



Status of Trophy Hunting in Zambia for the Period 2003 – 2012: Is Hunting Justified in Zambia?

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Abstract

A study was carried out to determine the status of trophy hunting in Zambia for the period 2002/3 – 2012 after the Department of National Parks and Wildlife Service was transformed into Zambia Wildlife Authority a semi autonomous institution. The main objectives were to determine: i) size of hunting quotas between residents and non residents, ii) revenue collected from residents and non residents, iii) status of game management areas and income collected, and iv) most popular species in hunting. Data was collected from the field particularly Form ZAWA 14, which captures hunting details. Further data were collected from the licencing office at Zambia Wildlife Authority headquarters in Chilanga. Results obtained showed that mean quota size for safari was 56% and 44% for residents, yet safari hunting contributed 95% of the revenue and only 5% was generated from resident hunting. Prime hunting areas were few 31%, secondary 41% specialized 8%, under stocked 13% and private 9%. In terms of revenue in USD prime generated the most followed by secondary, specialized which was at the same level with private hunting areas while under stoked generated the least. When compared with other sources of income for ZAWA hunting showed an increase over other sources. The most hunted species under resident were; buffalo, waterbuck, puku, bushbuck, lechwe, wildebeest, oribi, common duiker, reedbuck, and greater kudu. Under nonresident; lechwe, wildebeest, lion, buffalo, leopard and puku. It was observed that the status of habitats and animal numbers in most game management areas had declined, yet hunting continued to be an important source of revenue for Zambia Wildlife Authority. Further research is required on how under stocked and depleted game management areas can be rehabilitated to support the lucrative trophy hunting industry which also benefits local communities' resident in these areas. Further research is required to develop a model that would help Zambia Wildlife Authority to rehabilitate under stocked and depleted Game Management Areas.

Keywords: Nonresident Hunting, Resident Hunting, Quotas, Game Management Areas, Revenue, Species

1. Introduction

Nonresident (Safari) hunting in Zambia begun as a government scheme in the Luangwa valley in the 1950s. Over the years, the hunting industry spread to cover the whole country. In the 1950s to early 1970s the safari hunting industry did not attract as much public attention as it does today and the allocation of safari hunting blocks was mainly done administratively. During this time, operations of the safari industry suffered various malpractices, which among others caused government to terminate and compensate 26 safari hunting concessions through a presidential order in 1988. Even though the safari hunting companies were compensated by government for loss of business, its intention at the time was to try to cleanse the industry of the alleged malpractices. At this time, local communities residing in Game Management Areas (GMAs) did not participate in the allocation of hunting blocks neither did they have a share of the revenue accruing from trophy hunting.

In the early 1980s a pilot project was initiated in Lupande which later gave birth to the Administrative Management Design (ADMAD) for Zambia's Game Management Areas which was a community based natural resources management philosophy. It was finally accepted as government policy for managing wildlife resources in GMAs. This programme (ADMAD) introduced a system of sharing revenue generated from hunting in GMAs with local communities resident in those particular areas. Safari hunting from that point became an important source of revenue and employment for local communities. As a result of benefits accruing to local communities arising from hunting, communities living in GMAs got involved in working with the Department of National Parks and Wildlife Service (NPWS) in solving poaching problems originating from within their own frontiers. In the long-term, it was assumed that local communities would deter poaching incursions and regulate human settlements in a manner that would leave enough land for wildlife management, since doing so would enhance their economic benefits from the wildlife resources.

In the second republic which begun in 1991, a new democratic political dispensation took root in Zambia. Government shifted its management style of many of its public institutions from being totally government controlled to being semi autonomous based on good governance, transparency and accountability. This policy shift also resulted in the change of allocation of Hunting Concession Areas from administrative to Open Tender System. The initial Safari Hunting Concession Agreements that followed had three year tenure, followed by a five year tenure which expired in 2001 (Anon. 2009).

Regarding institutional transformation, the NPWS was transformed from a government department to a semi autonomous institution, Zambia Wildlife Authority (ZAWA) in 1999. Such institutional transformation also affected the ADMAD programme which was reviewed to bear a generic name, Community Based Natural Resources Management (CBNRM) programme and the sharing mechanisms of revenue was also reviewed in favour of local communities. Communities were now entitled to a 50% share of revenues. In 2001/2002 safari hunting was banned by government,

while resident hunting continued. During the hunting moratorium, many hunting areas experienced high levels of poaching and human encroachment while ZAWA staff persevered for many months without salaries. Village scouts were also unable to patrol GMAs as they also did not receive salaries. The ban and consequently the delay in allocating hunting concession areas by government cost ZAWA and communities a great deal of revenue losses and customer confidence and the image of the country as a hunting destination was allegedly tarnished. Many hunting blocks that were previously in the prime category were downgraded to secondary, under stocked and even depleted. The GMAs/hunting blocks that were most affected were; Sichifulo, Mulobezi, Mumbwa East and Tondwa.

Later in 2002, government realized that the hunting ban had inevitably affected income generation for ZAWA and local communities. ZAWA staff did not receive salaries for a continuous period of up to five months or more. Local communities did not receive their shares and village scouts could not patrol GMAs. The non remittance of community shares due to hunting ban compelled members of the local communities to either engage or facilitate poaching to supplement their income and to derive protein. During this period, human encroachment was exacerbated in many areas as communities allegedly saw no incentive to protect wildlife. The negative effects of such encroachment are still being felt to date, particularly in Mumbwa east and Sichifulo GMAs (Anon. 2010).

In 2003 government decided to reallocate hunting concession areas to improve revenue collections for ZAWA and to restore the active participation of local communities living in GMAs. The hunting ban despite its alleged negative effects on particularly the status of hunting concession areas provided time for government to assess the suitability of the open tender system of allocating hunting concession areas. This assessment was based on the understanding that despite Zambia having one of the largest hunting areas in eastern and southern African sub regions, ZAWA earned less than USD 5million annually, while the Department of Wildlife in Tanzania (now Tanzania Wildlife Authority) earned about USD 30 million (2010 figure) (Pers. Comm.) and Zimbabwe with a smaller hunting area only 11% of Zambia's GMA area earned about USD 20 million (2003 figure) (Pers. Comm.). This disparity in income from hunting compelled government to launch an investigation into the operations of the safari hunting industry (Anon. 2002). The alleged low revenue collection from hunting justified government's concern to investigate the *status quo*. It was at the time assumed that ameliorating measures if taken objectively would improve revenue collection and enhance the financial status of ZAWA and the local communities. A study tour was undertaken to Zimbabwe and yielded a wealth of information which was presented to government for consideration. Key among these were that; i) Zambia needed to adopt a bag system which would enable ZAWA to earn more revenue even from less popular species such as baboon (*Papio spp*) as the quota would be paid for upfront and in full which eliminates the current practice of negotiating quota utilization levels with hunting outfitters, ii) eliminate the need for classical, mini/midi safaris which often compels ZAWA to provide certain species on the quota even if their numbers are low, iii) increase hunting concession fees and subdivide some hunting blocks which are too big to be effectively administered by one operator, iv) enter into strategic partnerships with the private sector to ensure that depleted and under stocked areas are restocked and secondary areas upgraded to prime status, v) introduce a new business model which encourages a mixture of approaches in allocating hunting blocks such that some prime areas can be allocated through auctioning, others by lottery and still others by open tender, vi) to stagger lease periods so that concession agreements do not expire at the same time which would enable ZAWA to spread its income flows, viii) to consider citizens' participation as safari outfitters, ix), and to recapitalize ZAWA so as to improve operations in National Parks so that a buildup of animal populations would naturally spill into surrounding GMAs.

Despite the recommendation to explore other ways of allocating hunting concession areas, HCAs were again allocated by tender ignoring the recommendations made by a team of experts. Hunting Concession Agreements with a lease period of ten years for prime and secondary hunting areas and 15 for under stocked hunting areas were granted. Additional HCAs allocated in 2005, had a lease period of five years for prime and secondary areas and ten for under stocked areas (Table 1). In this open tender system, the selection criteria were not necessarily based on the highest bidder but on other supporting evidence such as, i) evidence of a company's ability to market a given HCA, ii) pledges to the local community living near to or within the HCA, iii) company's financial status, iv) assets available to operate a safari camp, v) evidence to show that the company has agents to help with overseas bookings, vi) marketing ability, vii) wildlife management inputs pledged, and viii) proof of qualified professional hunters among others. Consequently the issue of low revenue collections persisted. In 2012, the allocation of hunting concession areas was again cancelled and there was no hunting in 2013 and 2014. In 2015, hunting concessions were again reallocated without considering the earlier recommendations. This study therefore, was aimed at examining quota allocation between resident and non residents, sources of income for ZAWA and local communities, comparison of income between resident and nonresident quotas, the most hunted species under resident and nonresident hunting categories, status and classification of concession areas, and quota setting techniques among others.

Table 1 Hunting Concession Areas and length of lease

No.	Hunting Concession Area	Operator	Category	Length of lease	Year lease signed	Year of expiry of lease
1	Nkala	Nsonga Game Mgt.	Prime	10	2003	2012
2	Mumbwa West	Swanepol & Scandrol	Prime	10	2003	2012
3	Mulobezi	Mulobezi Outfitters	Prime	10	2003	2012
4	Kasonso	Hunters and Guides	Prime	10	2003	2012
5	Busanga	Mangomba Safaris	Prime	10	2003	2012
6	Upper Lupande	Kwalata Safaris	Prime	10	2003	2012
7	Lower Lupande	Sofram Safaris	Prime	10	2003	2012
8	Mwanya	Muchinga Adventures	Prime	10	2003	2012
9	Lumimba	Baobab Safaris	Prime	10	2003	2012
10	Nyampala	Luawata Conservation	Prime	10	2003	2012
11	Luawata	Luangwa Crocodiles	Prime	10	2003	2012
12	Chifunda	Bimm Safaris	Prime	10	2003	2012
13	Luembe	Wild Cat Safaris	Secondary	10	2003	2012
14	Chikwa	Prohunt Safaris	Secondary	10	2003	2012
15	Lunga Lushwishi	Sable Safaris	Secondary	10	2003	2012
16	Sandwe	Muchinga Adventures	Prime	5	2005	2012
17	Lumimba	Nyaminga Wild Cat Safaris	Secondary	8	2005	2012
18	Lundu Fulaza	Wild Cat Safaris	Secondary	8	2005	2012
19	Nyalugwe	Hunting Horizon	Secondary	8	2005	2012
20	Bilibili	Terminated				
21	Lower Luano	Agrofuel	Secondary	10	2003	2012
22	LungaBusanga	Royal Zambezi	Secondary	10	2003	2012
23	Sichifulo	Alfa Recreation	Secondary	10	30/12/2003	2013
24	Tondwa	Muchinga Adventures	Secondary	15	2003	2017
25	W/Zambezi Lower	Terminated				
26	Chiawa	Royal Zambezi	Secondary	15	1999	2014
27	Mukungule	Busanga Trails	Secondary	5	2005	2014
28	East Musalangu	Miyombo Safaris	Secondary	5	2005	(2010) 2015
29	Msoro Lupande	Eastern Safaris	Secondary	5	2008	2013
30	Rufunsa	Nyampala Safaris	Secondary	10	2005	2014
31	Chisomo	Sable Safaris	Under stocked	15	2003	2017
32	Chizera	Terminated				
33	Namwala	Nsonga Game Mgt.	Under stocked	15	2003	2017
34	W/Zambezi Lower	Maningi Safaris	Under stocked	15	2003	2017
35	Musele Matebo	Nyumbu	Under stocked	15	2005	2015
36	Musele Matebo	Nyumbu	Under stocked	15	2005	2015
37	ChibwikaNtambu	Terminated				
38	Bbilibi	Terminated				
39	Kafinda	Busanga Trails	Under stocked	10	2005	2015
40	Upper Luano	Agro fuel	Under stocked	15	2003	2015
41	Upper/Lunga Lushwishi	Not allocated				
42	Lower/Lunga Lushwishi	Not allocated				
43	Lukwakwa	Not allocated				

2. Materials and Methods

2.1 Location and Description of Study Area

The study covered Game Management Areas which are subdivided into Hunting Concession Areas (HCA) popularly called Hunting Blocks (HB) (Figure 1).

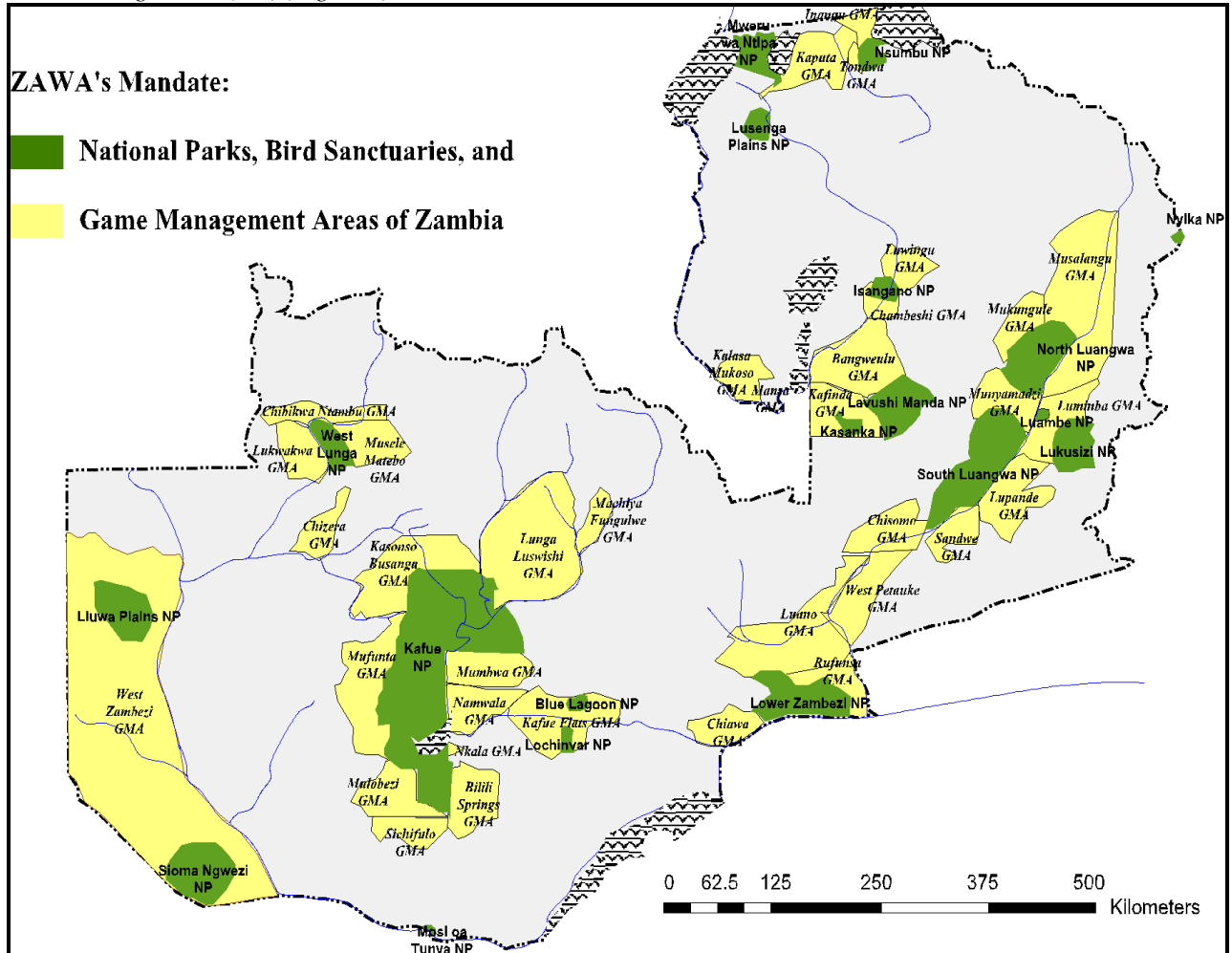


Figure 1 National Parks and Game Management Areas of Zambia which add up to 31.4 % of the country's land area of 752 614 km².

2.2 Field Methods

Data on size of hunting quotas and species hunted were collected from hunting quotas set annually by ZAWA. When setting quotas, species name, number and sex of animals to be hunted for the year between resident and nonresident hunting groups are indicated. The number of animals hunted or quota utilization levels by end of year, 31st December is collected and deposited with the licencing office and department of research in Zambia Wildlife Authority. This is done every hunting season, and forms a good data base from which this information was extracted.

Information on the species hunted under resident and nonresident hunting were collected from ZAWA's Form No. 14 which captures details on species name, place (GPS coordinates) and date where it was hunted as well as trophy size. This form also provides data on quota utilization, which then makes it easy to calculate fees collected for each animal hunted.

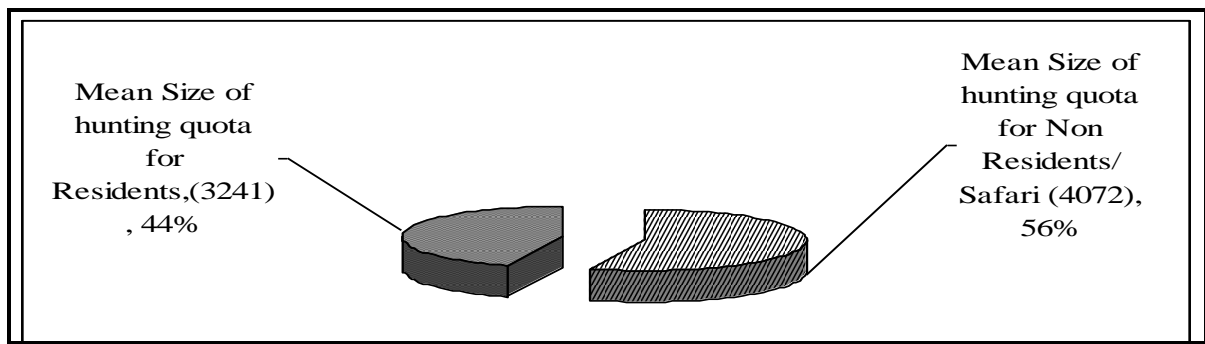
Data on income collected from hunting including concession fees were obtained from the signed Concession Agreements which provide details on the agreed amount of concession fees to be paid and the number of classical, minis, midis and other hunting packages.

The classification of hunting blocks has always been included in the hunting quota booklets. It was therefore easy to identify the status of Hunting Concession Areas based on the classification of the Game Management Area. In instances where part of the same GMA was richer than other sections, each hunting block was treated based on its individual classification. A comparison was also made with historical data of the 1980s when the classification of GMAs was reviewed.

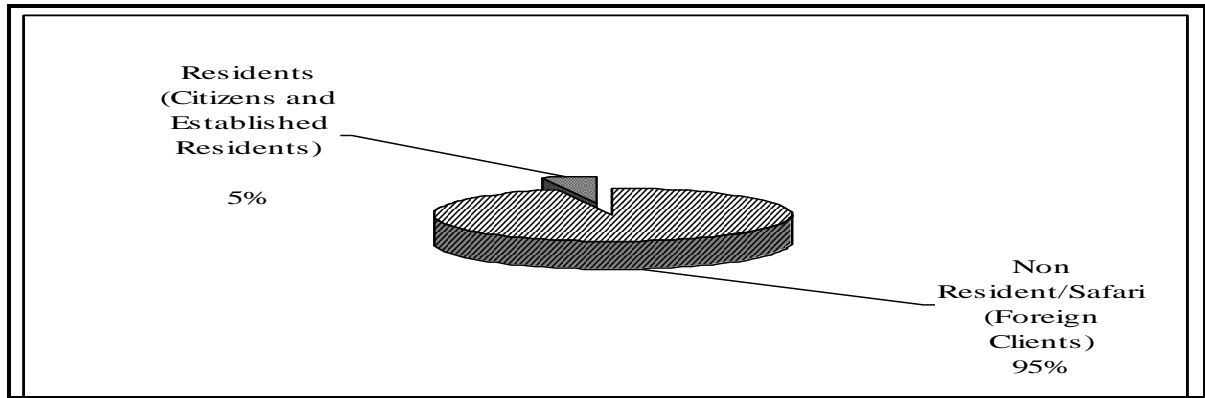
3. Results

3.1 Comparison of Size of Hunting Quotas

A comparison of the mean size of hunting quotas for the period 2003 – 2011 showed that 44% of the animal quotas were allocated to resident hunting and 56 % to nonresident hunting (Figure 2a). Conversely, there were glaring disparities in terms of revenue collected from resident and nonresident hunting, where Non Resident/Safari hunting which was allocated 55% animal quota contributed 95% of revenue and resident hunting which had 44% of the animal quota generated only 5% of revenue (Figure 2 a & b).



(a)



(b)

Figure 3 Comparison of, a) mean annual hunting quota size between residents and non residents /safari, and b) glaring disparity in percentage of revenue collected from Residents and Non Residents/Safari, for the period, 2003 – 2011.

3.2 Comparison of Species Hunted under Resident and Nonresident/Safari

During the period 2003 – 2011 a total of 41 species were allocated on hunting quotas; African civet (*Civettictis civetta*), baboon (*Papio spp*), black/Bangweulu lechwe (*Kobus leche smithemani*), blue duiker (*Philantomba monticola*), blue wildebeest (*Connochaetes taurinus*), buffalo (*Syncerus caffer*), bush buck (*Tragelaphus scriptus*), bush pig (*Potamochoerus larvatus*) common duiker (*Sylvicapra grimmia*), common genet (*Genetta genetta*), common waterbuck (*Kobus ellipsprymnus ellipsprymnus*), cookson’s wildebeest (*Connochaetes taurinus cooksoni*), defassa waterbuck (*Kobus ellipsprymnus defassa*), eland (*Taurotragus oryx*), elephant (*Loxodonta africana*), greater kudu (*Tragelaphus strepsiceros*), hippopotamus (*Hippopotamus ampibius*), impala (*Aepyceros melampus*), Kafue/brown lechwe (*Kobus leche kafuensis*), klipspringer (*Oreotragus oreotragus*), leopard (*Panthera pardus*), lichtensteini hartebeest (*Alcelaphus buselaphus lichtensteini*), lion (*Panthera leo*), Nile crocodile (*Crocodylus niloticus*), oribi (*Ourebia ourebi*), puku (*Kobus vardonii*), roan antelope (*Hippotragus equinus*), reedbuck (*Redunca arundinum*), red/Zambezi lechwe (*Kobus leche leche*), sable antelope (*Hippotragus niger*), Sharpe’s grysbok (*Raphicerus sharpei*), side striped jackal (*Canis adustus*), steinbok (*Raphicerus campestris*), sitatunga(*Tragelaphus spekei*), spotted hyaena (*Crocota crocuta*), tsessebe (*Damaliscus lunatus*), warthog (*Phacochoerus aethiopicus*), vervet monkey (*Cercopithecus africanus*), yellow backed duiker (*Cephalopus silvicultor*), and zebra (*Equus boehmi*).

A mean number of 7,600 animals were hunted each year (Figure 4).

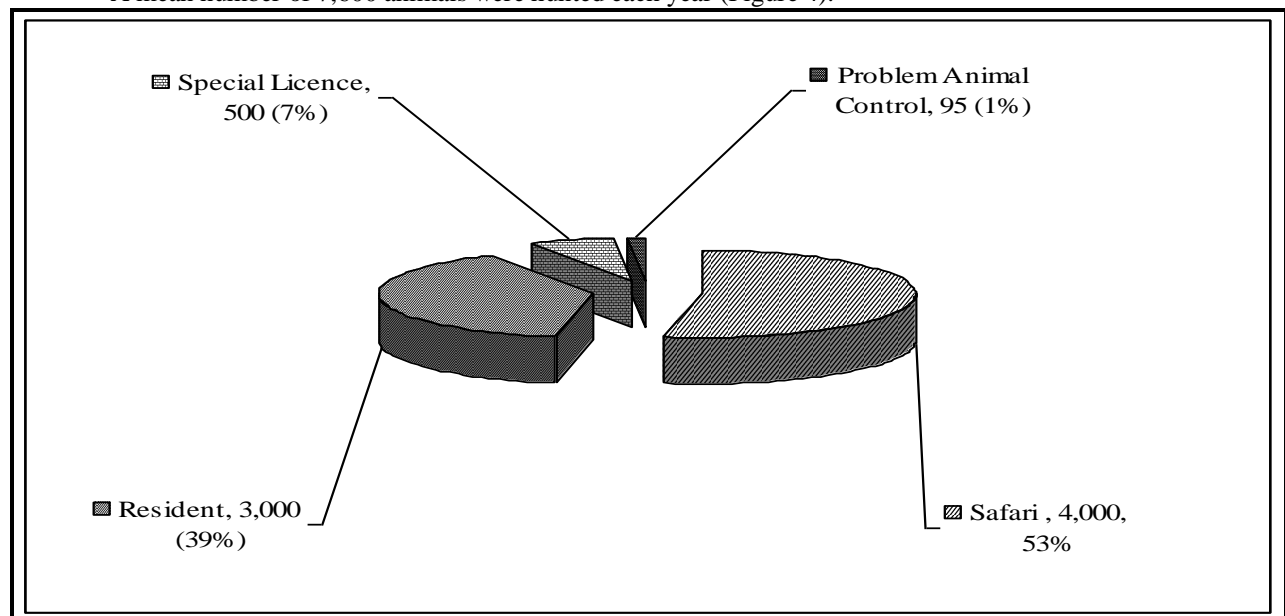


Figure 4 Mean number of animals killed each year under safari, resident, special licence and problem animal control for the period 2003 – 2011

Of the 41 species allocated on quota seven (7) species were the most hunted under Nonresident/Safari with quota utilization being above 50%. These species were; black lechwe (67%), kafue lechwe (66%), cooksons wildebeest (64%), lion (57%), buffalo (57%), leopard (55%), and puku (55%). Under resident hunting, despite the low revenue generated (Figure 3b) more species were utilized with quota utilization exceeding 50%, these were; buffalo (91%), common water buck (87%), defassa water buck (86%), puku (84%), reedbuck (84%), and so forth (Table 1; Figure 5).

An analysis of quota utilization of the Kafue lechwe for instance, which is an endemic species that has experienced a reduction in population size of 89 % since 1931, showed that during the period 2006 - 2012, residents hunted 3, 409 (93 %) with an annual mean of 487 animals while non residents/Safari only hunted 256 (7 %) and an annual mean of 36 animals (Figure 6).

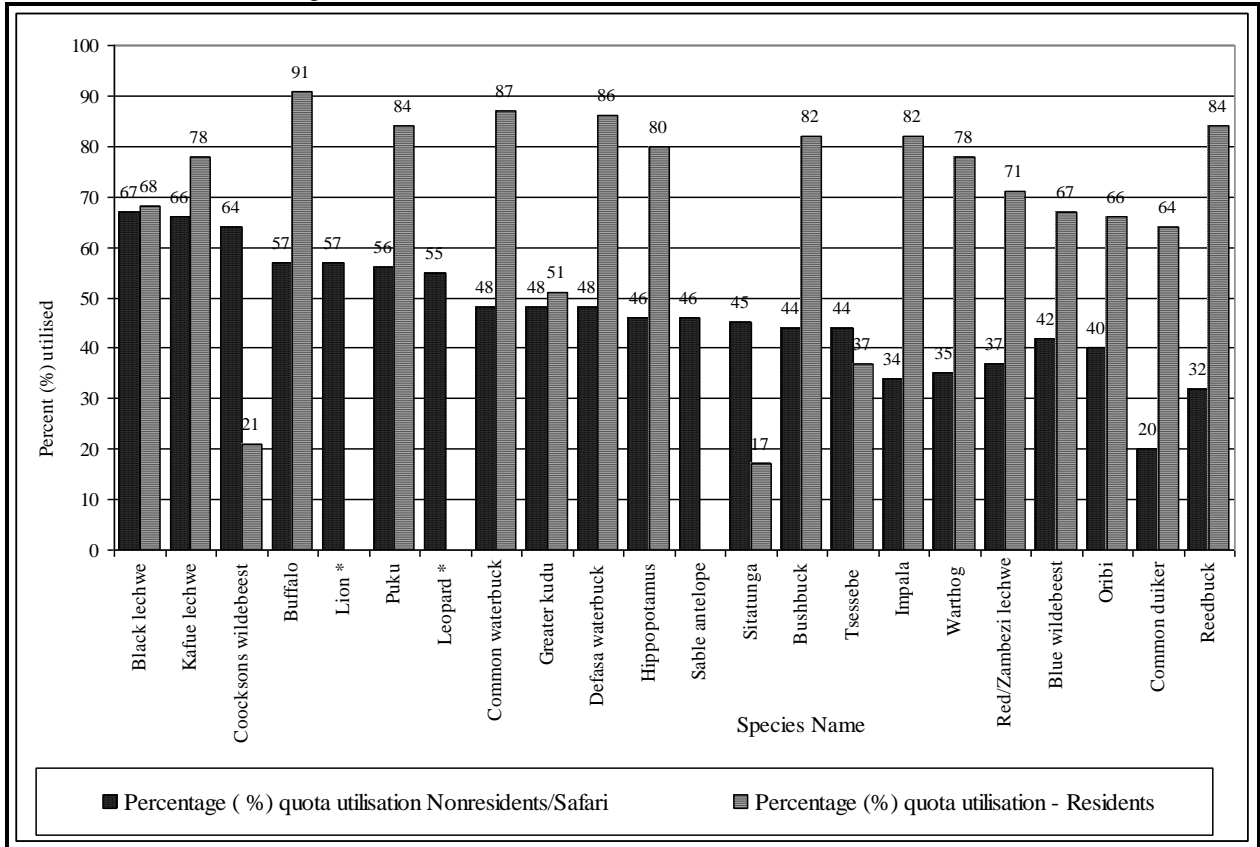


Figure 5 Comparison of top 20 most utilized species under Resident and Non Resident/Safari Hunting quotas (Notes * Not available under resident hunting quota)

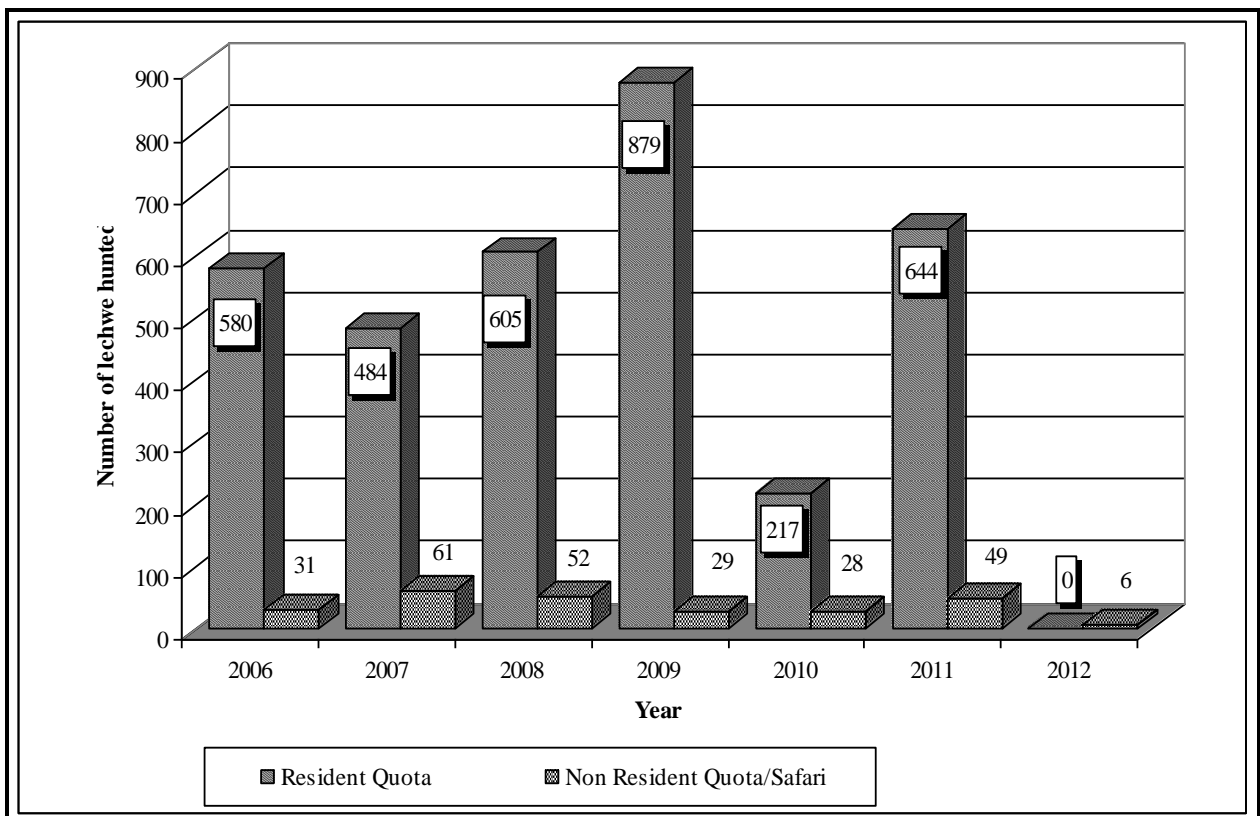


Figure 6 Number of Kafue lechwe hunted under resident and nonresident/Safari Quotas for the period 2006-2012.

Table 1 Ranked individual species utilization levels under Nonresident/Safari and Resident hunting quota for the period 2003-2011

Ranked individual species utilization levels under Nonresident/Safari hunting quota			Ranked individual species utilization levels under resident hunting quota		
Species	Average utilization 2003 - 2011	Rank	Species	Average utilization 2003 - 2011	Rank
Black lechwe	67.25	1	Buffalo	90.7	1
Kafue lechwe	65.5	2	Common waterbuck	87.3	2
Cookson's wildebeest	63.5	3	Defassa waterbuck	85.7	3
Buffalo	57	4	Puku	84.3	4
Lion	56.75	5	Reed buck	84.3	4
Puku	55.5	6	Bushbuck	82.3	5
Leopard	55.25	7	Impala	82	6
Common waterbuck	48.25	8	Hippopotamus	80	7
Greater kudu	48	9	Kafue lechwe	78.3	8
Defassa waterbuck	47.5	10	Warthog	78	9
Hippopotamus	46.25	11	Red lechwe	70.7	10
Sable antelope	46	12	Black lechwe	68.3	11
Sitatunga	44.5	13	Blue wildebeest	66.7	12
Bushbuck	43.75	14	Oribi	65.7	13
Tsessebe	43.5	15	Common duiker	64.3	14
Blue wildebeest	41.75	16	Greater kudu	51.3	15
Oribi	40.25	17	Bush pig	47	16
Lichtensteini's hartebeest	37.75	18	Eland	45.3	17
Red lechwe	37	19	Tsessebe	37.3	18
Nile crocodile	36.5	20	Klipspringer	23	19
Warthog	34.5	21	Cookson's wildebeest	20.7	20
Impala	33.75	22	Zebra	20.3	21
Reedbuck	31.5	23	Lichtensteini's hartebeest	19	22
Grysbok	31	24	Nile crocodile	18	23
Spotted hyaena	30.25	25	Sitatunga	17	24
Roan antelope	28.25	26	Blue duiker	12.7	25
Eland	25.5	27	Grysbok	12.7	26
Klipspringer	25.25	28	Side striped jackal	12.3	27
Baboon*	24.75	29	Civet	10.7	28
Civet	24.5	30	Genet	5.67	29
Zebra	22.5	31	Steinbok	5.67	30
Common duiker	20.25	32	Vervet monkey	2.67	31
Elephant	20	33			
Genet	19.25	34			
Blue duiker	18.75	35			
Bush pig	16.75	36			
Steinbok	12.5	37			
Side striped jackal	9.25	38			
Vervet monkey	2.75	39			
Yellow backed duiker **	0	40			

3.3 Hunting Packages

Hunting packages were classified as; *Classical or Deluxe Safari*, referring to a full bag hunt which may include lion, leopard, roan and sable antelopes. The hunting client may purchase as many species as are on quota for a given area. In addition to the usual animal licence fees, clients were also required to buy hunting rights fee prior to hunting. This fee was charged by local residents for the right to hunt in that particular area and was returned to the local community. If a client wished to hunt in a second area for a particular species not found in the primary area, he/she was required to pay an additional rights fee for that animal.

Mini safari was the second most important after *Delux/Classical Safari*, it limited the hunter to no more than seven animals of different species, which excluded lion, leopard, roan or sable antelopes. The lead animal species for the mini safari was found to be buffalo.

Midi safari was similar to mini safari except that the lead animal was sable antelope instead of buffalo. This Safari package was mainly applicable to the Kafue ecosystem where the buffalo population had declined.

Specialized safari was restricted to certain areas particularly wetlands where lechwe, sitatunga and tsessebe were found, these areas were; Busanga swamps in Kasonso Busanga GMA, Kafue Flats, West Zambezi upper and Bangweulu swamps. A specialized safari authorized the permit holder to purchase individually sitatunga, tsessebe, Kafue lechwe, black lechwe or red lechwe.

3.4 Income Collected from Trophy Hunting

Hunting was the Wildlife Management Agency’s main source of income and financial backbone contributing up to 76% of income. An analysis of main income generated during the period 2003 – 2011 showed that nonresident animal fees and concession fees were the most important sources of revenue for the Management Agency and local communities. Income from hunting seemed to have registered a significant increase during this period ($y = 4E+09x + 1E + 10$; $R^2 = 0.99$) while non consumptive tourism and miscellaneous sources registered only marginal gains. The proportional contributions to total revenue were ranked as; hunting 76%, non consumptive tourism 20% and miscellaneous 4% (Figure 7).

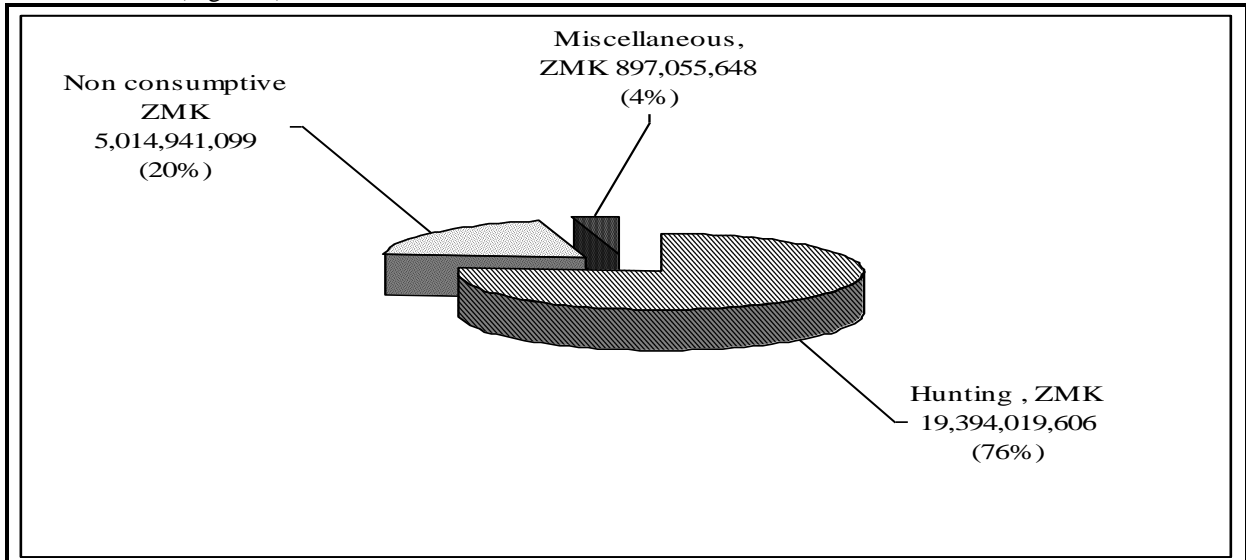


Figure 7 Mean income generated from hunting, non consumptive tourism and miscellaneous sources for the period, 2003 – 2011. (Mean exchange rate for the period 1USD to ZMK 4,500 before rebasing)

Revenue from hunting was further partitioned into seven different sources of which animal fees for non residents contributed 60%, concession fees 23%, animals fees for resident hunters 8%, others including CITES permits 3%, professional hunters licence fees 2%, elephant licence 2% (Figure 8).

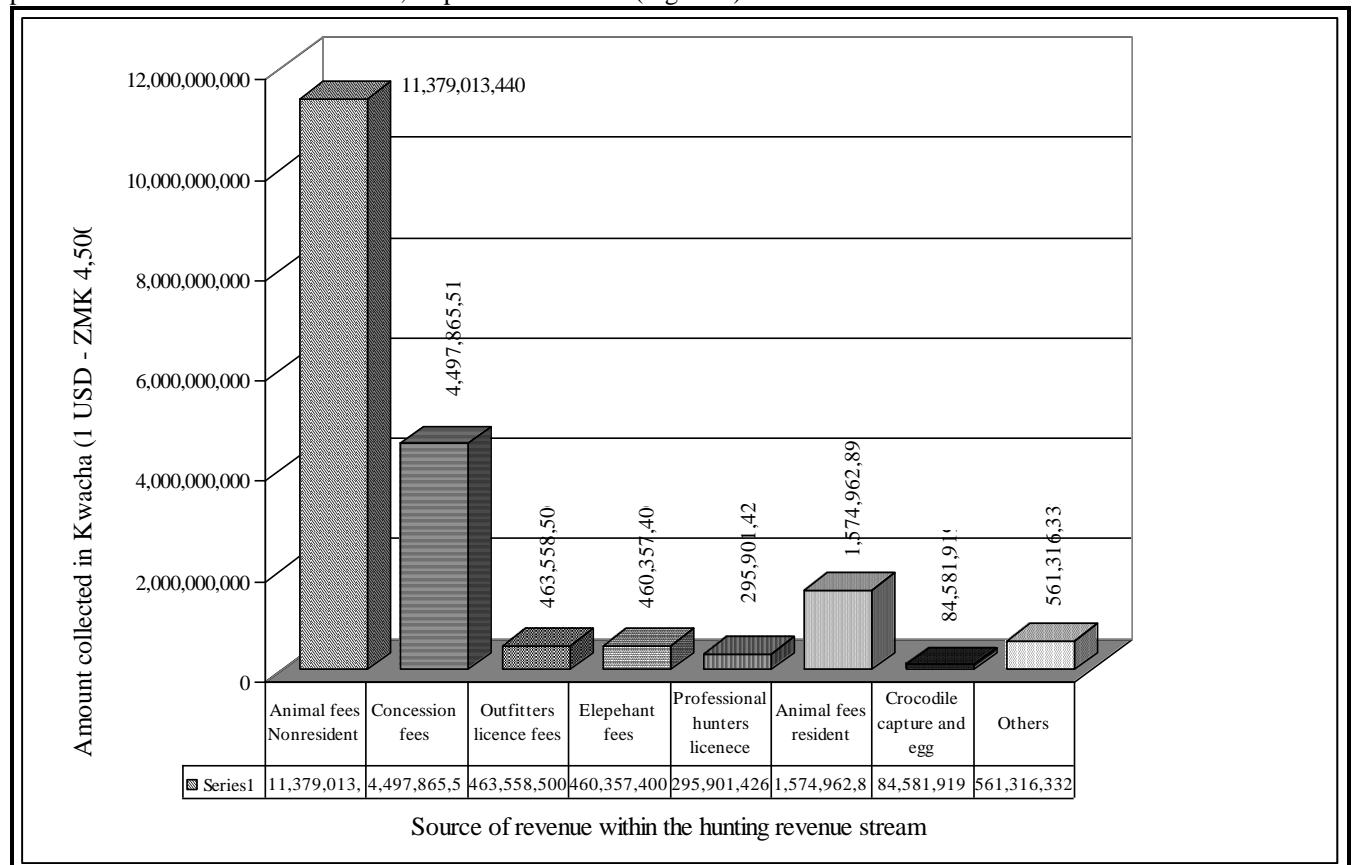


Figure 8 Mean annual income generated from different sources of hunting revenue stream, 2003-2011. [Elephant hunting started in 2005]

3.5 Ecological Status of Hunting Concession Areas

3.5.1 Concession Areas with the Most Hunted Species under Nonresident/Safari

Ecosystems and specific hunting concession areas where the seven most hunted species under nonresident /Safari were fewer for nonresident hunters. These were mainly concentrated around the Luangwa and Kafue systems (Table 2a & b). As for resident hunting, species coverage was almost country-wide (Table 2b).

Table 2a Ecosystems or concession areas where seven most hunted species under nonresident /Safari originated, 2003-2011.

Species	Ecosystem/ Concession area	Specific area	Remarks
Black lechwe	Bangweulu	Bangweulu GMA Specialized hunting area	Wetland of International Importance (Ramsar). Endemic species restricted to this ecosystem. Numbers declining
Kafue lechwe	Kafue Flats	Kafue Flats GMA Specialized hunting area	Wetland of International Importance (Ramsar). Endemic species restricted to this ecosystem. Numbers declining
Cooksons' wildebeest	Luangwa Valley	Few GMAs in the Luangwa Valley	Endemic species restricted to the Luangwa Valley
Buffalo	In Many Concession areas but mainly in the Luangwa and Zambezi Valley GMAs	Mainly GMAs in central Luangwa Valley	Numbers have declined in the Kafue system where mini has been replaced by midi Safaris
Lion	Many concession areas	Mainly Luangwa and Kafue systems	Most Safari Club Record trophies originate from the Kafue system. Numbers require monitoring.
Puku	Kafue, Nsumbu, West Luangwa and Luangwa Valley systems	Mainly Kafue, Tondwa and Luangwa areas	Populations are stable
Leopard	All hunting areas	Mainly Kafue and Luangwa systems	

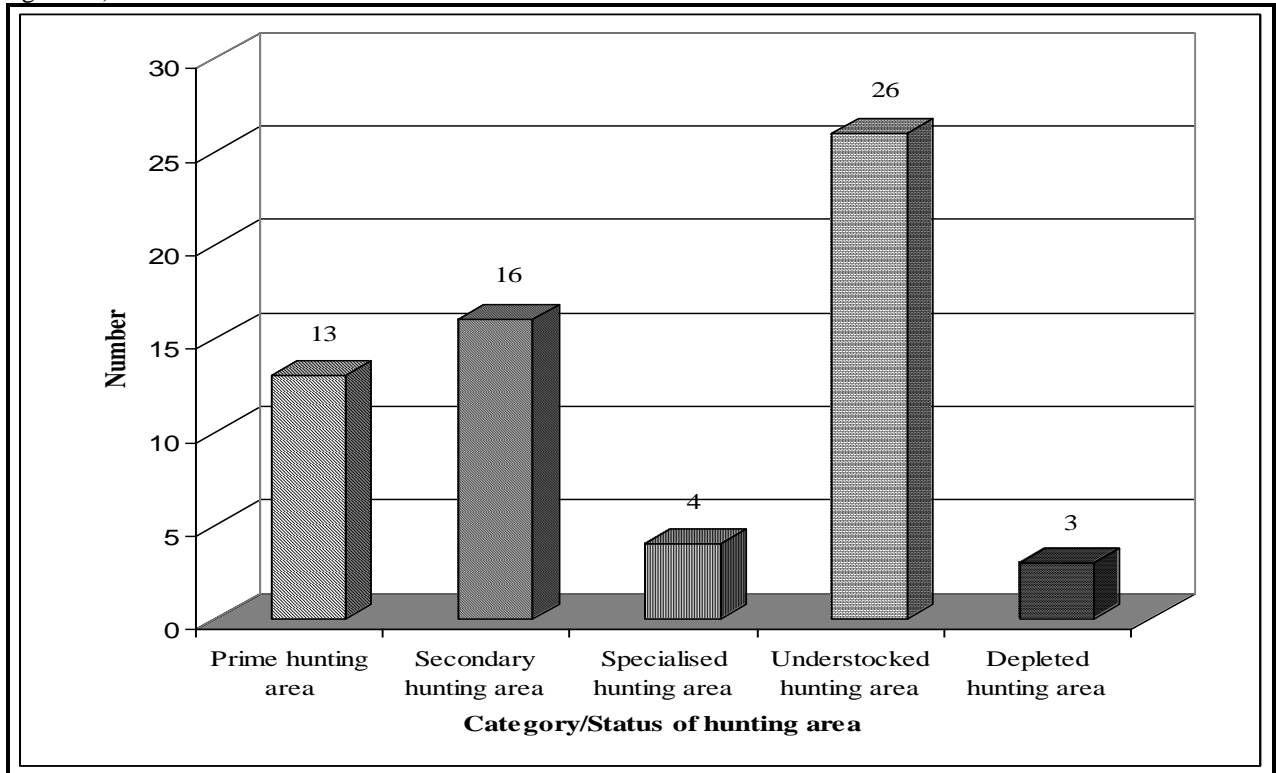
Table 2b Ecosystems or concession areas where seven most hunted species under nonresident /Safari originated, 2003-2011.

Species	Ecosystem	Specific area	Remarks
Buffalo	Almost all hunting blocks	Mainly GMAs in the Luangwa Valley; sometimes in the Zambezi Valley	Numbers elsewhere have declined except for the Luangwa Valley where residents are exerting increasing pressure.
Common waterbuck	Luangwa and Lower Zambezi systems		
Defassa waterbuck	Kafue system, Lunga system in Northwestern province and Tondwa area in the north.		
Puku	Open areas and plains of the Luangwa, Kafue, Lunga and Tondwa systems	Kafue, Luangwa and Lunga areas	The species requires monitoring in the Luangwa Valley
Reedbuck	Open plains and wetland areas		Reedbuck has been significantly reduced in the Luangwa valley
Bushbuck	Throughout Hunting Concession areas		
Impala	All Hunting Concession areas except those in the northern part of the country		
Hippo	All major rivers	Mostly Luangwa and some segments of the Zambezi, Kafue and its tributaries	The Luangwa valley is the stronghold of the species. It has been significantly reduced in western province.
Kafue lechwe	Kafue flats		Most pressure is exerted on the south banks which has less than 70% of the total population. The population has declined.
Warthog Red lechwe	Almost all Concession areas Wetland areas	West Zambezi, Busanga swamps/Lunga Lushwishi	The species has been extirpated from Lukanga Swamp Ramsar site. Except Busanga swamps, elsewhere the population is low.
Black lechwe	Wetland area	Bangweulu Ramsar Site	The population has declined and requires careful monitoring just like the Kafue lechwe
Blue wildebeest	West Zambezi, Kafue system and Kafue flats	Mainly West Zambezi	Populations are increasing in west Zambezi, but have declined to very low numbers on the Kafue flats
Oribi	Open plains and wetland areas	Mainly Bangweulu, Kafue system, Kafue flats	
Common duiker	Throughout the country		

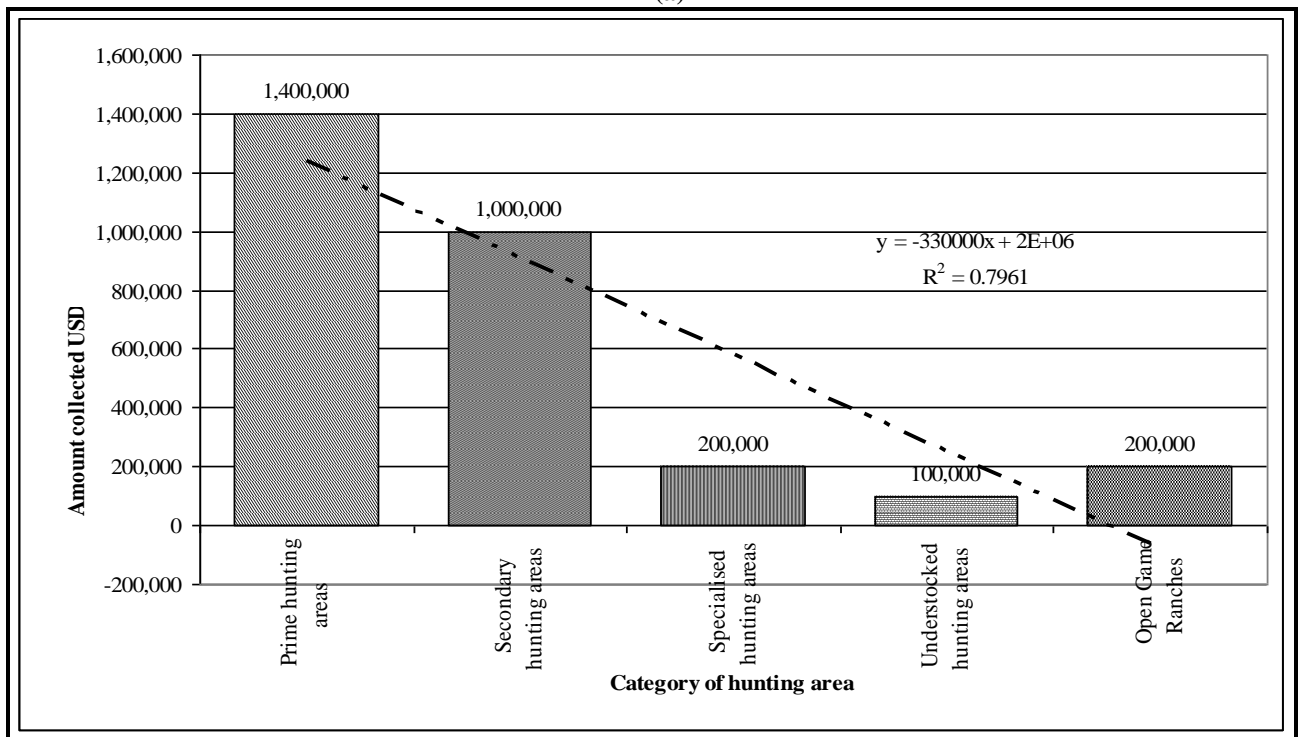
3.5.2 General Ecological Status of Hunting Areas for both Resident and Non residents

Hunting areas were classified under five (5) categories arranged in descending order depending on the species richness and relative abundance of species which also determined capacity to meet the needs of Safari clients and residents. Prime was the richest with capacity to provide for a minimum of five (5) deluxe/ classical, secondary three (3) deluxe/classical. There were 13 prime hunting areas, 16 secondary, four (4) specialised, 26 under stocked and three (3) depleted the latter of which included open areas where resident hunting also took place (Figure 9a)

In terms, of revenue generated in USD from these categories, results showed that, prime category which had a small number (13) generated the most, and the under stocked which had the highest number generated the least amount. The amount generated from hunting declined with decline in status of hunting area ($y = -330000x + 2E + 06$; $R^2 = 0.7961$) (Figure 9b).



(a)



(b)

Figure 9 a) Status of hunting areas located in Game Management Areas and open areas up to 2011, and b) amount of revenue in USD generated from each category

Multiple cross tabulation (sensu Aggarwal, 2013) showed that the number of hunting blocks did not matter or determine the amount generated but the status of the HCA category. The under stocked category which comprised the majority (26) generated the least and depleted generated no revenue at all (Figure 10).

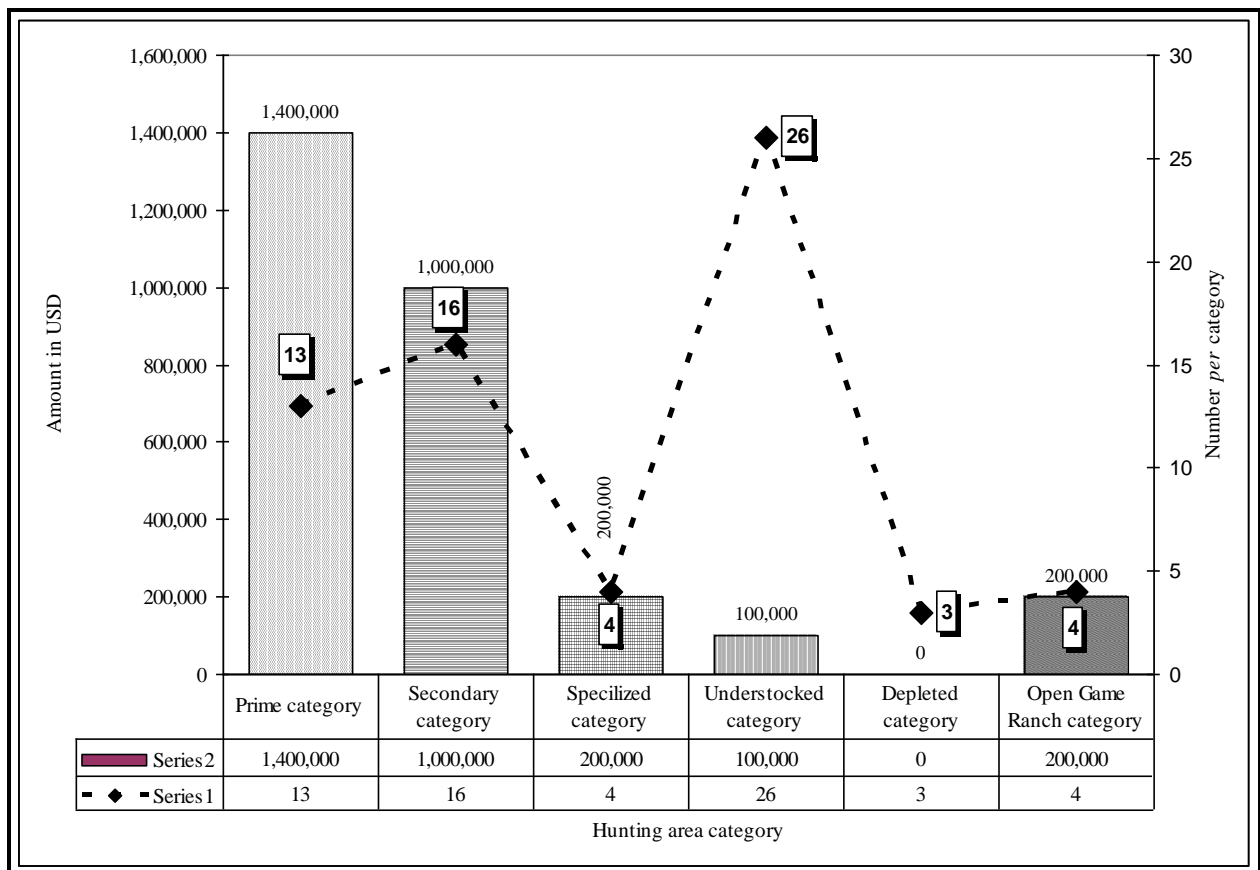


Figure 10 Mean annual revenue collected in USD for the period 2003 – 2011 from each hunting category

4. Discussion

4.1 Quotas and Harvesting Levels

Results show that close to 8,000 animals are hunted each year. This number could be higher because; i) resident hunters do not usually endorse their licences after hunting, and there was no mechanism to ensure that each resident hunter endorsed the licence, ii) resident hunters were not required by law to complete a ZAWA 14 form on which details of the hunt are entered, neither do they endorse as hunted when an animal is injured and later dies days after the shooting, iii) nonresident hunters were accompanied by ZAWA staff or village scouts to ensure compliance but resident hunters were in most cases not accompanied, iv) resident hunters were non selective and shot male or female which explains why their utilization levels of their quotas were higher than safari, v) most resident hunters were eminent figures in society or had political influence and often overlooked some regulatory frameworks, vi) resident hunters usually shot above quota since the animals are hunted for meat and not for export of trophies where CITES regulations would be a constraint (Pers. exp.).

Given these weaknesses, resident hunting harvested higher quotas than safari and could be the major reason why their utilization levels far exceeded safari (see Figure 5) yet their contribution to ZAWA and local community's revenue was paltry. Special licence on the other hand, took a mean number of 500 animals each year. It was also likely that the number of animals killed on special licence would increase in future as the number of traditional ceremonies and tribal tensions remain somehow significant. In incidences where there are tribal tensions, special licence may continue to be used as a tool for pacifying and soldering harmony to suture tribal cleavages especially through support to traditional ceremonies. During the period 2003 – 2011 each registered traditional ceremony including those chiefdoms located in areas where animals were wiped out more than two decades ago, through poaching got no less than five animals per ceremony. The role of special licence for scientific research and exchange of zoo specimens as well as facilitating establishment of game ranches was derided and over shadowed by the growing demand for game meat for traditional ceremonies. This could be the main reason for the increased number of animals under special licence. The costs of carrying out this activity of hunting for traditional ceremonies are also often passed on to the managing agency ZAWA, which adds on its long list of liabilities. The number of animals killed under Problem Animal Control (PAC) was highly variable. This was because it was determined by the scale of human – wildlife conflicts for which there were many factors. Subsisting empirical evidence showed that drought years often experienced high levels of conflicts and it was during such years that communities required meat to mitigate food shortages.

Viewed from this angle, it was assumed that if poaching cases were included as part of animal off take, on an annual basis, the number of animals killed annually would be between 20,000 and 30,000 individuals. No wonder many species have experienced severe population losses and are on decline. Classic examples are the Kafue and Bangweulu lechwe (Chansa and Kampamba 2009; Anon. 2013), and the significant reduction of the buffalo population in the Kafue ecosystem which led to the replacement on Mini safari by Midi safari.

The loss of almost 30,000 animals mainly through poaching is clear testimony of the failure of the Community Based Natural Resources Management (CBNRM) model. This model has been over publicized, but its impact in Zambia has over the years proved to be ineffective and may require complete review or perhaps complete turnaround. The topic of CBNRM is a multimillion dollar industry and many scholars have invested heavily in its publicity, yet even in countries where it is believed to be very successful, detailed information revealed heavy involvement of donor support

and a massive army of sophisticated and powerful sympathizers who are at best the beneficiaries of such donor input and not the poor community members *per se*. At community level, it was the traditional leaders, the chiefs that picked the last fragments of donor money while ordinary community members feasted on promises of better conditions in future. The years following the introduction of ADMAD for example, government efforts on boots on the ground slackened with the understanding that communities would fill up the gap. This has dismally failed. Game management areas are now heavily settled, poaching has increased and animal numbers have gone down, while at the same time communities continue to pressurize ZAWA to have a larger share and with the support of selected Non Governmental Organizations (NGOs) some communities have lobbied to have ZAWA's presence removed from GMAs. This observation is apparently in tandem with the earlier publication by Spinage (1996). Indeed the abrogation of game laws and dismantling of wildlife institutions cannot lead to lessening of the increasing destruction of African Wildlife. Although a number of articles particularly from Southern Africa were written to criticize to what is probably an accurate prediction by Spinage (1996), it is now clear that Spinage (1996) has been vindicated at least going by the current status.

This massive loss of animals through; i) poaching, ii) un controlled resident hunting, and iii) hunting for traditional ceremonies should not be allowed to continue in their current form and practice as they are unsustainable.

With respect to species specific quota utilization such as elephant, hunting only started in 2005 after the 10th Conference of the Parties of the Convention on International Trade in Endangered Species of Fauna and Flora (CITES) held in Bangkok, Thailand in 2004. The COP permitted Zambia to have a fixed quota of 20 elephants in the selected areas of the Zambezi and Luangwa Valleys. The mean utilization of this quota did not exceed 60% due to the non availability of the United States market which is the main source of hunting clients to Zambia. At this same conference Zambia was also permitted to hunt crocodiles from the wild, and it is for that reason that the species was included on the annual quotas.

4.2 Nonresident/Safari Hunting Off take Levels

Nonresident hunting operates through locally registered Hunting Outfitters also called Safari Companies. They purchase hunting licences from ZAWA's licencing office based on quotas provided to each outfitter with a valid Hunting Concession Agreement. They are ideally expected to harvest 100 % of the allocated quota and give 100% financial returns to ZAWA on all quotas. However, the 100% quota utilization is not often achieved in light of challenges such as availability of clients among competing hunting destinations, availability of quality trophy animals and in some cases the poor rating of hunting blocks particularly as a result of human encroachment and competition with resident hunting and many others. This accounts for low income earned by ZAWA and Local Communities.

4.3 Hunting Packages

The HCAs have inherent weaknesses of providing a fixed quota. This compels ZAWA to provide the same quota annually for the entire length of the Concession Agreement. In the event that a certain species' population declines or when there is international pressure to remove a certain species from commercial exploitation as has been for lion since 2004, ZAWA would and has in selected incidences faced litigation in the courts of law. The packaging of deluxe/classical, mini, mini and specialized safaris disadvantages ZAWA in that none of the four (4) packages compels the client to purchase a specified number of species provided by ZAWA. Consequently only the most popular species such as buffalo and lechwe are bought. Less popular species such as hippo, crocodile, baboon are hardly exhausted and their utilization levels were below 45%. This exerts hunting pressure on very few species which may in the medium to long-term negatively affect their population size.

4.4 Quotas and Quota Setting Techniques

Animal off take quotas are supposed to be carefully calculated in order to prevent ecological disasters in animal population dynamics. The main principle applied is Maximum Sustained Yield (*MSY*) and quality off take of animals. These two factors are important to avoid dangers of genetic drift.

4.4.1 Sustained Yield Harvesting

In principle, Maximum Sustained Yield (*MSY*) for populations of wild animals ensures that the maximum number of animals that may be removed every year from a population when it is at its highest intrinsic rate of increase, at half the carrying capacity does not cause that population to decline (Figure 10). At this point the population would increase at its maximum possible rate allowing maximum sustained annual harvest. This is the key and underlying principle under *MSY*.

For as long as the growth form of a population is logistic such as the Luangwa hippo, then it is possible to estimate the Sustained Yield (*SY*) that a population of a particular size can with stand. The *SY* is given by the same formula as for logistic curve (sensu Sincalir and Grimsdell, 1982) as follows:

$$SY = r_{max} \frac{N(K-N)}{K}$$

Where:

r_{max} = the maximum rate of increase of a population, under stated conditions, at a very low density.

N = population size at which the *SY* is to be taken

K = the maximum population size that a particular area can hold, thus the population size at the ecological carrying capacity of the area.

From the above it can be seen that maximum sustained yield (*MSY*) is $\frac{1}{2} r_{max} \cdot \frac{1}{2} K$, represents the maximum trade-off between rate of population increase and population size (Figure 10).

A good estimate of r_{max} and K are needed in order to calculate an *SY* on *MSY*. The calculation of K is often difficult, because it involves various environmental parameters. However for some species such as K for the hippo of the

Luangwa valley are already known. But for many other species' K still remains unknown. An alternate method is to estimate r_{max} from a hypothetical population with maximum birth reproduction and minimum mortality.

A few estimates of r_{max} have been calculated for African large mammals based on Sinclair and Grimsdell, (1982) such as:

African buffalo - $r_{max} = 0.23$

Lechwe - $r_{max} = 0.27$

Hippo - $r_{max} = 0.22$ (Chomba 2012)

The r_{max} values are in fact infinitesimal values, when converted to finite values they become somewhat higher. Thus the lechwe value of $r_{max} = 0.27$ equivalent to a finite rate of increase of about 1.3, (or 30%) per year.

Recently it has been shown that r_{max} is a simple function of body weight and can be calculated approximately as follows:

$$r_{max} = 1.5 W^{-0.36}$$

Where W = weight in kg.; and r_{max} is calculated on a yearly basis (Chomba et al. 2011; Sinclair and Grimsdell, 1982).

In polygamous species the rate of increase will be higher if the population is biased towards females. Given poor funding to ZAWA and the irregular surveys, most of the data used in quota setting is based on indices and very often based on percentage quota utilization by the operator. Under such circumstances, it is difficult to determine with absolute certainty whether quotas are sustainable or not for some species.

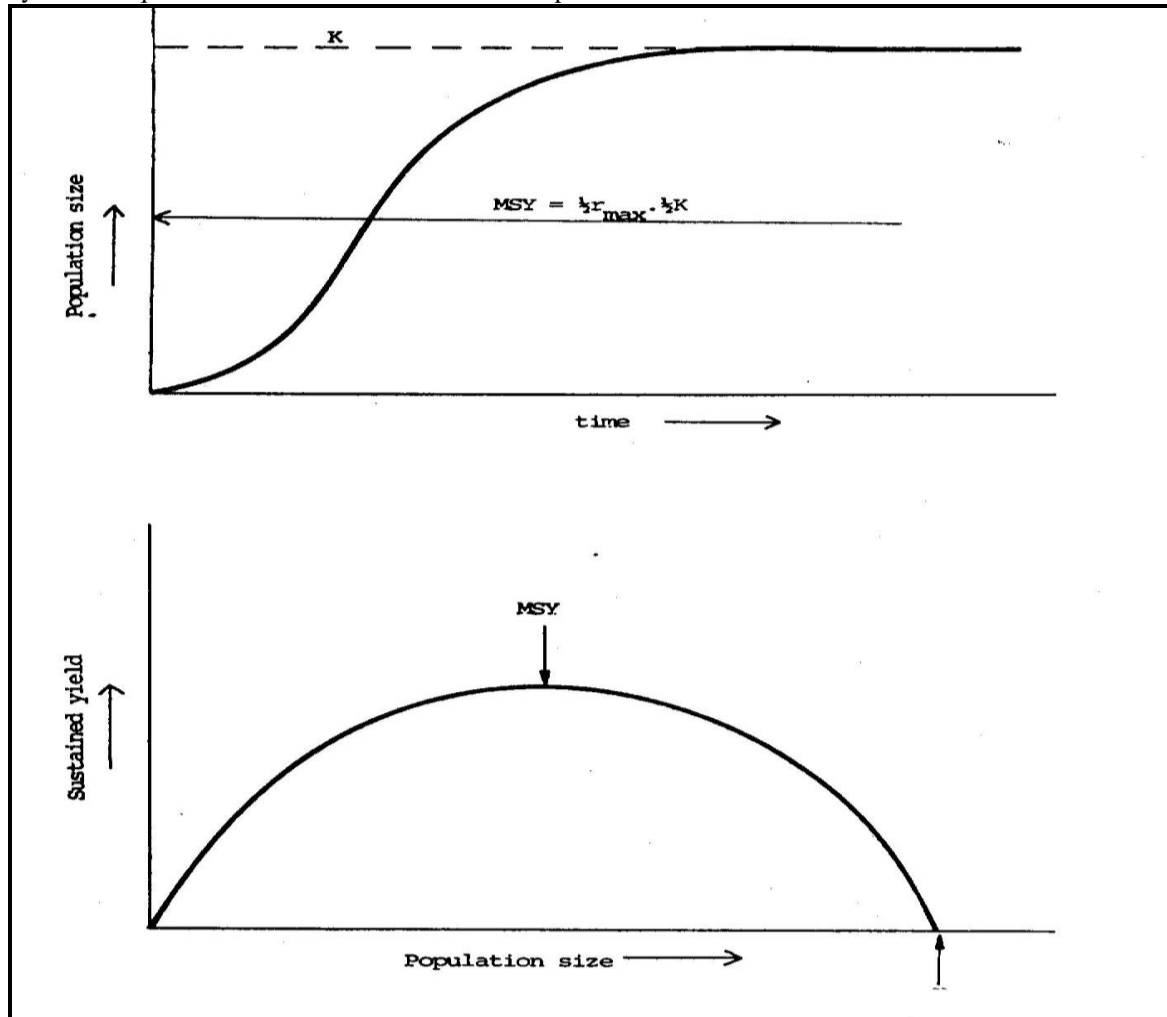


Figure 10: Sustained Yield based on logistic curve. MSY – Maximum Sustained Yield; K- Population size at Carrying Capacity (sensu Sinclair and Grimsdell, 1982).

4.4.2 Packaging of Quotas

The current system of packaging quotas into; *deluxe/classical*, *mini* and *midi* safari is rigid and compels ZAWA to provide certain species whether the population is low and declining such as the Kafue lechwe (Chansa and Kampamba 2009). For instance, a prime area is expected to yield a minimum of five (5) classicals implying that there has to be five lions and only in very special circumstances do operators agree to get leopard in place of lion. It is therefore, based on this assumption, very likely that the quotas are based on the number of classical, minis and midis expected to be harvested by operators rather than basing it on the biological status of the species being harvested.

Assessing the suitability of a species for harvest requires good baseline population data. Where none previously existed a practical and sensible way may be to ascertain the biology of the species. For instance, large bodied species or rare ones or food specialists are more at risk than small bodied generalists. Assessment of the geographic distribution and range are equally critical as endemic and localized species such as Bangweulu and Kafue lechwe are more at risk than non endemic and wide spread such as impala and common duiker. Given the increasing level of human encroachment in most GMAs, a regular review of available habitat would help understand the proportion of the habitat that is effectively protected. Most important though, is the national population trends of species. Intuitively, species that are generally abundant occurring at high densities are likely to be less sensitive to harvests than less common occurring at low

densities. Having current data on national population status and distribution provides some indication about the species' likely susceptibility to harvest. Species with an increasing population are likely to be less sensitive to harvest than species whose population is decreasing such as the Kafue lechwe. Ideally trends in the national animal population status in Zambia have been measured over long periods of time but usually independent of harvesting regimes. Such measurements have also covered only selected species and certain areas mainly due to resource constraints. Where data from actual population surveys are available, results from at least three or five preferably consecutive censuses would be considered ideal to be used for plotting trends. When monitoring of population status improves, the age and sex structure of the population should also be assessed. Failing this, trends or indices of relative abundances, hunting effort, hunting success and trends in trophy size can be used, but with great care.

4.5 Income Collected from Trophy Hunting

Income from hunting has the largest contribution to ZAWA and Local Community's income. This study has revealed that nonresident animal fees and concession fees are the most important sources of income from hunting. Current data showed that income from National Park collections slightly declined during the period 2003-2011 and only income from hunting and miscellaneous sources registered a marginal increase ($y = 4E+09x + 1E + 10$; $R^2 = 0.99$). This is symbolic of a poorly developed state of infrastructure in National Parks as income from the latter was expected to rise and surpass income from hunting. This lag in photographic tourism may also be attributed to the lengthy process it takes for a lodge to be built, marketed and start attracting visitors, while hunting has no lag phase. The lag phase is further exacerbated by poor road infrastructure and low animal numbers in most National Parks which is a disincentive to non consumptive tourism. The inadequate and poor quality of roads in National Parks has also reduced the tourism season to no more than six months in many areas. This implies that lodges remain closed during the rainy season or operate at very low occupancy rates. This low income from non consumptive tourism is a risk to ZAWA, particularly in the event where there is a hunting moratorium as was the case in 2012 or when certain key/premium species are removed from the quota due to CITES constraints or as national decision as was the case in 2012 when cats (lion and leopard) were removed from the hunting quota.

4.5.1 Increasing Income from Resident Hunting

Resident hunting currently generates only up to 6 % of income compared with safari. The animal fees are very low as this is considered to be a non commercial operation but a service to the people of Zambia. Attempts to increase animal fees for residents have often faced fierce resistance from the public and it is often assumed that increasing animal fees for residents would increase poaching even if the two are not related. This kind of resistance is not seen with other public institutions such the power utility company the Zambia Electricity Corporation (ZESCO) which increases its electricity tariffs without public consultation and yet no one insinuates that there would be vandalism of their properties. In 2010 an attempt was made to conduct an auction of resident hunting quotas, and the contribution of resident hunting to hunting revenue increased from 5% in the previous year to 13 %. This showed that if this model was popularized and conducted in designated centers around the country such as provincial towns, the proportional contribution of resident hunting to total hunting revenue would increase. This practice was stopped after interested parties complained that auctioning only favoured the rich, especially Zambians of European and Indian decent. Other attempts made were to remove certain premium species from resident hunting quota and restricting them to safari, but this also faced resistance and the animals were reinstated. Under such circumstances, resident hunting will continue to be a service and not a source of income for ZAWA and Local Communities.

4.6 Ecological Status of Hunting Concession Areas

The hunting concession areas in GMAs are the animal production units where hunting takes place. Effective ecological management of GMAs is critical to sustaining consumptive tourism. Empirical evidence suggests that before the CBNRM programme took root in the 1980s, only an average of 7.4% of GMA land area were occupied by human settlements. Human density was low and averaged 0.3 – 9.3 local residents /km² (Lewis, 1993; Anon, 1996). This left a lot of land for wildlife and hunting. At this time hunting flourished because; i) safari hunting areas were sparsely populated with humans and animal numbers were high, and ii) hunting levels were supposedly far below animal populations' growth rates.

Lack of investments in the wildlife sector and the ineffective CBNRM model has reversed the trend. For instance, Bilili GMA has been completely taken over by human settlements, and the eastern part of Mumbwa GMA is heavily settled and there are some spill over's in the Mumbwa west as well. The traditional authorities, contrary to popular view supported by countless publications by the pro CBNRM cartel have not managed the resources well and have in some instances even supported human encroachment in some areas of GMAs such as Mumbwa east. This has been accentuated by politics as the illegal settlers are not seen as a threat to the development of sustainable tourism but as potential voters. The management agency, ZAWA is in many instances left powerless and cannot control increasing levels of encroachment in GMAs. This multifaceted scenario has led to reduced number of prime hunting areas while the number of under stocked and depleted GMAs has increased (see Figure 9a & b). The downgrading of hunting concession areas to lower ecological status has inevitably reduced the potential income to ZAWA and local communities and is a major financial risk. As human encroachment increased, so did poaching, some of which was and still is done by the GMA *bonafides* who are supposed to be the custodians of the resource. Here we assume that there may have been a major fault in the way the CBNRM model was designed. It assumed for instance, that once communities participate and receive a share of revenue, then poaching would be reduced to low levels much lower than the population's rate of increase. This is perhaps was one of the major weaknesses of this model as individuals have particular needs and sharing of hunting revenue at house hold level which has been tried in some countries is at best a fallacy which cannot work. It is at the moment difficult to determine at what level individuals would get satisfied with the income received per household level as to give up poaching. One of the potential threats of encouraging sharing of revenue at house hold level is that once

such revenues are treated as an entitlement the same way civil servants treat a monthly wage, the next thing is to demand an annual increase or at least an increase once in a while even if the resource cannot meet such demands. An example of this is with the traditional authorities who are placed on an honorarium wage in recognition of their role as custodians of culture and traditions, but still lobby for more incentives and often demand for higher allowances than civil servants. Recently there have been demands from traditional leaders for government to build modern palaces, provide personal to holder vehicles and to increase the monthly allowances even when civil servants are not demanding for any increase. In a few weeks before sending this paper for publication, there was another demand from traditional leaders to form an upper house of parliament something not provided for under the subsisting constitution.

In our earlier publication of 2011 (Chansa and Mwenya, 2011), we gave a back ground that before the British Government colonized Zambia, wildlife belonged and was under the control and management of the indigenous people through traditional authorities called Chiefs. Under this traditional way of life, characterized by the leadership of Chiefs, wildlife was used for the benefit of the community and formed an integral part of their lives. At the turn of the last century when Zambia fell under British rule, wildlife ceased to be under the custodianship of the indigenous people. It was placed under centralized state protection and management. For this purpose the Game Ordinance, Chapter 106, was enacted on 1st January 1943, making wildlife the property of the state and governing its use. The subsequent amendments, repeals and replacements of the wildlife legislation were made essentially to keep such wildlife legislation up to date in line with government requirements. The process of updating the wildlife legislation was done to ensure that it provided for the protection, management and use of National Parks. However, it has now become apparent that pre colonial era system of managing wildlife through traditional authorities can no longer work. Since Chiefs are non elective, and therefore, not accountable to any one, it would be very risky to place absolute powers and decision making on matters dealing with wildlife in institutions that are not accountable to the public. Politicians have consistently failed to recognize this fact and for as long as we maintain a two tiered governance system over the wildlife resources, thus traditional authorities and government through ZAWA, the CBNRM may have no chance to succeed. Experience has shown that where there is resource use conflicts between ZAWA and Traditional Leaders (chiefs), politicians usually play the role of a biased referee favouring traditional leaders to the detriment of ZAWA and wildlife resources. For example, the level of encroachment in GMAs can in no way be attributed to shortage of land as the most recent human population estimates (2010), showed that Zambia had 17people/km². This 17 people per square kilometer is based on a uniform distribution of people across the country which is not realistic as most people are aggregated around urban areas and along the old line of rail which leaves most rural areas empty. In most rural areas population density is less than 10/km², so the justification often advanced by traditional leaders and politicians of shortage of land is not true.

5. Conclusion and Recommendations

5.1 Conclusion

Sport or trophy hunters and others that support consumptive utilization of wildlife resources claim that the idea of preserving wildlife in a pristine state for all time may no longer be realistic due to increasing human populations, increased demand for land and reduced expenditure from Central Government to support wildlife conservation. Many protected areas, National Parks in particular, are becoming ecological islands in a sea of human settlements. The value of ecological services such as pollination and water catchment for instance, are difficult to translate into dollar value to convince local communities as well as politicians not to engage in unsustainable use of their natural environments. In Zambia like many other African countries, the concept of sustainable utilization will remain controversial and emotional and there may be no consensus on the best form of utilization. The conservation community as deciphered from the two National Workshops held at Sandy's Creation in 2012 and Mulungushi International Conference Centre, Lusaka in 2013 was split over attempts to define what is in principle, the best method of sustainable use of wildlife in Zambia. It is therefore, not the intention of this paper to provide an answer to this emotional area of conservation but rather to bring out key principles on how the two may coexist with minimum conflicts.

Proponents of Consumptive Utilization (Modified After Baker, 1997) argue that trophy hunting is a professionally controlled form of utilization which is more environmentally friendly and more social culturally acceptable than photographic tourism due to the following reasons:

- 1) Hunters are not as ecologically destructive as photographic/non consumptive tourists. They usually come in fewer numbers than the ordinary tourists and do not demand luxurious amenities such as hotels or Lodges.
- 2) Hunters require fewer services and accommodation facilities, less infrastructure, thus keeping wildlife habitats more pristine.
- 3) Hunters usually pay more money *per* unit time *per* visit than the ordinary tourist yet they use fewer services.
- 4) The cost of a hunting safari in Africa is more than triple the cost of an ordinary safari of the same length.
- 5) For an area to be attractive under photographic tourism it must have abundant populations of animals and/or have the *big five* while hunting can be carried out in areas with low animal densities and hunters are often patient and willing to wait even up to 21 days until they get a desirable trophy. Photographic tourists are often impatient wanting to see as many animals as possible in the shortest possible time.
- 6) Some areas hosting the most wildlife in numbers and variety are often inaccessible to regular visitors/tourists or practically inaccessible because of poor transportation services and infrastructure. Such areas, however, are likely to attract sport hunters, which increases local benefits.
- 7) Over population of certain species can damage if not destroy the natural habitat which would threaten their own existence and that of other species. Elephants for instance, can be very destructive leaving thousands of hectares of land barren of trees there by negatively affecting other species dependent on such trees such as some raptors (Chomba and M'Simuko 2013). In the Luangwa Valley of Zambia for instance, high hippopotamus numbers often cause over grazing which negatively affects other grazing species by reducing the amount of food available to them (Chomba, 2012; Chansa et al. 2011).
- 8) Death is part of the animal kingdom. Animals die whether they are hunted or not.

- 9) Money collected from hunting supports community livelihoods and conservation of wildlife.
- 10) Hunters take only a very small percentage of the old male segment of the population and by definition the take is small and select.
- 11) Non consumptive/photographic tourism can harm wildlife as masses of tourists swarm around fewer and fewer animals causing stress and sometimes disrupting their mating patterns.
- 12) In photographic tourism, off road driving, and vehicles congregating on key attractions such as lion prides causes damage/soil erosion to the range and sometimes changes behavior of the animals being viewed.
- 13) Excessive graffiti, noise and disposal of litter away from designated places destroys the aesthetic beauty of the natural environment and negatively affects the very principle of maintaining a pristine environment.
- 14) Over speeding 4x 4s across the African savannahs in pursuit of lion pride or rhino causes damage to the roads, raises dust and often create a net work of loop roads often appearing like a spider web on the natural landscape.
- 15) The presence of hunters in many remote parts of Game Management Areas deter poaching incursions. This is supported by the experience of the 2001 and 2002 when hunting was suspended and most GMAs experienced high levels of poaching and human encroachment and some of them were later downgraded to secondary or under stocked/ depleted category in 2003.

Based on the above, supporters of consumptive tourism argue that no matter how desirable from the conservation stand point, preserving ecosystems in their pristine state to save endangered species would appear from the face value of it, it is impracticable in view of high levels of poverty as communities will use these resources out of necessity to survive. The emphasis should be sustainable use.

Trophy hunting in Zambia therefore, can continue but there has to be significant review regarding:

- 1) *Resident hunting*: A comprehensive monitoring programme should be put in place, or consider a non time bound moratorium to have the sector totally reorganized.
- 2) *Special Licence*: It would be advisable to eliminate the component of traditional ceremonies and restrict this provision to scientific studies, museum specimens, special state donations and breeding /restocking programmes;
- 3) *Problem Animal Control*: It should be done based on a comprehensive Problem Animal Control Protocol.

The other important matter arising from this study is the status of GMAs. Based on the 2003 HCA classification, there are a total of 43 HCAs, from which only 13 are prime. It is therefore doubtful that hunting would continue over a much longer period of time unless practical interventions are undertaken to restore the ecological integrity of GMAs.

5.2 Recommendations

5.2.1 Quota Allocation and Harvesting Levels

Current quota allocation to resident hunting is high 44%, when it only accounts for up to 6% revenue. The rising demand for resident hunters to hunt key trophy animal species is likely to stifle the safari hunting industry which is the main source of income and may ultimately destroy the principle of quality off take. It is here recommended that ZAWA should develop a comprehensive monitoring programme for resident hunting. This should include; reducing the size of the resident quotas, removing key/ premium species or consider a non time bound moratorium for resident hunting.

5.2.2 Hunting Packages

Zambia currently operates a Hunting Outfitters' preferential choice when it comes to selling animals on quota. Subsequently operators have free will to purchase animal species based on preferences of the market in line with the economic principle of supply and demand, which only works in favour of the Safari Hunting Outfitters. This approach though good from a purely economic stand point, creates an ecological imbalance in terms of biodiversity conservation. Exerting undue pressure on the most sought after and high premium species in large numbers may affect inter and intra species interactions with net consequences on species population viability. It is here recommend that ZAWA should package its animal quotas in hunting bags. ZAWA would package lowly utilized species such as baboon and others into bags together with the most sought after and high premium species to improve the quota utilization levels and earn more income.

5.2.3 Animal Pricing

Pricing of wildlife products in Zambia is fixed and based on a Statutory Instrument (SI) for Licences and Fees. Inherently, this mechanism is not flexible to market forces. Subsequently ZAWA can only earn income from the most sought after species by maintaining hunting quotas for such species at a certain minimum threshold especially for classical and mini/midi safaris. This practice is in most cases tied to the HCA and gives little or no room for ZAWA to adjust hunting quotas when additional biological information is made available. This inevitably places immense hunting pressure on selected species and may reduce the population's viability in the long-term. It is here recommended that the pricing system should also be made flexible to give ZAWA the leverage to earn more income from a limited quota of the high premium species.

5.2.4 Hunting Concession Areas and Agreements

After animal fees, concession fees are the second most important source of income from hunting. It is therefore critical to address the HCA and introduce new clauses that would provide additional income to ZAWA without necessarily creating financial deficits to the Safari Hunting Outfitter, but aim to achieve a win-win situation.

5.2.5 Staggering Hunting Concession Agreements

To stagger the allocation of hunting concession areas would ensure that they do not expire at the same time, thus allowing an almost constant inflow of income to ZAWA and Local Communities. In instances where Government

decides to suspend the allocation of HCA as was the case in 2012, only a small proportion of hunting areas would be affected, while hunting continues in other areas.

5.2.6 Separating Hunting Areas for Residents and Non Residents

It may be advisable to consider as an option allocating highly prized hunting concession areas as exclusive hunting blocks for non resident hunting only. The concession fees for such hunting areas would be increased as they would offer exclusive hunting opportunities to Safari Clients without disturbance by resident hunters. Resident hunter would be allocated one or two exclusive secondary hunting blocks.

5.2.7 Concession Fees

Revise and where possible standardize concession fees and do away with classical, mini and midi which currently determine how much a Safari Hunting Outfitter will pay as Concession fees. Additionally, introduce bags instead of selling classical, mini and midi. Conditions for bag system would include; i) trophies legally obtained under citizen hunting should not be exported, ii) trophies legally obtained under international hunts can be exported, iii) No resale/transfer of the bag by any individual who had won at the auction should be permitted and many others.

5.2.7 Alternative Methods of Allocating Hunting Concession Areas

Consider offering some hunting concession areas on auction to the highest bidder, rather than through tender. Alternatively, also consider the allocation of concession through a combination of approaches; by draw system, tender system, and auctioning. In doing so, ensure that no single Safari Hunting Outfitter holds more than one prime or secondary hunting area.

5.2.8 Participation of Civil Servants and other Zambians

Encourage civil servants and public service workers and other citizens to participate through a draw system which works on similar lines as the lottery system. This should be a strictly restricted tender system where only citizens qualify to participate. This will eliminate the current discriminatory practice which only favours Zambians of Indian or European origin.

Acknowledgements

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