White are relatively evenly distributed throughout the sampled area; whereas Annubis Baboon and Menelik's Bushbuck are recorded in four out of the six line transects.On the subject of the age and sex structure of the recorded wild animals the male to female ratio is more or less fairly represented except in the case of Menelik's Bushbuck where the number of males is about double of the females and no age structure difference is observed and only adults were recorded. Therefore, to investigate the problems and to find out a solution, the team suggests further study to conduct research by concerned bodiesPopulation estimate of the recorded wild animals shows that Mountain Nyala is a relatively at a good population number with an estimate of 985, followed by Annubis Baboon, Colobus Black and White, and Menelik's Bushbuck having 684 ,423 , and 258 respectively.The unfavorable human activities like poaching and expansion for agriculture would have a greater impact on the abundance and distribution of wild animals in the controlled hunting area. It is therefore advisable to all the stake holders to take immediate actions to counter the problems and make sure the wellbeing of the wild animals in the area. Additionally, wildlife conservation awareness program should be further strengthened by concerned stake holders to get the overall support of the community.
Keywords/phrases: Quota setting, Sustainable utilization, Munesa Kukke Controlled hunting area, sport hunting

1. Introduction

In large parts of Africa trophy hunting is a major industry. It is currently practiced in 24 sub-Saharan African countries. It creates incentives for wildlife conservation where alternative conservation friendly land uses do not exist. It has been estimated that the industry generates gross revenues of at least US$ 201 million per year from a minimum of 18,500 clients. Over 1,394,000 km^2 area is used for hunting, which is bigger than the surface of the national parks in these countries (Lindsey et al., 2006)

Trophy hunting has a relatively long history in Ethiopia. In 1901, Emperor Menelik is remembered in Ethiopia's natural resource conservation for his role in passing a prohibition law to his subordinates not to hunt any wildlife arbitrarily particularly the big game like elephants without his prior permission. Before that he reserved the right to grant hunting rights to foreigners. A more formal type of wildlife conservation started in the 1960s after the establishment of the first National Parks in the country, including Awash and Simien Mountains National Parks. However, the value of wildlife has been largely ignored and wholesale killing of wildlife was common to see across the country when compared to other neighboring countries (Tessema, 2003)

Ethiopia acknowledges trophy hunting as legitimate form of land use. Wildlife Policy of Ethiopia (wildlife development, conservation and utilization policy) states that "maintaining sustainable utilization of wildlife in open and controlled hunting areas in a manner that would not affect their distribution through sport hunting or other means" is Government strategy. Hunting is regulated by Proclamation 541/2007 on "Wildlife Areas and Authority" and the corresponding Regulations 163/2008 on "Wildlife Development, Conservation and Utilization". The Regulations prescribe fees, organizational requirements, licensing and other procedures, do's and don'ts.

There are currently 18 active Controlled hunting areas (CHAs) and 5 open areas in Ethiopia. The country harbors species interesting for experienced hunter and provide three endemic mammals like Mountain

Nyala, Menelik bushbuck and Gelada baboon for sport hunting. Additionally the country harbors "hunting" endemics (species that can only be hunted in Ethiopia, even though they exist elsewhere) like the Soemmering's gazelle Beisa oryx, Salt's dikdik, Nile lechwe, White-eared kob, and others.

In Oromia, the Oromia Forest and Wildlife Enterprises (OFWE) is currently responsible for the wildlife utilization. The concession and hunting fees are paid to the Enterprise. There are four CHAs including Munessa Kukke which is under responsibility of OFWE, Arsi branch.

For Adaba-Dodola CHA there is a special community-orientated arrangement: It has a functioning communal tourism cooperative carrying out trekking tourism in the area, so 65 % of the hunting fees are passed on by the Oromia forest and wildlife enterprises to the cooperative. In other hunting areas, of the trophy fees, 85% are transferred to the regions while 15% stays with EWCA (Ethiopian Wildlife Conservation Authority). The concession fee goes totally to the regions, whereas the other fees like PH fee, gun handling fee, and conservation fee etc stay with EWCA. The primary goal of wildlife management is to optimize the utilization of wildlife resources, as wildlife is one of the few renewable natural resources that can be utilized sustainably. This utilization can be either consumptive or non consumptive. One way of consumptive utilization of wild life is through sport hunting. This hunting practice which is carried out in controlled hunting areas generates a reasonable amount of revenue to the country. In principle, sustainable utilization of wildlife resources is assured through implementing efficient and regulated consumption strategy. Therefore, to ensure this sustainability of the wildlife resources of the controlled hunting areas, timely follow ups, monitoring and evaluation to take proper measures is very essential. To this end, a team have conducted wildlife census in Munessa-Kuke controlled hunting area.

Figure1. The Core Wildlife Habitat of Munessa Kuke Controlled Hunting Area

1. Objectives of The study

- ☞ To assess wild animals' population, habitat condition, and set hunting quota for 2014, 2015 and 2016 Ethiopian calendar years.
- ☞ To identify major threats to Munesa kukke controlled hunting area
- ☞ To record GPS coordinates of boundary points of the controlled hunting area and produce GIS Map.

2. Description of the Study Area

Figure2. The Wildlife Census Team Marching at Munessa Kuke Controlled Hunting Area

Munessa- kuke Controlled Hunting Area is found in Oromia Regional State, in the Kerssa and Arsi-Negelle Woredas, About 248 km South of Addis Ababa, via the main road of Addis Ababa to Shashemene, detouring from a small town called dole and driving 33 Km to South East. The GIS location of Munessa-Kuke controlled hunting area is UTM 37 N 483000 to 491000 Easting, and UTM 37 N 811000 to 829000 Northing and its area is 92.52 km^2 with a landscape exhibiting undulated topography.

The whole controlled hunting area is divided in to two vegetation zones. The first one is the Natural forest, which has approximate area of 70 km^2 and the remaining 22.52 km^2 is covered by plantation forest. It is under the ownership and management responsibility of OFWE, Arsi branch.

The area is source of major rivers like Hoje, Dalele, Mukonisa and Kata which are permanently flowing into Lake Langano. The controlled hunting area generally lies in the dega and weyna dega climatic zones characterized by high rain fall from June-August.

The mean annual rain fall ranges from 913 to1232 mm and the altitude ranges from 2100 to 2600m above sea level.

1. Flora

Major trees of the natural forest include: *Croton megalocarpus*, *Syzigium guinense Cordia africana, Schefflera abbyssinica*, *Aningeria adolfi- frediricii, Mytenus ovatus* and the dominats *Podocarpus falcatus* and *Celtis africana*. Whereas trees of the plantation forest include: *Cuppressus lusitanica, Pinus radiata, Eucalyptus grandis, Eucalyptus eamaldulensis, Eucalyptus globulus and Eucalyptus saligna.*

2. Fauna

As to the fauna of the habitat Colobus Black and White (*Colobus guereza*), Mountain Nyala (*Tragelaphus buxtoni*), Annubis Baboon (*Papio annubis*) and Menelik's Bushbuck (*Tragelaphus scriptus menelikii*) are frequently seen in the area.

3. Birds

The area is also an important habitat for the endemic birds of Ethiopia such as Black-headed forest oriole, yellow-fronted parrot, Abyssinian catbird, White-backed Black tit, Yellow- crowned canaries, African rooks and African paradise flycatchers.

Figure3. Plantation Forest (*Cupressus lusitanica*) of Munessa Kuke Controlled Hunting Area

4. Materials and Methods

4.1 Materials

GPS (Global Positioning System), Topography map of the concerned Weredas, Binoculars, A Field Guide to the Mammals of East Africa, and Note books were used during the wildlife census and demarcation period

4.2 Methods

Reconnaissance survey of the overall area of the controlled hunting area was carried out by the team, and the previous boundary points were followed and recoded with GPS to produce GIS Map.

Line transects are used to conduct the wildlife census as per the habitat nature of the area. Six line transects ranging from 2.5km to 5.5km were randomly selected covering 22km length in total (annex 2). In this case perpendicular sighting distance of 150 meters on both sides of the line transects covering 300 meters in total was used to count forest and thicket animals. All larger mammals encountered along the transects were counted and recorded on the census sheet (Table 1). Counts were made every morning at dawn from 6:00 AM to 10:00 AM hours.

Resource based information on the controlled hunting area was collected through direct field observation and using oral interviews. Formal and informal discussions were also held with the concerned officials of Arsi forest and wildlife enterprise branch and with community members surrounding the controlled hunting area.

The total population estimate for each animal recorded in the area was calculated using the following relationship:

Population Estimate =Total animals observed X Total estimated suitable habitat Observed area

Where sampled area of line transects is calculated as: $A = L \times W$

$A = 22km \times 0.3km = 6.6\ km^2$

where, A = Sampled area, L= Length of the line transects, and W= width of perpendicular sighting distance.

5. Limitations of the Study

The height of the vegetation growth and cover has made the census activities difficult and to some extent hindered the sighting of wild animals in the controlled hunting area. In addition to that the continuous occurrence of rainfall, foggy weather, and the difficult terrain of the controlled hunting area also made it difficult to cover long transect distances during the study. However, in order to fulfill our objective the required information was adequately collected from the area regardless of the challeges.

Figure4. Continuous Rain Fall and Foggy Weather at Munessa Kuke Controlled Hunting Area

6. Results and Discussion

6.1 Wildlife Census and Hunting Quota Setting

Table1. Total Number of Wild Animals Counted in Sampled Area of Line Transects (LT)

No	Species Common Name	LT1	LT2	LT3	LT4	LT5	LT6	Total seen
1	Mountain Nyala	32	16	4	1	5	7	65
2	Colobus Black and White	3	3	11	3	4	7	31
3	Menelik's Bushbuck	8	6	2	-	1	-	17
4	Annubis Baboon	-	26	5	5	7	-	43
5	Hyena	Call	Call	-	Call	-	-	-
6	Leopard	-	Foot print	-	Scratch Foot print	-	-	-

As shown above in table 1 a total of six species of larger wild animals were recorded in various lines transects of the sampled area. Regarding the distribution of the wild animals Mountain Nyala, and Colobus Black and White are relatively evenly distributed throughout the sampled area; whereas Annubis Baboon and Menelik's Bushbuck are recorded in four out of the six line transects. Similarly we have recorded the presence of leopard and hyena by indirect observation i.e. by identifying foot prints, scratches and Call in two and three transects respectively.

Table2. Sex, Age Structure and Population Estimate of the Recorded Wild Animals

No	Species Common Name	Total seen	Male Adult	Female Adult	Sub adult	Juvenile	Sampled Area (Km^2)	Density	Suitable Habitat (Km^2)	PopulationEstimate
1	Mountain Nyala	65	12	44	6	3	6.6	9.848	100	985
2	Colobus Black and White	31	8	23	--		6.6	4.696	90	423
3	Menelik's Bushbuck	17	11	6	-	-	6.6	2.575	100	258
4	Annubis Baboon	43	11	20	9	3	6.6	6.515	105	684

On the subject of the age and sex structure of the recorded wild animals the male to female ratio is more or less fairly represented except in the case of Menelik's Bushbuck where the number of males is about double of the females and no age structure difference is observed and only adults were recorded. Therefore, to investigate the problems and to find out a solution, the team suggests further study to conduct research by concerned bodies.

Population estimate of the recorded wild animals shows that Mountain Nyala is a relatively at a good population number with an estimate of 985, followed by Annubis Baboon, Colobus Black and White, and Menelik's Bushbuck having 684 ,423 , and 258 respectively. The previous wildlife census study (2010) estimate shows that Mountain Nyala 670, Annubis Baboon 1488, Colobus Black and White 655, and Menelik's Bushbuck 327. When we compare both census years result even though we have followed the same methodologies the population estimate of the three species (Annubis Baboon, Colobus Black and White and Menelik's Bushbuck) have shown slight drops. The reason for this could be the dense forest nature of the controlled hunting area, the continuous rain fall and the foggy weather has limited the sighting of these species.

Besides, the team has observed few settlements and expansion for agriculture in the Chorora usha and Bedasso Jerjarso localities in the eastern part of the controlled hunting area. In addition to this we have information's indicating the existence of activities of illegal killing of wild animals by surrounding communities.

We have discussed all these issues with concerned officials of the Arsi forest and wildlife branch office and from their briefings we understood that they have the information and they are doing their best to alleviate all these problems.

Finally the team appreciates the wildlife conservation efforts made by the Arsi forest and wildlife enterprise branch to make the controlled hunting area a suitable habitat for wild animals living in. Previously part of the controlled hunting area was severely affected by grazing activities of live stocks of Godantu (traditional livestock keepers). But currently the team has witnessed no such activities and as a result we have observed habitat rehabilitation of the area.

Table3. Hunt able Male Population Estimate and Suggested Hunting Quota

No	Species Common Name	Males total seen	Sampled area (Km)2	Density	Suitable habitat (Km)2	Males population Estimate	Off take %	Suggested Hunting Quota	
1	Mountain Nyala	12	6.6	1.818	100	182	2	3.64	~ 4
2	Colobus Black and White	8	6.6	1.212	90	109	2.5	2.72	~ 3
3	Menelik's Bushbuck	11	6.6	1.666	100	167	2	3.34	~ 3
4	Annubis Baboon	11	6.6	1.666	105	175	2.5	4.37	~ 4

The above suggested hunting quota for the species recorded is reasonably adequate to enhance the sustainable utilization of the wildlife resources of the controlled hunting area.

6.2 GIS Map Productions

The controlled hunting area was represented by a sketched map only. Therefore to develop it and produce GIS Map, the previous boundary was followed and the Map boundary coordinates were recorded in the field by using

GPS, and topography Map of the appropriate Weredas for reference. During these work two experts from Ethiopian Wildlife Conservation Authority and two experts from Oromia Forest and Wildlife Enterprise (one from head office and one from Arsi branch) were participated. Finally the GIS Map of the controlled hunting area was produced using GIS soft ware (Annex 10. 1).

7. Major problems in Munessa kukke Controlled hunting area

The hunting industry is faced with a series of problems in a number of the countries. The same is true for munesa kukke CHA. Some of the problems are governance problems and the failure to involve local communities and lack of benefit sharing. Like every human activity, hunting can best develop and be sustainable when an appropriate societal and legal framework fosters transparency, good governance and rule of law. Additionally field observation reviled that the problem such as poaching, encroachment, agricultural expansion, over grazing, deforestation, habitat destruction, human wildlife conflict, failure of concessioner to implement the agreement signed with OFWE due to weakness of OFWE, unfulfilled promise by OFWE to local community, unfair in providing benefit to local community are common in Munesa kukke controlled hunting area.

8. Community Participation

During this wildlife census work, and GPS data collection activities to produce GIS Map of the controlled hunting area, nine local community members were benefited economically by participating in various activities related to the wildlife census work.

9. Conclusion and Recommendations

In general, the number of wild animals recorded and the potentiality of their habitat shows that Munessa- kuke controlled hunting area is a potential site to practice the sustainable utilization of the wildlife resources in the area. As the team has witnessed during the study time the Arsi forest and wildlife enterprise forest guards, and the wildlife scouts hired by the concessionaire are working closely and patrolling the wildlife area together to ensure the wellbeing of the wild animals and their habitat. We appreciate the collaborative efforts done by both concerned stake holders and we further suggest this kind of cooperation to include the local communities.

The overall habitat condition of the controlled hunting area is good as both the concessionaire and the forest enterprise's collaborative management of the resources is better. However there is information, indicating that, poaching and expansion for agriculture are noticeable in the area. Therefore in order to ensure sustainable utilization of the wildlife resources and to strengthen further integrated conservation and development activities in the area the team forwards the following recommendations:

1. In collaboration with local administrative officials and concerned stake holders, both Arsi forest and wildlife enterprise branch and the concessionaire should work their best level to mitigate the encroachment activities in the area.
2. The unfavorable human activities poaching and expansion for agriculture would have a greater impact on the abundance and distribution of wild animals in the controlled hunting area. It is therefore advisable to all the stake holders to take immediate actions to counter the problems and make sure the wellbeing of the wild animals in the area.
3. Wildlife conservation awareness program should be further strengthened by concerned stake holders to get the overall support of the community.
4. The other recommendations given in the 2010 wildlife census report should be implemented.

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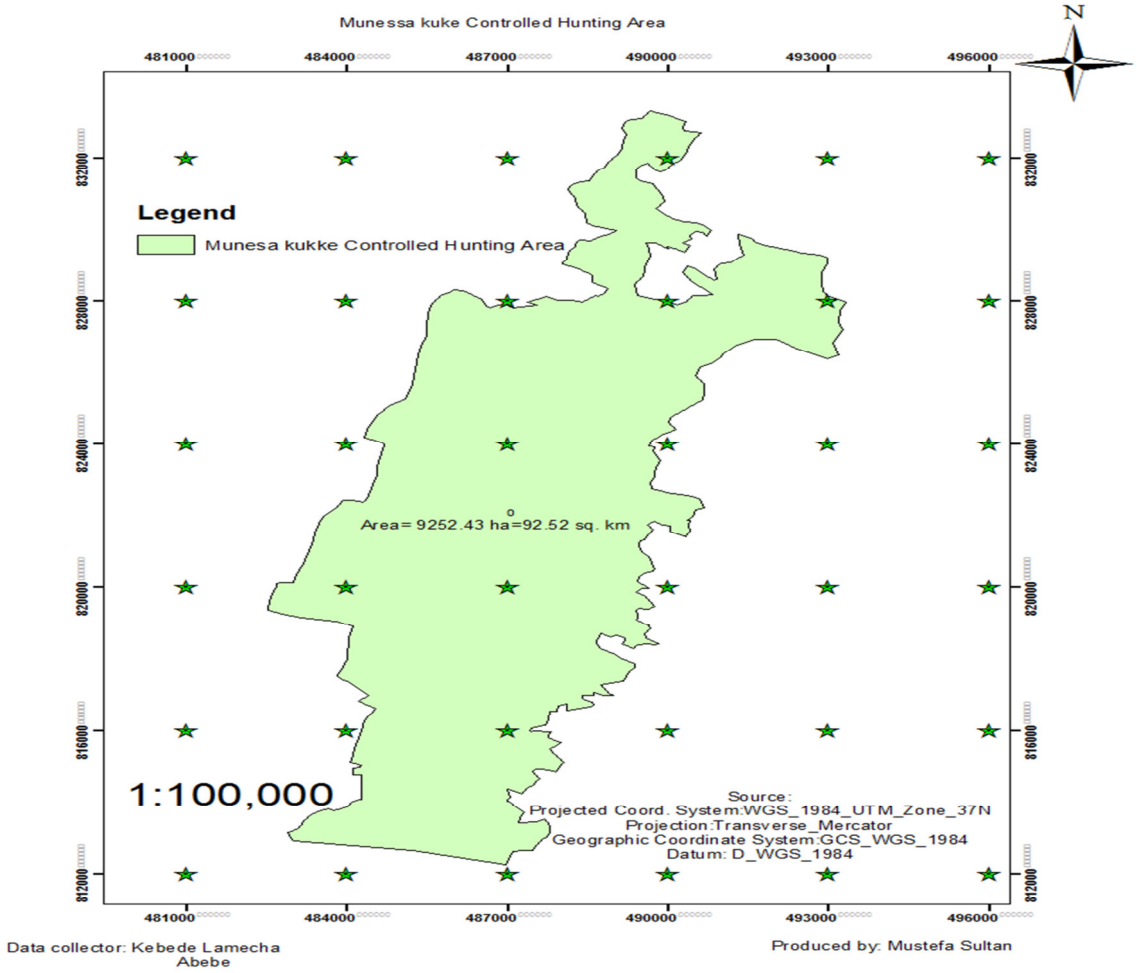
10. Annexes

Annex 10.1 The GIS Map of Munessa Kuke Controlled Hunting Area



Annex 10.2 GPS Coordinates of the Sampled Area Line Transects (LT)

No	Transect Number	Starting	Finishing	Transect Length(Km)
1	LT1	37N 0485307 0822617	37N 0485843 0820906	3.5
2	LT2	37N 0486396 0821615	37N 0487252 0822143	3
3	LT3	37N 0487876 0821818	37N 0488541 0824476	5.5
4	LT4	37N 0485390 0820550	37N 0486114 0819313	3
5	LT5	37N 0485511 0826753	37N 0488022 0824733	4.5
6	LT6	37N 0484553 0820960	37N 0485474 0821957	2.5
Total Transect Length				22 km

Annex 10.3: Active hunting areas

	CHAs	Concessionaire	Area (Km^2)	Regional State
1	Abasheba-Demero	ERVS	165	Oromia
2	Arbagugu	Libah	225	Oromia
3	Bilen Hartele	Libah	1,095	Afar
4	Besemenna Odubulu	ERVS	350	Oromia
5	Chiffra	RVS	509	Afar
6	Dati	ERVS	431	Oromia
7	Dindin	WS	280	Oromia
8	Hanto	RVS	190	Oromia
9	Hurufa-Soma	Libah	215	Oromia
10	Munesa-Kukie	ERVS	110	Oromia
11	Murrulle	ERVS	639	SNNPRS
12	Shadem-Berberie	WS	160	Oromia RS
13	Telalak Dawe	WS	460	Afar
14	Walishet Sala	ERVS	325	SNNPRS
15	Urgan-Bula	Blue Nile Safari	78	Oromia
16	Adaba Dodola	SSIS	736	Oromia
17	Sororo Torgem	Travel Ethiopia	78	Oromia
18	Haro Abadiko	Travel Ethiopia	200	Oromia

Annex 10.4: Open hunting areas

	Area	Regional State
1	Gara Gumbi	Oromia
2	Gara Miti	Oromia
3	Debre Libanos	Oromia
4	Aluto Kulito	Oromia
5	Jibat	Oromia
6	Gelida Duru	Afar

Source EWCA

Annex 10.**5: Abandoned hunting areas**

	Area	Outfitter
1	Fursi Artuma	ERVS
2	Galama-Bora-Luku	RVS
3	Kaka	RVS
4	Kebena	RVS
5	Lake Chamo	ERVS
6	Tori	GS/ERVS

Source: EWCA

Annex 10. 6: huntable species and prices

English Name	Scientific Name	Unit Price (USD)
Baboon, Anubis	*Papio anubis*	100
Baboon,Gelada	*Theropithecus gelada*	3,000
Baboon, Hamadryas	*Papio hamadryas*	1,000
Bushbuck, Common	*Tragelaphus scriptus*	700
Bushbuck, Menelik's	*Tragelaphus s.meneliki*	6,000
Buffalo	*Syncerus caffer*	3,000
Caracal	*Felis caracal*	400
Cat, Wild	*Felis silvestris*	200
Colobus, Black & White	*Colobus guereza*	600
Crocodile, Nile	*Crocodylus niloticus*	2,000
Dikdik, Guenther's	*Madoqua guentheri*	200
Dikdik, Salt's	*Madoqua saltiana*	340
Duiker, Grey	*Sylvicapra grimmia*	360
Fox, Bat-Eared	*Otocyon megalotis*	300
Gazelle, Grant's	*Gazella granti*	440
Gazelle, Soemmerring's	*Gazella soemmerringi*	2,600
Genet, Common	*Genetta genetta*	200
Genet, Rusty-Spotted	*Genetta rubiginosa*	200
Gerenuk	*Litocranius walleri*	3,000
Hare, Abyssinian	*Lepus habessinicus*	60
Hartebeest, Lelwel	*Alcelaphus buselaphus lelwel*	4,000
Hippopotamus	*Hippopotamus amphibius*	1,200
Hog, Giant Forest	*Hylochoerus meinertzhageni*	1,000
Hyaena, Spotted	*Crocuta crocuta*	180
Jackal, Black-backed	*Canis mesomelas*	100
Jackal, Golden	*Canis aureus*	160
Jackal, Side- Striped	*Canis adustus*	100
Klipspringer	*Oreotragus oreotragus*	1,400
Kudu, Greater	*Tragelaphus strepsiceros*	2,700
Kudu, Lesser	*Tragelaphus imberbis*	3,000
Leopard	*Panthera pardus*	4,600
Lion	*Panthera leo*	4,000
Mongoose, Egyptian	*Herpestes inchneumon*	60
Mongoose, Slender	*Herpestes sanguineus*	60
Mongoose, Southern Dwarf	*Helogale parvula*	60
Monkey, Blue	*Cercopithecus mitis*	140
Monkey, Grivet	*Cercopithecus aethiops*	80
Monkey, Vervet	*Cercopithecus pygerythrus*	80
Nyala, Mountain	*Tragelaphus buxtoni*	15,000
Oribi	*Ourebia ourebia*	240
Oryx	*Oryx Beisa*	2,000
Ostrich	*Struthio camelus*	1,600
Pig,Bush	*Potamochoerus porcus*	400
Porcupine	*Hystrix cristata*	50
Ratel	*Mellivora capensis*	300
Reedbuck, Bohor	*Redunca redunca*	700
Reedbuck, Mountain	*Redunca fulvourfula*	1,000
Serval	*Felis serval*	360
Tiang	*Damliscus lunatus tiang*	1,100
Warthog	*Phacochoerus aethiopicus*	400
Waterbuck, Defassa	*Kobus ellipsiprymnus*	1,000
Zorilla	*Ictonyx striatus*	100
Lechwe, Nile	*kobus megaceros*	7,000
Kob ,White eared	*Kobus kob leucotis*	4,000

Source: regulations 163/2008