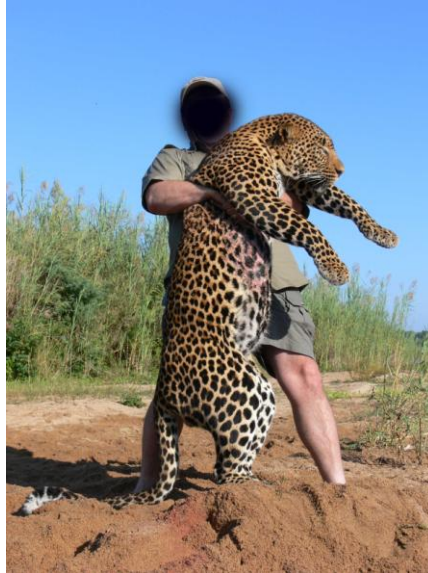


PRELIMINARY NON-DETRIMENT FINDING ASSESSMENT

PRELIMINARY REPORT FOR LEOPARDS IN ZIMBABWE
December 2012



Workshop funded by
PANTHERA



Workshop facilitated by: David J. Newton – TRAFFIC East/Southern Africa
Workshop Report compiled by: P.A. Lindsey and R. Chikerema-Mandisodza

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CITES non-detriment finding Process

The non-detriment finding (NDF) assessment process is typically used to determine whether CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) quotas of species affected by trade are justified. The system is most often used to determine whether a CITES II listing is justified, or whether a species should have a CITES I listing. In the case of Leopards, which are listed on CITES Appendix I and have a CITES quota allocation, the NDF exercise is conducted to assess the suitability of the trophy export quota allocated to Zimbabwe. The NDF assessment process involves scoring of issues relating to the harvest of a species, the impacts of the harvest and the management, regulation and monitoring of the harvest.

Preliminary non-detriment finding assessment

A workshop was held in Harare on December 4th and 5th 2012, attended by Zimbabwe Parks and Wildlife Management Authority (ZPWMA) officials, researchers, representatives from NGOs, the Zimbabwe Professional Hunters and Guides Association and the Safaris Operators Association of Zimbabwe (Appendix 1). Prior to presenting the results of this assessment, key background information is presented.

Background information

Legislation pertaining to leopards in Zimbabwe

There are three pieces of legislation pertaining to leopards in Zimbabwe: The Parks and Wildlife Act (Chapter 20:14 Revised Edition (1996)), the Forest Act (6/2005) and the Environmental Management Act (6/2005).

Conservation status

The leopard is considered to be 'Near Threatened' having been recently elevated from their previous status of 'Least Concern' (Henschel et al., 2008).

National distribution and population trends

During the 1970s research was conducted on leopards in the Matopos area, which provided insights into the density and abundance of the species in that area (Grobler and Wilson, 1972). In the 1980s Martin & Muelenaer (1988) estimated that Zimbabwe hosted 16,064 Leopards, using population models and regressions to predict Leopard densities based on rainfall. However, that estimate is considered to exaggerate numbers significantly (Balme *et al.* 2009a) due to flawed assumptions (Norton, 1990; Marker and Dickman, 2005). In 2012, landowners in Zimbabwe estimated that 13,521 leopards occur on their land (R. Mandisodza [ZPWMA], unpublished data) (Table 1). However such a figure would mean that leopards on private lands occur at 8.2 times the density of the species in the fully protected Kruger NP in South Africa (where 700 individuals are estimated to occur in prime leopard habitat, Mills and Funston, 2003), which is highly unlikely.

Table 1. Landowners' estimates of the numbers of leopards on private land in Zimbabwe

	Hunting area (km ²)	Landowners' estimates of the number of leopards
Matabeleland South	19,497	6,840
Matabeleland North	5,880	2,077
Masvingo	18,773	3,093
Midlands	1,655	534
Mashonaland West	1,529	876
Mashonaland East	69	34
Manicaland	66	67
	47,469	13,521

Several recent studies have shed light on the distribution and status of leopards in various parts of the country. A national leopard survey has been just completed by the WildCru (University of Oxford) research team in conjunction with ZPWMA and the Zambezi Society. The national survey involved camera trapping and spoor surveys along 14,400 km of transects, at 28 sites comprising 48,123 km² or 12% of the country (Figure 1). The result of that survey suggested that key factors influencing the density of leopards include the level of human disturbance, the region, the density of spotted hyaenas *Crocuta crocuta* and the density of lions *Panthera leo* (A. Loveridge, unpublished data). The survey results suggested that population densities in Zimbabwean protected areas were similar to those reported in protected areas elsewhere in comparable habitat (Bailey 2005, Balme et al. 2010), but the species occurs at lower than expected densities in areas that have been impacted by human disturbance (Loveridge et al. in prep) (Figure 1).

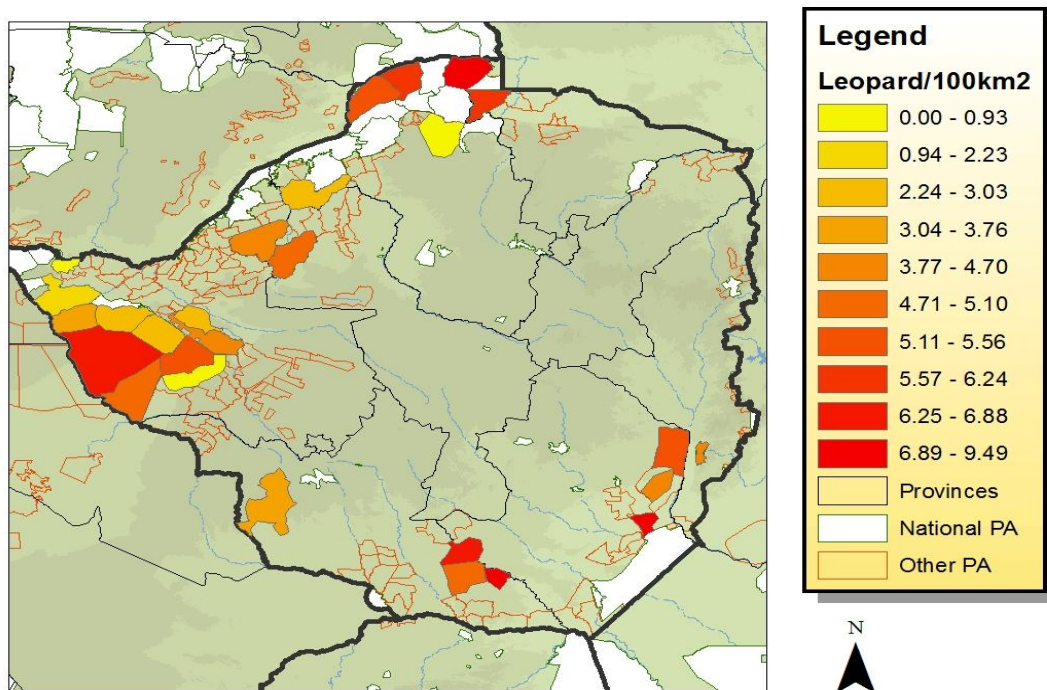


Figure 1. Results of the national leopard survey (A. Loveridge unpublished data) (NB surveys were restricted to the areas shaded in yellow, orange and red)

Spoor count surveys and camera trapping surveys have been conducted in Bubby Valley (by Byron du Preez) and Savé Valley Conservancy (by Dusty Joubert and Rosemary Groom) and spoor counts have been conducted in Gonarezhou National Park (by Rosemary Groom).

Despite these studies, the national population size, population trends or the species distribution in Zimbabwe are not known. There remain large areas of Zimbabwe where the conservation status of leopards is poorly understood, particularly on former commercial farmlands and private wildlife ranches which have been subject to significant land use changes since 2000.

Threats facing leopards in Zimbabwe

The relative severity of various threats facing leopards in Zimbabwe is poorly understood. Potential threats include the following:

Habitat loss

Habitat loss is likely to have had a significant adverse impact on leopard populations in Zimbabwe in recent years. Prior to 2000, Zimbabwe had 2.7 million hectares of game ranches (Bond et al., 2004) and large areas of ranch lands that were used for extensive cattle production (where natural vegetation was largely intact and where prey was often abundant). However, during the land reform programme, a significant proportion of such lands were settled by subsistence farmers, resulting in widespread deforestation and the conversion of woodlands to agricultural lands (Lindsey et al., 2011a).

Snaring and prey loss

Illegal bushmeat hunting has surged in Zimbabwe during recent years, due to combination of severe economic conditions, food shortages, the settlement of ranches during land reform (and consequent cessation of anti-poaching security), and weak penalties for poaching (Gandiwa, 2011; Lindsey et al., 2011b). Bushmeat poaching has resulted in the virtually complete loss of wildlife resources on many former wildlife and cattle ranches, which is likely to have worsened the prospects for successful leopard conservation (Lindsey et al., 2011a). Snaring also has direct impacts on leopards as they are sometimes caught in snares (which are normally set to catch ungulates). In Savé Valley Conservancy, for example five leopards were recorded killed in snares during 2001-2009. Research on the impacts of snaring and illegal bushmeat hunting in Zimbabwe is limited to a few case studies, primarily from the South East Lowveld (Gandiwa, 2011; Lindsey et al., 2011a; Lindsey et al., 2011b). In addition, data have been collated on snaring from Hwange (Loveridge unpublished data) and raw data on the prevalence of snaring exist at several ZPWMA field stations and Rural District Councils through CAMPFIRE Offices.

Trophy hunting of leopards

The Zimbabwean CITES quota for leopard trophies is 500 per annum. The number of hunting permits issued on private land has ranged from 312 to 578 during 2000-2012 (Table 2), and between 186-304 on state land and in CAMPFIRE areas (Table 3).

Table 2. The number of leopard hunting permits issued on private (alienated) land

	Matabeleland	Matabeleland	Mashonaland		Mashonaland	Manicaland	Total	
	South	North	Masvingo	Midlands	West			East
2004	166	62	125	8	32	0	3	396
2005	158	78	130	10	40	1	3	420
2006	224	108	172	17	51	3	3	578
2007	195	84	149	24	31	2	4	489
2008	104	79	137	24	17	2	0	363
2009	94	67	125	24	17	2	0	329
2010	96	69	103	25	18	1	0	312
2011	108	69	103	23	17	0	0	320
2012	132	71	84	16	21	0	0	324

Table 3. Leopard quotas on state land and in CAMPFIRE areas, by region

Year	Northern	Southern	Western	Total
2000	124	11	56	191
2001	128	35	115	278
2002	118	39	126	283
2003	124	38	130	292
2004	125	41	128	294
2005	124	39	130	293
2006	126	46	132	304
2007	125	40	127	292
2008	125	36	127	288
2009	110	28	115	253
2010	116	28	122	266
2011	116	28	122	266
2012	92	26	68	186

The number of leopard hunting permits issued is invariably greater (578-882) than the national quota (500), although the number of leopards actually hunted (160-302) is lower (Figure 2).

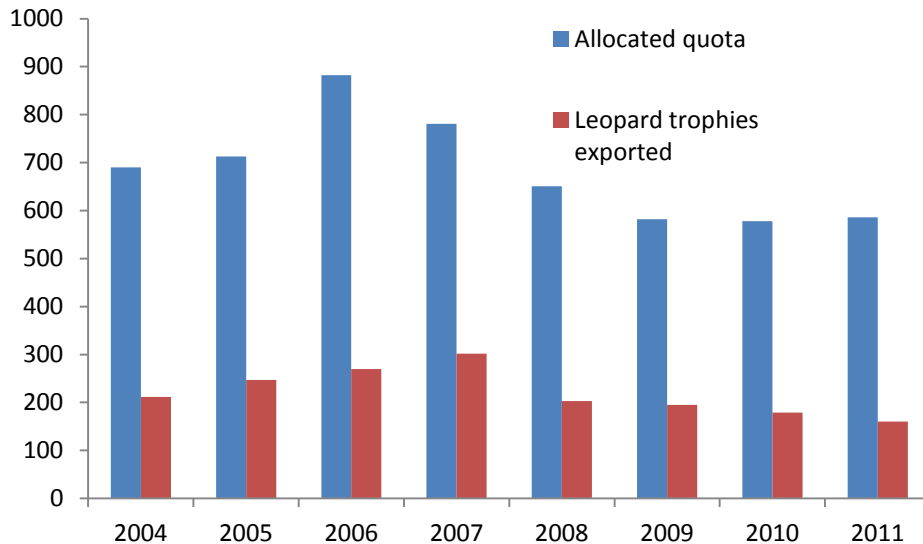


Figure 2. Allocated leopard quotas and annual exports of leopard trophies

According to the CITES trade database, 189 ± 22 (mean \pm S.E.) leopard trophies were exported per annum from Zimbabwe during 2002-2010, and 271 ± 12 were recorded as being imported from Zimbabwe by other countries during the same period (Figure 2). Both exports and imports of leopards from Zimbabwe appear to have declined in recent years (Figure 3).

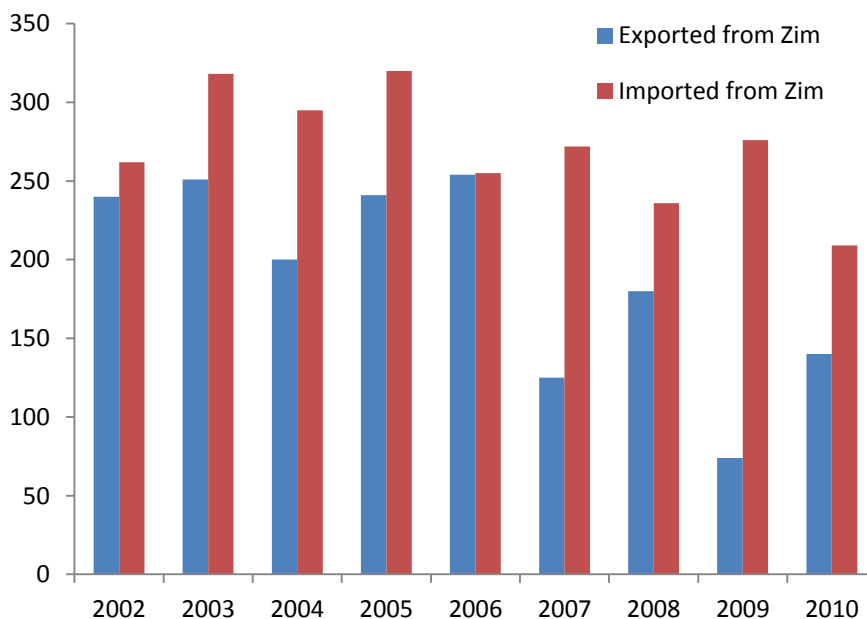


Figure 3. Numbers of leopard trophies recorded as being exported from Zimbabwe, and imported from Zimbabwe during 2002-2010 (<http://www.unep-wcmc-apps.org/citestrade/>, accessed December 2012)

More leopards are hunted as trophies in Zimbabwe than any other country, other than Tanzania (Figure 4).

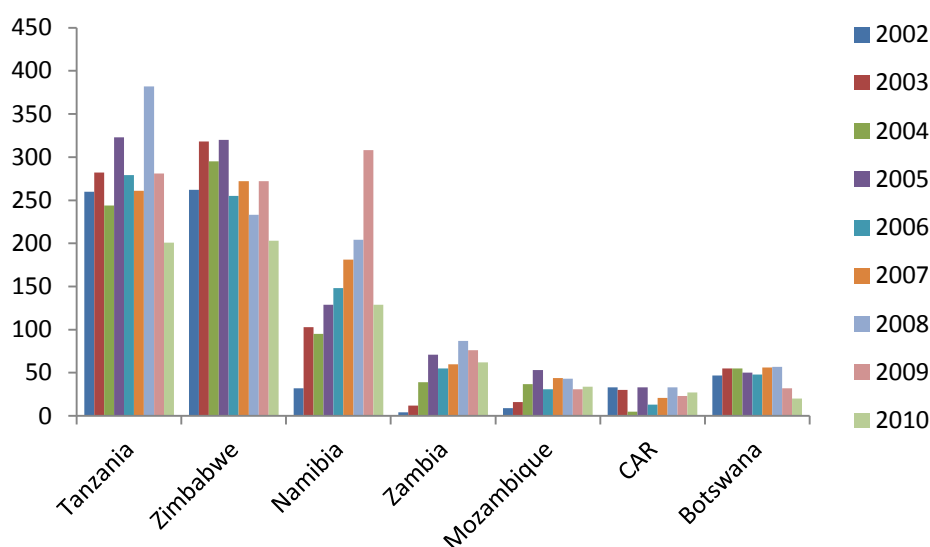


Figure 4. Numbers of leopards recorded as being imported from various African countries during 2002-2010 (<http://www.unep-wcmc-apps.org/citestrade/>, accessed December 2012)

The recent national leopard survey indicated that relative to other explanatory factors, the size of leopard trophy hunting quotas was a poor indicator of leopard population density in Zimbabwe, potentially implying that the impacts of hunting may not be significant (A. Loveridge, unpublished data). However, this affect was compared against other significant factors such as human population density and disturbance, which are likely to have a much larger impact on the distribution and numbers of a large carnivore, and may possibly mask a more subtle impact by hunting. Similarly, trophy quotas often have little bearing on the actual numbers of leopards harvested in a particular area, and therefore do not accurately reflect the pressures placed on leopard populations by hunting. Consequently, it is impossible to say without further analyses and more fine-scale harvest data as to whether trophy hunting has an impact on leopard densities. The authors of the study are currently collecting the necessary data for that analysis.

Problem animal control

Another potential threat to leopards in Zimbabwe comes from the legal lethal problem animal control (PAC) of leopards in response to perceived or actual livestock losses. Data on PAC of leopards are held by various ZPWMA stations and Rural District Council Offices, though this information as yet has not been compiled or written up. In addition, there are some data available on the PAC control of leopards in communal lands. For example, during the period 2002-2006, 31 problem animal reports were received from CAMPFIRE areas, four reports were attended and eight leopards were killed as problem animals (CAMPFIRE Association, unpublished data). In addition, it is almost certainly the case that some leopards are killed illegally in PAC incidents, though the extent of such mortality is not known.

Killing of leopards for the skin trade

In South Africa, there is a significant demand for leopard skins for traditional and religious purposes among some cultural groups. Such demand drives significant levels of illegal killing of leopards for skins in that country and potentially in neighbouring countries (Lindsey, 2011). However, in Zimbabwe, such killing appears to be relatively rare and there are few records of seizures of skins by ZPWMA (ZPWMA unpublished data). Three such incidents have been recorded since the formation of the authority – and in each occasion, the person caught selling leopard skins were trying to

dispose of the pelt of an animal killed in PAC (ZPWMA unpublished data). Very occasionally, traditional healers request skins from ZPWMA. Participants at this meeting felt that gathering data on the extent of the use of leopard (or other wildlife) body parts for traditional medicine or ceremonial purposes is likely to be challenging as the people involved are loathe to divulge secrets regarding their practices.

Capture for trade in live animals

The capture of wild animals to supply the trade in captive animals is a problem for some predators, and notably Cheetahs in South Africa (Marnewick *et al.* 2007). However, participants at the NDF meeting felt that removal of Leopards to supply the live trade was not a significant problem in Zimbabwe. There is currently a moratorium on the export of any live wild animals from Zimbabwe except elephants *Loxodonta africana*.

Excessive elephant densities

Elephant densities in several Zimbabwean protected areas are high, and this was postulated by some meeting attendees as having the potential to impact on leopards by impacting their prey species.

Current management structures

Trophy hunting

Leopard quotas are allocated to state and private land owners through a quota allocation process which is conducted once a year. A participatory method is used where all stakeholders gather and deliberate on what the quotas should be. This process involves consideration of available population data, trophy quality data, stakeholder information and ground count information, where available (Figure 5). However, leopard population data are unavailable in most places where they are hunted and effective trophy monitoring is not yet established. Consequently, in practice quota setting relies primarily on the opinions of stakeholders (including hunting operators). Final quotas are then approved by ZPWMA and the Minister of Environment and Natural Resources.

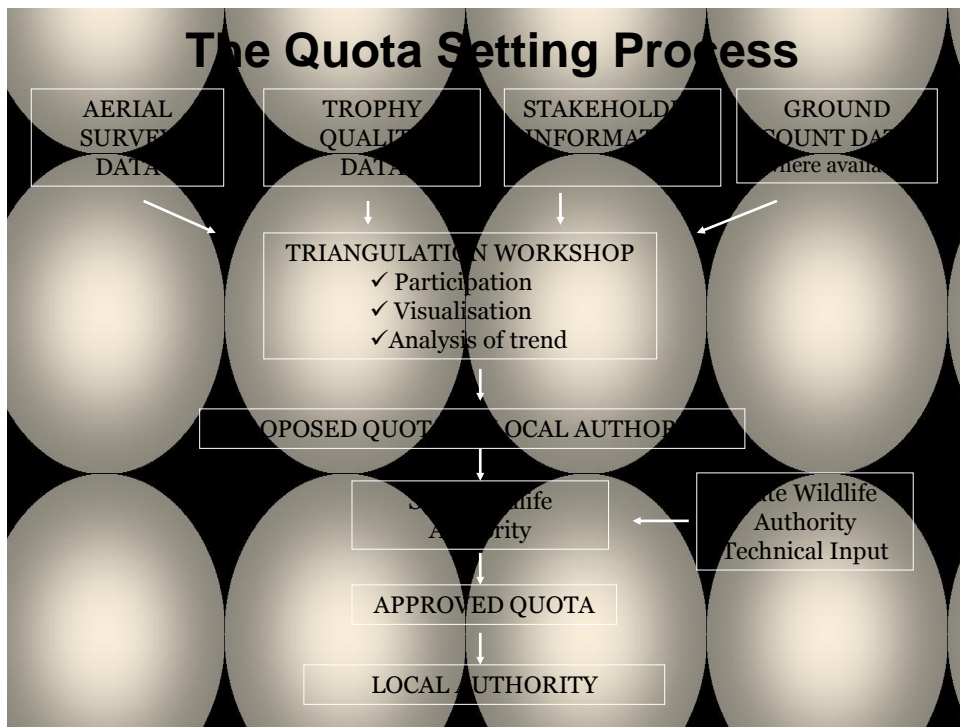


Figure 5. The process for establishing hunting quotas in Zimbabwe

The hunting of female leopards is prohibited in Zimbabwe, following an agreement between the Safari Operators Association of Zimbabwe and ZPWMA. In addition, there is also an agreement in place that leopard trophies where the skull size is smaller than 13 and $\frac{3}{4}$ inches (width plus length) are not allowed to be exported.

Problem animal control

The procedure for reporting a problem leopard depends on the land tenure and on the proximity of the area to a national park. On communal land, a report is issued to the nearest Rural District Council office and in instances where the problem animal occurs near to the parks estate, to ZPWMA. On private land, a report is issued to ZPWMA. The report is then ostensibly verified by the agency that receives it to ensure that a leopard has been correctly identified as being responsible. According to the Parks and Wildlife Act (123/1991) destruction of a leopard as a PAC animal is only permissible in the event of a threat to human life. ZPWMA consider there to be three options available for dealing with problem leopard incidents: a) to improve livestock husbandry to reduce losses; b) to capture and translocate the leopard; c) to hunt the problem leopard as a trophy with a paying client. In most cases, ZPWMA attempt to relocate the problem leopard. Data are not available on whether this method has been successful in Zimbabwe in reducing livestock losses, or on the survival of leopards post-translocation. However, elsewhere in leopard range translocation has been shown to ineffective for alleviating human-leopard conflict (Athreya et al., 2011) (Weilenmann et al., 2011). In addition, hunting problem animals with clients poses a risk that of false reporting of problem animals in order to obtain additional hunting permits.

The non-detriment finding assessment

Participants were broken up into two groups, each of which conducted a preliminary NDF assessment. During the NDF-assessment, participants were requested to allocate scores to a series of questions relating to the biology of the species, harvest of the species and management of the harvest. Low scores were indicative of resilience of the species, effective management or low impact of harvest, whereas high scores denoted the opposite (or lack of data and uncertainty). These issues and the scores granted by participants at the meeting are summarized in Table 4 and are discussed below. In cases where the two groups gave different scores, the middle value was used (if the scores were >1 score apart) or the more conservative score was applied (where the scores were 1 point apart).

1. Biological characteristics

1.1. *Life history*

NDF assessment scoring: 3 - Low reproductive rate, long lived

Background information -

Leopards become sexually mature at 3-4 years of age (Balme et al. 2009, Balme et al., 2012). Cubs are weaned at four months and start making their own kills from eight months (Roux and Skinner, 1989). The interbirth interval depends on whether the litter was successfully raised to independence (successful litters – 25 months, unsuccessful litters – 10 months; Balme et al. 2012). The average mortality of cubs prior to independence is estimated at 63% (Balme et al. 2012). Annual mortality among sub adults (1.5-3.5 years old) in the Kruger National Park is estimated to be 32%, compared to 19% for adults (Bailey 2005). The mean lifetime reproductive success of female leopards in the Kruger is 4.1 cubs and is dependent mainly on cub survival (Balme et al. 2012). Female leopards in the wild can survive to 19 years and males to 14 years (Balme et al. 2012).

At a population and habitat viability analysis assessment for leopards in South Africa, the annual deterministic growth rate was estimated for Leopards to be 10% based on available published information and expert opinion (Friedmann & Traylor-Holzer 2008). The deterministic growth rate was assumed to be the potential growth in the absence of demographic and environmental variation, inbreeding depression, migration, and harvest (both legal and illegal), a generation time of about 7 years (7.2 for males, 6.7 for females), and an adult sex ratio of 1.6 females per adult male (Friedmann & Traylor-Holzer 2008).

Table 4. Summary of the scores granted to various categories during the preliminary NDF assessment for Leopards in Zimbabwe (where more than one score was given, this denotes disagreement between the two groups of Leopard experts)

Category	Characteristic of species	Group 1	Group 2	Conservative estimate
<u>Biological characteristics</u>				
Life history	Low reproductive rate, long lived	3	3	3
Ecological adaptability	Generalist	2	2	2
Dispersal efficiency	Good	3	1	2
Interaction with humans	Sensitive	4	4	4
<u>National status</u>				
National distribution	Widespread, fragmented	2	2	2
National abundance	Uncommon	3	2	3
National population trend	Uncertain	5	5	5

Quality of information	Anecdotal	4	2	4
Major threats	Substantial	3	3	3
<u>Harvest management</u>				
Illegal harvest or trade	Small	2	2	2
Management history	Managed harvest: ongoing with adaptive framework	1	1	1
Management plan or equivalent	No approved plan, informal unplanned management	4	4	4
Aim of harvest regime in management planning	Maximize economic yield	3	1	3
Quotas	Ongoing national quota: based on biologically derived local quotas	2	2	2
<u>Control of harvest</u>				
Harvesting in protected areas	Medium	2	2	2
Harvesting in areas with strong resource tenure or ownership	High	2	2	2
Harvesting in areas with open access	None or low	1	1	1
Confidence in harvest management	Low or no confidence	3	3	3
<u>Monitoring of harvest</u>				
Methods used to monitor the harvest	National monitoring of harvests	4	3	4
Confidence in harvest monitoring	No confidence	4	3	4
<u>Incentives and benefits from harvesting</u>				
Utilization compared to other threats	Harmful	3	2	3
Incentives for species conservation	Medium	2	2	2
Incentives for habitat conservation	Medium	2	2	2
<u>Protection from harvest</u>				
Proportion strictly protected	5-15%	2	2	2
Effectiveness of strict protection measures	Low confidence	3	2	3
Regulation of harvest effort	Uncertain	2	5	5

1.2. *Ecological adaptability*

(To what extent is the species adaptable [e.g. in its habitat, diet, environmental tolerance, etc])

NDF assessment scoring: 2 - Generalist

Background information -

Leopards have the widest distribution of any felid (Sunquist & Sunquist 2002). Unsurprisingly, therefore, the species has a wide habitat tolerance, partly due to the breadth of their diet, which also explains their ability to persist close to urban areas (Hayward *et al.* 2006b). Prey items range from beetles to ungulates the size of eland. Habitat can vary from a few scattered shrubs and trees to dense tropical evergreen forests.

1.3. *Dispersal efficiency*

(How efficient is the species' dispersal mechanism at key life stages?)

NDF assessment scoring: 2 - Good

Background information -

One of the groups considered leopards to be of 'medium' proficiency at dispersing, and the other group considered the species to be 'very good'. Consequently, the intermediate value 'good' was chosen. While leopards are relatively good at dispersing, it was felt that some forms of human habitat modification would act as a barrier to their dispersal. This suggestion is backed up by observations of leopards at Phinda Private Game Reserve in South Africa where only two of 71 radio-collared individuals were observed to move between two protected areas 25 km apart (J. Fattebert in prep.). There are no published scientific data supporting the assertion that leopards are very effective dispersers across human-impacted landscapes and a score of 2 may be optimistic.

1.4. *Interaction with humans*

(Is the species tolerant of human activity other than harvest?)

NDF assessment scoring: 4. Sensitive

Background information -

Leopards are very successful at adapting to altered natural habitat and settled environments (Nowell and Jackson 1996). However, habitat conversion is a primary threat to leopards and indications are they do disappear when disturbance exceeds certain thresholds (Henschel et al. 2008).

2. **National status**

2.1. *National distribution*

(How is the species distributed nationally?)

NDF assessment scoring: 2 – Widespread, fragmented

Background information -

Leopards are believed to have a wide occurrence in Zimbabwe, although participants felt that their range is fragmented and that there are areas within the boundaries of their range where they have disappeared.

2.2. *National abundance*

(What is the species' abundance nationally?)

NDF assessment scoring: 3 - Uncommon

Points of contention –

One group felt that Leopards were 'uncommon' whereas the other felt that they are 'common'. On balance, 'uncommon' is probably a safer assessment because although their abundance in Zimbabwe is poorly understood, as a large predator, leopards are nowhere common, relative to species lower in the food chain.

2.3. *National population trend*

(What is the recent population trend?)

NDF assessment scoring: 5 - Uncertain

Background information -

Land use changes since 2000 are likely to have had negative impacts on leopards as large areas of game ranch land have been converted into subsistence farms (Lindsey et al. 2011). However, no data are available to say with any certainty what the current trend in leopard numbers in Zimbabwe is.

2.4. *Quality of information*

(What type of information is available to describe the abundance and trend in the national population?)

NDF assessment scoring: 4 - Anecdotal

Background information -

While some information is available on the status of leopards due to the national leopard survey and from research projects in the South East Lowveld, no information is available from the majority of the species range. Additionally, no information whatsoever is available on trends in leopard numbers.

2.5. *What are the major threats affecting the species?*

(What major threat is the species facing and how severe is it? – overuse / habitat loss / invasive species / other)

NDF assessment scoring: 3 - Substantial

Background information -

Key threats to Leopard populations in Zimbabwe include: habitat loss; and loss of prey due to the bushmeat trade. Little is known about other threats – though it is possible that illegal PAC of leopards is an issue in some areas, and that excessive trophy off-takes may impact the species in certain parts of the country.

3. Harvest management

3.1. *Illegal harvest or trade*

(How significant is the national problem of illegal or unmanaged harvest or trade?)

NDF assessment scoring: 2 - Small

Background information –

Little is known about the extent of illegal harvest and trade in Zimbabwe. There was some debate within the groups about whether this score should have been ‘small’ or ‘uncertain’ as little data are available on the scale and impact of illegal harvest of leopards. ZPWMA have not recorded any incidences of illegal killing of leopards specifically for their skins. However, no data are available on the extent of illegal conflict-related killings. In the end, both groups agreed on the threat being ‘small’, though with the lack of data there is a strong case for an ‘uncertain’ score in this category.

3.2. *Management history*

(What is the history of harvest?)

NDF assessment scoring: 1 – Managed harvest: ongoing with adaptive framework

Background information –

There was agreement that trophy harvest was within a managed framework, though there was some debate within the groups as to how adaptive it is – due to the lack of a formal, specified adaptive framework. However, several examples were given of adaptation of the quota to local circumstances, hence the decision.

3.3. Management plan or equivalent

(Is there a management plan related to the harvest of the species?)

NDF assessment scoring: 4 – No approved plan, informal unplanned management

Point of contention -

A leopard management plan has not yet been developed for Zimbabwe and so some meeting attendees felt that the correct answer was ‘No approved plan: informal unplanned management.’

3.4. Aim of harvest regime in management planning

(What is harvest aiming to achieve?)

NDF assessment scoring: 3 – Maximize economic yield

Point of contention -

One group felt that the aim of harvest was ‘Generate conservation benefit’ whereas the other felt that the primary aim was ‘maximizing economic yield’. This debate ensued because while the trophy harvest is conducted to generate financial returns, it also yields conservation benefits.

3.5. Quotas

(Is the harvest based on a system of quotas?)

NDF assessment scoring: 2 – Ongoing national quota: based on biologically derived local quotas

Point of contention -

Though both groups ultimately chose the above score, there was much debate within groups. Specifically, NGO representatives felt that quotas could not be considered cautious if the number of permits issued is greater than the CITES quota and that the quotas are to some extent market driven as the quota setting process relies partly on population estimates of people benefitting from the hunting. Similarly, a cautious quota would suggest that it is set well below that which may have a detrimental impact on populations, but the effect of trophy hunting on leopards in Zimbabwe is uncertain (2.3, 4.4, 5.2, 6.1).

4. Control of harvest

4.1. Harvesting in protected areas

(What percentage of legal national harvest occurs in state-protected areas?)

NDF assessment scoring: 2 - Medium

Background information -

A significant proportion of leopard harvest occurs in Safari Areas, which are a category of government protected area.

4.2. *Harvesting in areas with strong resource tenure or ownership*

(What percentage of the legal national harvest occurs outside protected areas in areas with strong local control over resource use?)

NDF assessment scoring: 1 - High

Background information -

Leopard harvest either occurs in state safari areas, private land, or on communal lands, and in all cases there is strong tenure over wildlife resources.

4.3. *Harvesting in areas with open access*

(What percentage of the legal national harvest occurs in areas where there is no strong local control giving de facto or actual open-access?)

NDF assessment scoring: 1 - None

4.4. *Confidence in harvest management*

(Do budgetary and other factors allow effective implementation of management plan(s) and harvest controls?)

NDF assessment scoring: 3 – Low confidence

There is currently no leopard management plan, and ZPWMA is severely underfunded which undermines the effectiveness of the management of harvests.

5. Monitoring of harvest

5.1. *Methods used to monitor the harvest*

(What is the principal method used to monitor the effects of the harvest?)

NDF assessment scoring: 4 – National monitoring of harvests

Background information -

The harvest of trophy leopards is monitored nationally and records kept of exports and imports.

Point of contention:

One group considered there to be 'qualitative indices' of the harvest. As for the other categories where there was disagreement, the more conservative score was issued.

5.2. *Confidence in the harvest monitoring*

(Do budgetary and other factors allow effective harvest monitoring?)

NDF assessment scoring: 4 – No confidence

Budgetary constraints have constrained the effectiveness of harvest monitoring.

Point of contention:

One group considered there to be 'Low confidence' of harvest monitoring. As for the other categories where there was disagreement, the more conservative score was issued.

6. Incentives and benefits from harvesting

6.1. Utilization compared to other threats

(What is the effect of the harvest when taken together with the major threat that has been identified for this species?)

NDF assessment scoring: 3 – Harmful

Point of contention:

One group considered the impact of harvest when take with other threats to be 'Neutral'. As for the other categories where there was disagreement, the more conservative score was issued.

Background information -

The relationship between harvesting and other threats (such as habitat destruction) is not clear. On the one hand, the potential for generating financial incentives from trophy hunting means that attitudes of landowners towards Leopards are better than for other predator species where such potential does not exist (Lindsey *et al.* 2005). Consequently, persecution of Leopards may be less than would be the case if trophy hunting were not permitted. Conversely, spatial clumping of trophy hunting harvest, excessive trophy harvests, shooting of breeding females, or excessive problem animal control would undoubtedly compound the impacts of other threats such as habitat destruction.

6.2. Incentives for species conservation

(At the national level, how much conservation benefit is derived from harvesting?)

NDF assessment scoring: 2 – Medium

Background information -

The attitudes of ranchers towards Leopards are more positive than towards other large predator species, due in part to the fact that they are perceived to have value through trophy hunting (Lindsey *et al.* 2005). Consequently, harvest through trophy hunting does create incentives for their conservation. The same cannot be said, however, for other forms of harvest, such as problem animal control or illegal hunting.

6.3. Incentives for habitat conservation

(At the national level, how much habitat conservation benefit is derived from harvesting?)

NDF assessment scoring: 2 - Medium

Background information -

Trophy hunting of Leopards (and other species) does create incentives for the conservation of habitat. Trophy hunting was the primary stimulus for the development of the game ranching industry in Zimbabwe, which prior to 2000, comprised 27,000 km² of natural habitat (Bond *et al.* 2004) (though the size of that area is likely to have been reduced considerably since then due to the settlement of game ranches from 2000 onwards).

7. Protection from harvest

7.1. *Proportion strictly protected*

(What percentage of the species' natural range or population is legally excluded from harvest?)

NDF assessment scoring: 2 – 5-15%

Background information -

The Zimbabwe parks network comprises 67,674 km² of which 15,912 km² (23.5%) is comprised of safari areas where leopards are hunted (www.protectedplanet.net, accessed January 2013). Populations occurring in protected areas incur significant edge-effects due to mortality of animals moving into adjacent unprotected areas, and a small proportion of the species range is likely to be excluded from harvesting. For example, in Phinda Private Game Reserve in KZN, the density of Leopards declined from 11.1/100 km² in the centre of the protected area, to 7.2/100 km² at the periphery due to harvesting of Leopards in the areas adjacent to the reserve (Balme *et al.* 2010). Consequently, it is likely that the proportion of the species' range where leopards are fully protected is likely to be closer to 5% than 15%.

7.2. *Effectiveness of strict protection measures*

(Do budgetary and other factors give confidence in the effectiveness of measures taken to afford strict protection?)

NDF assessment scoring: 3 – Low confidence

Point of contention -

One group felt that there is medium confidence in the effectiveness of strict protection measures because leopards appear to be doing well in the protected area network (as evidenced by the recent national leopard survey), whereas the other felt that confidence was low.

7.3. *Regulation of harvest effort*

(How effective are any restrictions on harvesting [such as age, size, season or equipment] for preventing over-use?)

NDF assessment scoring: 5 - Uncertain

Point of contention –

One group felt that restrictions on harvesting were effective at preventing over-use, using the example of the enforced fines for the shooting of female leopards in Zimbabwe. However, the other group pointed out that there was uncertainty over the sustainability of the leopard quotas allocated to some areas.

Preliminary non-detriment finding assessment radar chart

The scores granted for each question were used to generate a radar plot, which provides the basis for making the NDF assessment (Figure 5). According to the guidelines for assisting parties in making NDF decisions “If the harvest is likely to be non-detrimental, most of the answers will be depicted near the centre of the circle”. “Outlying points may indicate a low confidence in the probability that the harvest is sustainable and should prompt the Scientific Authority to look in more detail at the responses. It may be that further investigation is needed or that insufficient information exists with which to make a non-detriment finding”.

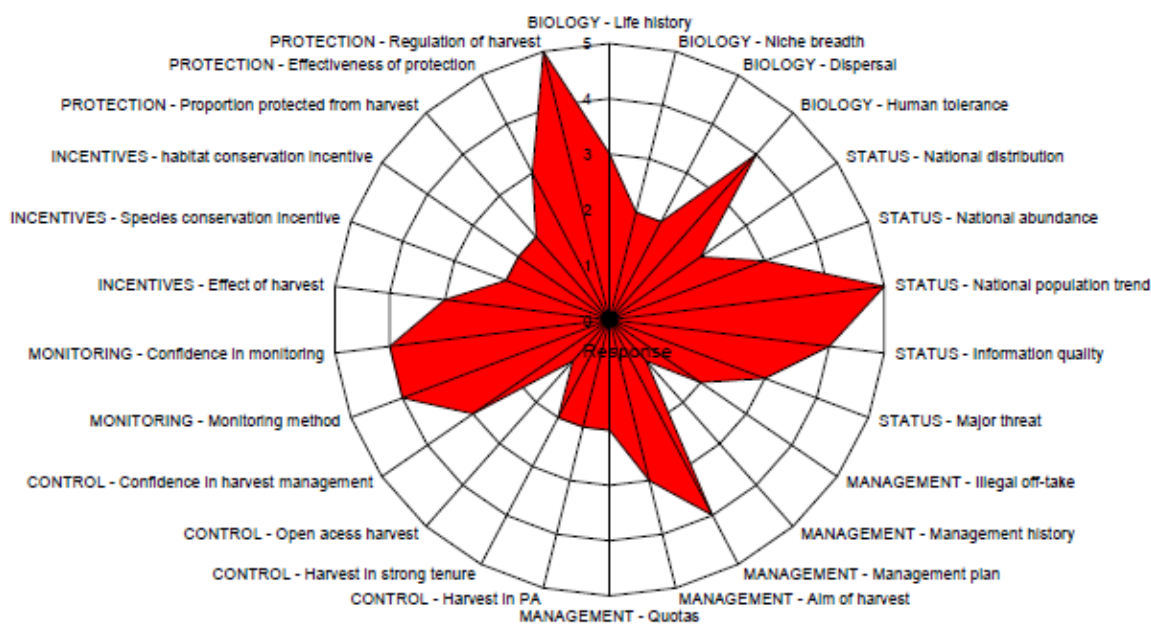


Figure 5. Preliminary radar chart to assist in decision-making with the non-detriment finding for leopards in Zimbabwe (summarising results from Table 4)

NDF assessment finding

There was significant debate among attendees of the meeting regarding the outcome of the non-detriment finding assessment. Some attendees felt that in the absence of sufficient information it is impossible to make a non-detriment finding, whereas others pointed to the findings of the recent leopard survey which suggest that leopard populations in hunting areas appear to be within the range of densities observed in areas of similar habitat elsewhere. Ultimately, the consensus of the group was to issue a qualified or precautionary non-detriment finding assessment, conditional upon fulfilment of a number of management actions and research projects. Further consensus was that the current quota should be retained for the next three years, immediately followed by the holding of a more comprehensive and informed NDF assessment, which would be informed by the research outlined below. It was felt that in three years time Zimbabwe would be much better positioned to assess the validity of the current quota.

Recommended management actions

Management action needed	Activities needed	Responsibilities
Produce a national leopard management plan	Hold a workshop as the basis for the development of a Zimbabwe national leopard management plan in February 2013. Produce the management plan within the first six months of 2013.	1) ZPWMA 2) CAMPFIRE Association 3) WildCru, University of Oxford 4) Zambezi Society 5) Panthera 6) ZPHGA 7) SOAZ
Develop trophy monitoring and	Develop and implement a comprehensive trophy monitoring programme to allow for	1) ZPWMA (Roseline Mandisodza)

adaptive management of quotas	identification of changes in trophy quality, trophy age, hunting success rates and mean catch effort expended to acquire leopard trophies. This information should provide the basis for adaptive management of leopard quotas. This would represent a significant improvement on the current system for establishing quotas and would increase the probability of harvest being sustainable.	2) Panthera 3) CAMPFIRE Association 4) ZPHGA 5) SOAZ
Reduce the number of leopard hunting permits allocated	Reduce the number of leopard hunting permits allocated. The number of hunting permits allocated should be lower than the national CITES quota of 500 and should ideally be closer to the typical number of leopards hunted.	1) ZPWMA 2) CAMPFIRE Association 3) ZPHGA 4) SOAZ
Ensure appropriate spatial spacing of quotas	Following the research outlined in the next section, the distribution of leopard hunting permits should be carefully monitored to prevent clumping of off-takes.	1) ZPWMA 2) CAMPFIRE Association 3) ZPHGA 4) SOAZ
Prohibition of the hunting of females	Continue to prohibit the hunting of females.	1) ZPWMA 2) CAMPFIRE Association 3) ZPHGA 4) SOAZ
Minimize the house of hounds for hunting leopards	Implement measures to minimize the use of packs of hounds for hunting leopards. Due to the high degree of efficiency associated with that hunting method, it poses a significant risk where leopard quotas are established in the absence of population data (as a leopard is likely to be taken on a hunt even if the population is small and unable to sustain harvest).	1) ZPWMA 2) CAMPFIRE Association 3) ZPHGA 4) SOAZ

Information required to conduct a formal non-detriment finding assessment

Study needed	Activities needed	Responsibilities
Expansion of the leopard survey	Population assessments are needed in areas that have not been surveyed, and especially on private lands – given the land tenure and use changes that have occurred there since 2000.	1) Panthera 2) WildCru 3) ZPWMA 4) ZPHGA 5) SOAZ 8) CAMPFIRE Association
Repetition of surveys to detect population trends repetition of the assessment of the	An adequate number of representative sites from various categories of land tenure (and degree of human threat/encroachment) should be selected. At some sites, surveys	1) Panthera 2) WildCru 3) ZPWMA 4) ZPHGA

national conservation status and of population trends	<p>should be conducted annually, whereas at a second set of additional sites, five-yearly surveys can be conducted. The methods used should be kept constant in order to allow for the assessment of population trends.</p> <p>Calibrate spoor densities with actual leopard densities at sites where leopard numbers are known.</p>	<p>5) SOAZ 6) CAMPFIRE Association</p>
Assessment of the spatial distribution of leopard harvests	<p>Assess the spatial distribution of both leopard hunting permits and the sites where leopards are actually hunted. The rationale for this is that the impact of the current leopard quota depends on how the off-take is distributed in time and in space.</p>	<p>1) ZPWMA – Roseline Mandisodza 2) Panthera 3) SOAZ 4) ZPHGA 5) Savé Valley Conservancy</p>
Assessment of the scale and impacts of other forms of mortality	<p>Collate data on all forms of anthropogenic mortality of leopards, including <i>inter alia</i>: mortalities due to snaring (and impacts of snaring on prey populations); PAC; killings for skins and other body parts.</p> <p>These data (in combination with information on the spatial distribution of trophy harvests, on leopard distribution and population trends) would allow for a much more robust assessment of the impact of trophy harvests on leopards in Zimbabwe.</p>	<p>1) ZPWMA</p>
Assessment of the extent of habitat loss	<p>An assessment of the extent of habitat loss to assess the impact of land use and tenure changes since 2000 on the prospects for leopard conservation.</p>	<p>1) ZPWMA 2) University of Zimbabwe, Department of Geography 3) WildCru</p>

References

- Athreya, V., Odden, M., Linnell, J.D.C., Karanth, K.U., 2011. Translocation as a Tool for Mitigating Conflict with Leopards in Human-Dominated Landscapes of India. *Conserv. Biol.* 25, 133-141.
- Bailey, T.N. 1993. *The African Leopard: ecology and behaviour of a solitary felid*. Columbia University Press, New York.
- Balme, G.A., Hunter, L.T.B., Goodman, P., Ferguson, H., Craigie, J. & Slotow, R. 2009b. *An adaptive management approach to trophy hunting of Leopards Panthera pardus: a case study from KwaZulu-Natal, South Africa*. In: Macdonald, D. & Loveridge, A. (Eds.), *Biology and Conservation of Wild Felids*. Oxford University Press, Oxford.
- Balme, G., Slotow, R. & Hunter, L. 2009a. Impact of conservation interventions on the dynamics and persistence of a persecuted Leopard (*Panthera pardus*) population. *Biological Conservation*, 142: 2681-2690.
- Balme, G., Slotow, R. & Hunter, L. 2010. Edge effects and the impact of non-protected areas in carnivore conservation: Leopards in the Phinda–Mkhuze Complex, South Africa. *Animal Conservation*, 13: 315-323.
- Balme, G., Batchelor, A., Woronin Britz, N., Seymour, G., Grover, M., Hes, L., Macdonald, D.W., TB Hunter, L., 2012. Reproductive success of female leopards *Panthera pardus*: the importance of top-down processes. *Mamm. Rev.*
- Bond, I., Child, B., De la Harpe, D., Jones, B., Barnes, J., Anderson, H., 2004. Private land contribution to conservation in southern Africa, in: Child, B. (Ed.), *Parks in Transition: Biodiversity, Rural Development, and the Bottom Line*. Earthscan, London, .
- Burgener, M. A., A. Greyling & T. Rumsey. 2005. *Status quo report on the policy, legislative and regulatory environment applicable to commercial and recreational hunting in South Africa*. The Wildlife Trade Monitoring Network (TRAFFIC) East/Southern Africa, Johannesburg, South Africa.
- Ferguson, H. 2006. Guidelines to Managing Damage-causing Leopards and Crocodiles in KwaZulu-Natal. Ezemvelo KwaZulu-Natal Wildlife Working Document, Pietermaritzburg.
- Friedmann, Y. & Daly, B. (Eds) 2004. *Red Data Book of the Mammals of South Africa: A Conservation Assessment*. CBSG Southern Africa, Conservation Breeding Specialist Group (SSC/IUCN), Endangered Wildlife Trust. South Africa.
- Friedmann, Y. & Traylor-Holzer, K. 2008. *Leopard (Panthera pardus) case study*. NDF Workshop Case Studies, Mexico 2008.
- Gandiwa, E., 2011. Preliminary assessment of illegal hunting by communities adjacent to the northern Gonarezhou National Park, Zimbabwe. *Tropical Conservation Science* 4(4), 445-467.
- Grimbeek, A. 1992. Ecology of Leopards, *Panthera pardus*, in the Waterberg. Unpublished MSc thesis University of Pretoria.

- Grobler, J., Wilson, V., 1972. Food of the leopard *Panthera pardus* (Linn.) in the Rhodes Matopos National Park, Rhodesia, National Museums of Rhodesia (Bulawayo), Salisbury, Rhodesia.
- Hayward, M., Adendorff, J., Moolman, L., Hayward, G., & Kerley, G. 2006a. The successful reintroduction of Leopard *Panthera pardus* to the Addo Elephant National Park. *African Journal of Ecology*, 45: 103-104.
- Hayward, M., Henschel, P., O'Brien, J., Hofmeyr, M., Balme, G. & Kerley, G. 2006b. Prey preferences of the Leopard (*Panthera pardus*). *Journal of Zoology*, 270: 298-313.
- Henschel, P., Hunter, L., Breitenmoser, U., Purchase, N., Packer, C., Khorozyan, I., Bauer, H., Marker, L., Sogbohossou, E., Breitenmoser-Wursten, C., 2008. *Panthera pardus*. IUCN Red List of Threatened Species, www.iucnredlist.org 2012.
- Lindsey, P., 2011. Non detriment finding assessment for the trophy hunting of leopards in South Africa. Endangered Wildlife Trust , 1-40. .
- Lindsey, P., du Toit, J.T. & Mills, M.G.L. 2005. Attitudes of ranchers towards African wild dogs *Lycaon pictus*: conservation implications for wild dogs on private land. *Biological Conservation*. 125: 113-121.
- Lindsey, P. Romañach, S. & Davies-Mostert, H. 2009. The importance of conservancies for enhancing the conservation value of game ranch land in southern Africa. *Journal of Zoology*, 277: 99-105.
- Lindsey, P.A., Romañach, S.S., Tambling, C.J., Chartier, K., Groom, R., 2011a. Ecological and financial impacts of illegal bushmeat trade in Zimbabwe. *Oryx* 45, 96.
- Lindsey, P.A., Romañach, S.S., Matema, S., Matema, C., Mupamhadzi, I., Muvengwi, J., 2011b. Dynamics and underlying causes of illegal bushmeat trade in Zimbabwe. *Oryx* 45, 84. .
- Linnell, J., Annes, R., & Swenson, J. 1997. Translocating carnivores as a measure for managing problem animals: a review. *Biodiversity and Conservation*, 6: 1245-1257.
- Marnewick, K., Beckhelling, A., Cilliers, D., Lane, E., Mills, M.G.L., Herring, K., Caldwell, P., Hall, R. & Meintjes, S. 2007. *The status of the Cheetah in South Africa*. In: Breitenmoser, C. & Durant, S. (Eds). The Status and Conservation Needs of the Cheetah in Southern Africa. *Cat News Special Edition*, December 2007.
- Martin, R. B. & De Meulenaer, T. 1988. *Survey of the status of the Leopard (Panthera pardus) in sub-Saharan Africa*. Convention on the International Trade of Endangered Species Secretariat, Lausanne, Switzerland.
- Martins, Q. & Martins, N. 2006. Leopards of the Cape: conservation and conservation concerns. *International Journal of Environmental Studies*, 63, 579–585.
- Mills, G. and Hes, L. 1997. *The complete book of southern African mammals*. Struik, Cape Town.

- Mills, M., Funston, P., 2003. Large carnivores and savanna heterogeneity, in: du Toit, J., Rogers, K. and Biggs, H. (Eds.), *The Kruger experience: ecology and management of savanna heterogeneity*. Island Press, Washington, USA, pp. 370-388.
- Norton, P., 1990. How many leopards? A criticism of Martin and de Meulenaer's population estimates for Africa. *S.AFR J.SCI./S.-AFR.TYDSKR.WET.* 86, 218-219.
- Roux, P., Skinner, J., 1989. A note on the ecology of the leopard (*Panthera pardus* Linnaeus) in the Londolozi Game Reserve, South Africa. *Afr. J. Ecol.* 27, 167-171. .
- Nowell, K. & Jackson, P. 1996. *Wild cats status survey and conservation action plan*. IUCN/SSC Cat Specialist Group. IUCN, Gland.
- Skinner, J.D. & Smithers, R.H.N. 1990. *The mammals of the Southern African subregion*. University of Pretoria, Pretoria.
- Sunquist, M. & Sunquist F. 2002. *Wild Cats of the World*. The University of Chicago Press, Ltd., London.
- Turnbull-Kemp, P. 1967. *The Leopard*. Howard Timmins, Cape Town.
- Weilenmann, M., Gusset, M., Mills, D.R., Gabanapelo, T., Schiess-Meier, M., 2011. Is translocation of stock-raiding leopards into a protected area with resident conspecifics an effective management tool? *Wildl. Res.* 37, 702-707.

Appendix 1. Attendees of the preliminary non-detriment finding assessment meeting

Surname	Name	Position	Location	Email
Balme	Dr Guy	Lion Program Manager	Panthera, southern Africa	gbalme@panthra.org
Chikerema- Mandisodza	Roseline	Trophy monitoring coordinator	ZZPWMA, head office	mandisodzar@gmail.com
Chikumba	Hardwick	Area Manager	ZZPWMA, Chirisa	
Chimeramombe	Felix	Regional Manager	ZZPWMA, Western region	fchimeramombe@yahoo.com
du Preez	Byron	PhD candidate	Wildcru, Univ. Oxford, Buby	bydupreez@gmail.com
Gandiwa	Edson	Senior Ecologist	ZZPWMA, Gonarezhou	egandiwa@gmail.com
Gandiwa	Patience	Senior Ecologist	ZZPWMA, Gonarezhou	patience.gandiwa@gmail.com
Gotosa	Tawanda	Regional Manager	ZZPWMA, Northern Region	nyamazana@zol.co.zw
Groom	Dr Rosemary	Conservation Programme Manager	African Wildlife Conservation Fund, South East Lowveld	rosemary@africanwildlifeconservationfund.org
Joubery	Dusty	Ecologist	Savé Valley Conservancy	dustjoubert@gmail.com
Labat	Thierry	Professional Hunter Policy Initiative	ZPHGA, Harare	tlabatsafaris@gmail.com
Lindsey	Dr Peter	Coordinator	Panthera, Southern Africa	plindsey@panthera.org
Loveridge	Dr Andy	Researcher	WildCru, Univ Oxford, Hwange	andrew.loveridge@zoo.ox.ac.uk
Madzikanda	Dr Hilary	Chief Ecologist	ZZPWMA, Head office	hmadzikanda@zimparks.co.zw
Makuwe	Edwin	Senior Ecologist Acting Director,	ZPWMA Hwange	emakuwe@yahoo.com
Matipano	Geoffrey	Conservation	ZZPWMA, Head office	gmatipano@zimparks.co.zw
Matokwe	T.B.	Ecologist	Masvingo Regional Office	tichbless@yahoo.com
Mkhwebu	Victor	Area Manager	ZPWMA Matetsi	vmkhebu@yahoo.com
Moodie	Alan	Professional Hunter	Harare	allenmoodie@gmail.com

Moyo	Gilbert	Principal Ecologist	ZPWMA Sengwa	ghmoyo@yahoo.co.uk
Mtare	Godfrey	Senior Ecologist International	ZPWMA Hwange	tgmtare@yahoo.com
Mufute	Olivia	Conventions Manager	ZZPWMA, Head office	omufute@zimparks.co.zw
Mupedzi	Innocent	Wildlife Officer	ZPWMA Tuli	iskrufiz@yahoo.com
Musto	Peter		Zambezi Society, Harare TRAFFIC Southern/East Africa, Pretoria	petemusto@gmail.com
Newton	David			david.newton@traffic.org
Nhidza	Leonard	Investigations Branch Utilization and	ZZPWMA, Head office	lnhidza@zimparks.co.zw
Nyaguse	Gregory Dr	Crocodile Unit	ZZPWMA, Kariba	hnyaguse@gmail.com
Tafangenyasha	Clifford	Principal ecologist	ZZPWMA, Head office	cliffordtafa@gmail.com
