REPORT

July 2015

BONES OF CONTENTION:

An assessment of the South African trade in African Lion *Panthera leo* bones and other body parts

Vivienne Williams, David Newton, Andrew Loveridge and David Macdonald

A **TRAFFIC & WildCRU** Joint Report

WILDCRU Wildlife Conservation Research Unit

TRAFFIC

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Report

The views of the authors expressed in this publication do not necessarily reflect those of TRAFFIC, WildCRU, WWF or IUCN. The role of the authors was to unearth, and impartially to present, evidence that can inform decisions and decision-makers on this trade insofar as it might impact the conservation of wild lions.

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Front cover: Main photograph (African Lion skull part of a consignment en route to Asia) ©Vivienne L. Williams; Left (from top) Andrew Loveridge, 'Anonymous' (name is known to author); Andrew Loveridge; Vivienne Williams (lower two)

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JOHANNESBURG

Bones of Contention

An assessment of the South African trade in African Lion Panthera leo *bones and other body parts*

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African Lions at Ngweshla, Hwange National Park, Zimbabwe

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CONTENTS

CONTENTS

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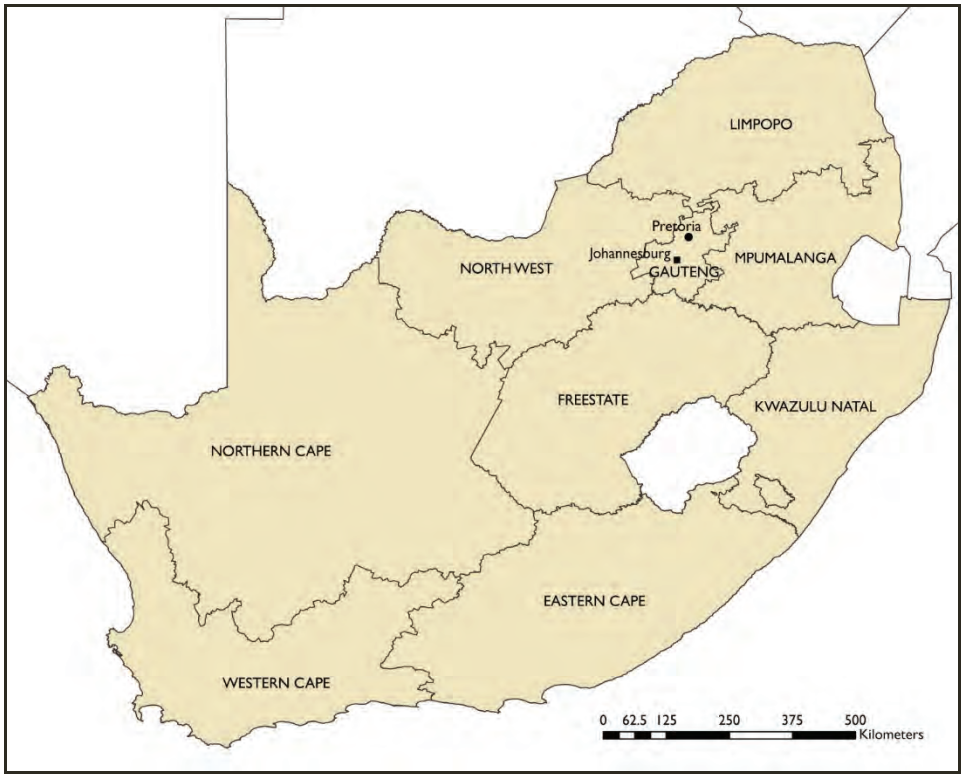
ABBREVIATIONS AND ACRONYMS USED

BMP	Biodiversity Management Plan
BOD	Bodies
BON	Bones
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CN	China, or People's Republic of China (PRC) (Map 2)
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
EC	Eastern Cape (Province) (Map 1)
EWT	Endangered Wildlife Trust
FS	Free State (Province) (Map 1)
GR	Game Reserve
IUCN	The World Conservation Union
KNP	Kruger National Park
KZN	KwaZulu-Natal (Province) (Map 1)
LA	Laos, or Lao People's Democratic Republic (Lao PDR) (Map 2)
LIV	Live (animals)
LP	Limpopo (Province) (Map 1)
MM	Myanmar, Republic of the Union of Myanmar (Map 2)
MP	Mpumalanga (Province) (Map 1)
NC	Northern Cape (Province) (Map 1)
NEMBA	National Environmental Management and Biodiversity Act (Act 10 of 2004)
NGO	Non-Governmental Organization
NP	National Park
NSPCA	National Society for the Prevention of Cruelty to Animals
NW	North West (Province) (Map 1)
ORTIA	O.R. Tambo International Airport
PHASA	Professional Hunters Association of South Africa
SAPBA	South African Predator Breeders Association
SADC	Southern African Development Community
SANParks	South African National Parks
SAPS	South African Police Service
SARS	South African Revenue Service
S.D.	Standard Deviation (a statistics term)
SKE	Skeletons
TAM	Traditional Asian Medicine (including TCM and other East- and Southeast Asian Medicines)
TCM	Traditional Chinese Medicine
TH	Thailand, or Kingdom of Thailand (Map 2)
TOPS	Threatened Or Protected Species regulations of 2007 [Section 56(1) of NEMBA]
TRAFFIC	The wildlife trade monitoring network
TRO	Trophies
UNEP-WCMC	United Nations Environment Programme – World Conservation Monitoring Centre
USD	United States Dollar
VN	Viet Nam, or Socialist Republic of Viet Nam (Map 2)
WWF	The World Wide Fund for Nature
ZA	South Africa
ZAR	South African Rand

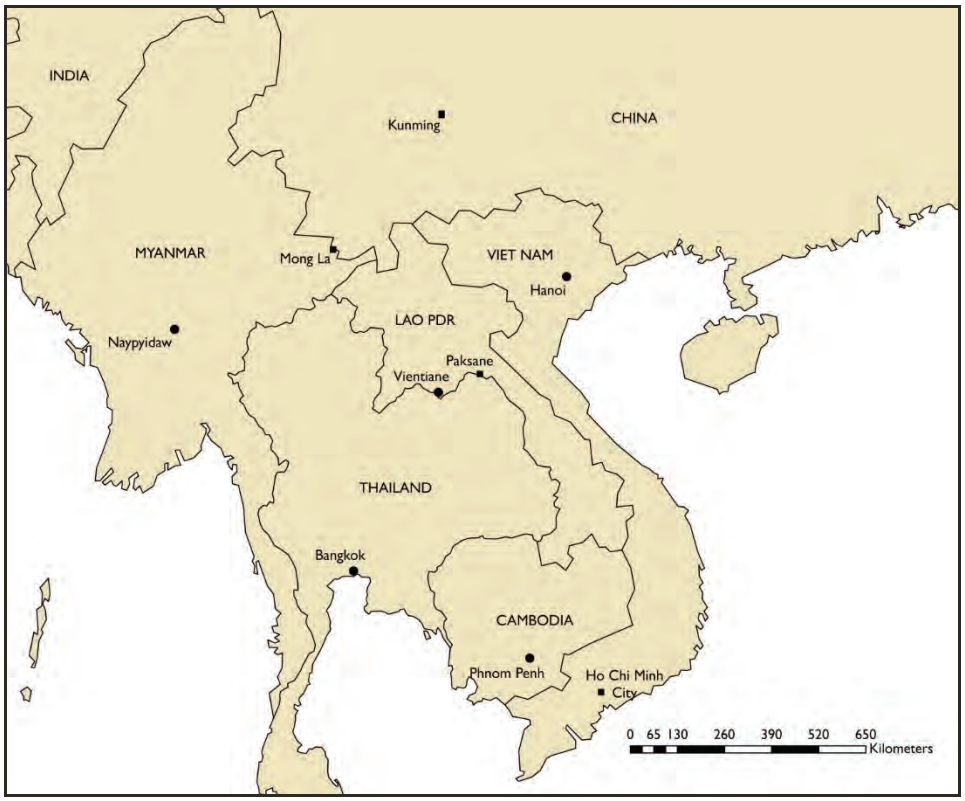
Exchange rates for South African Rand (ZAR) into United States Dollar (USD) are indicative and were calculated during the drafting of the report between May and July 2013.

MAPS OF SOUTH AFRICA AND EAST–SOUTHEAST ASIA



Abbreviations for South African provinces:

EC: Eastern Cape
FS: Free State
GP: Gauteng
KZN: KwaZulu-Natal
LP: Limpopo
MP: Mpumalanga
NC: Northern Cape
NW: North West
WC: Western Cape



Abbreviations for countries in East Southeast Asia:

CN: China
LA: Lao PDR (Laos)
MM: Myanmar
TH: Thailand
VN: Viet Nam

EXECUTIVE SUMMARY

CONTEXT: LION BONES AND TIGER WINE – LETTING THE CAT OUT OF THE BAG

In the 1990s, images of Tigers *Panthera tigris* on some manufactured Chinese medicines were replaced with Lions *Panthera leo*, leading to suspicions that parts from Tigers were being substituted with Lions. In 2005, evidence emerged that African Lion bones were indeed being substituted for Tiger in "bone strengthening wine", thus confirming the presence of Lion derivatives in "tiger" products. *"Anger over lion bones sales"* was the first South African newspaper headline in December 2009 publicly to proclaim the existence of a legal trade in African Lion bones to supply the substitute "tiger bone" market in East–Southeast Asia. The story generated widespread outrage when it emerged that a CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) permit had been issued to a local Lion breeder to export the skeletons – however, unbeknownst to the public was that permits to export Lion bones had been issued a year earlier in 2008. The sharp increase in the export of Lion skeletons from South Africa to Southeast Asia (especially Lao PDR and Viet Nam) from 2008 led to concerns that bones from wild Lions were being sold into the Traditional Asian Medicine (TAM) trade and thus negatively affecting vulnerable wild Lion populations. Accordingly, it became necessary to investigate the trade in Lion bones to: (1) examine the extent to which bones were available through legitimate and illegitimate sources within South Africa; (2) determine the source of the bones and parts (wild or captive bred); and (3) assess the potential impacts on wild populations.

The Lion bone trade is a contentious and complex conservation issue spanning continents and cultures and a diverse array of role-players. A critical question that emerged during the research was: what events (if any) drove the demand for Lion bones in East–Southeast Asia? When examining the timelines in the Tiger and Lion trades, it appears as if measures adopted to protect Tigers and Asian big cats (especially in 2002 and 2006/2007) was inadvertently one factor that catalysed a chain reaction of interlinking and unexpected events that resulted in a shift from the traditional use of Tiger bones and products in TAM, to including the parts of other Asian big cats (such as leopards), and eventually the bones of Asiatic and then African Lions. Furthermore, we speculate whether rhino poaching worsened after representatives of a Laotian export-import company, known for its involvement in wildlife trade and the illicit trade in rhino horn, visited South Africa to purchase lion bones from game farmers c.2008. Thus, are the rhino-lion-tiger trades interlinked, and did measures intended to protect a charismatic species in Asia have unintended consequences for other species on a different continent? This is an issue worthy of further debate to avoid similar knock-on effects in the future.

LION POPULATION IN SOUTH AFRICA

The estimates of the Lion population in this report indicate that there are more than 9100 African Lions in South Africa, approximately 68% of these are in captivity and 32% are free-roaming in reserves. The majority of free-roaming Lions are protected in SANPark Reserves, with the remainder in provincial and private reserves. There were estimated to be around 5800 captive-bred Lions in 2013, and this number has almost doubled since 2005. The Free State province is the epicentre of the captive Lion breeding industry and has about 3000 Lions in 70 breeding and two hunting facilities. The North West province had almost 2200 captive Lions in 64 hunting "reserves". The number of Lions in the North West and Free State provinces fluctuates because of the large number of Lion translocations, mainly from the breeding facilities to the hunting reserves.

LEGISLATION

South Africa has a well-developed legal framework for the conservation, regulation and sustainable use of its biodiversity. The legislation includes the National Environmental Management and Biodiversity Act (NEMBA) and various provincial nature conservation ordinances used by the nine provinces for protecting wildlife and regulating the trade thereof. However, there are complexities of implementation and inconsistencies resulting from the provincial legislation that have raised concerns that loopholes exist for illicit activities that thereby present compliance challenges. A broad overview of the legislation and the enforcement and compliance concerns are presented. The prevailing view of the role-players interviewed was that Lion bone exports are mostly legal – but there are flaws in the regulatory systems that have created opportunities to exploit weaknesses in the legislation. Moreover, there is questionable provincial capacity to monitor all aspects of the Lion trade and still contend with the monitoring of other TOPS (Threatened Or Protected Species) listed species that are more threatened (including rhinos and cycads).

LION HUNTING IN SOUTH AFRICA

Lion hunting in South Africa has been the subject of extensive judicial scrutiny – specifically with regards to "put and take animals". In 2007, applicants from the South African Predator Breeders Association (SAPBA) took the Environment Minister to court over certain TOPS regulations that were to be implemented in 2008. SAPBA challenged the Minister

on the inclusion of Lion on TOPS as a "listed large predator" and specifically the regulation that captive-bred animals could only be hunted after a 24-month self-sustaining release period. They argued that this regulation would put an end to the hunting industry, but the courts ruled in 2009 that this 24-month period was not unreasonable. However, SAPBA appealed the ruling and won and in 2010 the definition of Lions as a "listed large predator" was declared invalid in so far as it applied to a "put and take" animal that is a Lion – hence the 24-month period was no longer applicable and provinces would have to apply regulations as per their provincial ordinances or guidelines. The self-sustaining period for Lions released on hunting reserves varies across the provinces, but in the North West province, for example, it is 96 hours.

Most Lion trophy hunting in South Africa is from captive-bred animals, and figures of between 0.9% and 5% of the total successful hunts have been attributed to wild Lions only. These wild Lions were reportedly hunted in reserves bordering the Kruger National Park or in the Kgalagadi Transfrontier Park. Trophy hunting of captive-bred Lions, however, occurs mostly in the provinces of North West (82% of hunts in 2010), Eastern Cape (7%) and Free State (6%) – and these were the primary sources of Lion bones sold to East–Southeast Asia. The revenues generated by Lion hunting topped more than USD21 million in 2008 (the figures were lower in 2009/10, and no data were available for 2011/2012 at the time of writing this report). Accordingly, the value of the industry makes it hard to envisage that the South African government will shut the industry down in the near future.

LION TROPHIES AND THE SIZE OF THE SKELETON RESOURCE BASE

Permits to hunt Lions in South Africa are issued through the provinces, and Professional Hunters are obliged to record all completed hunts in a professional hunting register. The hunting register is then used to compile provincial reports on the number of Lions hunted annually, which they submit to the Department of Environmental Affairs (DEA). The number of permits issued to hunt Lions is usually more than the number of Lions actually hunted and recorded on the register; this is because not all the permits that are issued are used. Accordingly, the number of hunting permits issued cannot be used as a proxy for the number of carcasses potentially available to supply the Lion bone trade, hence one is reliant on the accuracy of the hunting register to estimate: (1) the number of Lions hunted, (2) the maximum number of trophies that could be exported, and (3) the number of carcasses available for the bone trade via the hunting industry [*Note*: there are other sources of Lion bone besides those derived from hunting].

Since the African Lion is listed in Appendix II of CITES, all foreign clients must also have CITES permits to export trophies (usually the skin and skull); the provincial permit Issuing Authority issues these permits once the hunts have been registered. From 1977 to 2011, South Africa reportedly issued permits to export 7014 Lion trophies to 100 countries – this figure should be less than the number of Lions hunted since not all hunters take their trophies home. However, when one compares the number of Lions hunted (indicated by the hunting register) with the number of trophies exported (indicated by CITES permits) between 2004 and 2010, there is a large discrepancy in that 1138 more trophies were apparently exported than Lions hunted. There may be various legitimate reasons for this discrepancy, but ultimately the accuracy of the hunting register is called into question.

There are several potential sources of skeletons for the Lion bone trade namely: (1) natural mortalities, (2) euthanized/culled Lions, (3) problem-Lion hunts, (4) carcasses buried/discarded after events in the past that could potentially be located/exhumed, (5) poaching, and (6) trophy hunts. Information is limited on the number of skeletons available from the first four sources, and the size of this resource base is assumed to be cumulatively large considering the number of captive animals and the amount of hunting that took place in the past. Incidences of wild Lion poaching are rare in South Africa and not believed to be a notable contributor of bones to the trade. Hence, the "best" estimator of the minimum size of the carcass resource base that could be sold into the Lion bone trade is the number of Lions hunted annually. It is estimated that from 2004 to 2010 the number of skeletons available from trophy hunts amounted to 2900 to 4100 units. Despite rumours that landowners are exhuming Lion skeletons and selling them, there was no information available on the extent to which that might be occurring.

TRADE IN LION BONES & OTHER BODY PARTS

Besides Lion trophies, South Africa has issued permits to export 19 other categories of Lion products since 1977. Of most interest, and the focus of this report, are the commodities exported to East–Southeast Asia that are part of the extensive global carnivore trade and feed into the "tiger" bone industry as substitutes. Since 1998 (but especially from 2006/2007) China, Viet Nam, Lao PDR, Myanmar and Thailand have imported increasing quantities of live Lions, Lion bodies, bones and skeletons.

Applications to import live Lions to East–Southeast Asia were irregular until 2006, but export permits were issued consistently thereafter. Thailand imported most of the live Lions, followed by China, Myanmar and Viet Nam. However, since there were few CITES trade data available on the legal cross-border regional trade in Southeast Asia, it was difficult to validate the motives for these imports. Are the Lions retained in the possession of the importers or are some of them subsequently trafficked throughout the region?

In parallel with the increase in the rhino horn trade, there has been an increase in wildlife hunting in South Africa by Southeast Asian nationals in the last decade. However, unlike rhinos where Vietnamese clients are the main importers of horns, the main importers of Lion trophies from 1999 to 2008 were the Chinese. Lion trophies were exported to Lao PDR for the first time in 2009, despite there being no records of Laotian clients having hunted Lions in South Africa. Since 2010, the number of permits issued to export Lion trophies to Lao PDR has increased exponentially and currently dominate the export market for this commodity to the region.

The CITES category "bones" is different to "skeletons", but when discussing the Lion "bone" trade one generally refers to exports/imports of partially complete or whole skeletons instead of individual bones. Prior to 2008, the only record of South Africa having issued CITES permits to export Lion skeletons was for three units to Denmark in 2001. Furthermore, the worldwide export of skeletons from 1982–2000 only totalled nine, and these were mainly to Europe. In mid-2008, South Africa issued its first export permit for 50 Lion skeletons obtained from captive-bred Lions destined for Lao PDR. In 2011, permits to export approximately 573 skeletons from South Africa to Asia (China, Viet Nam, Thailand and Lao PDR) were issued – 91% of which were to Lao PDR, and 76% originated from the North West Province in South Africa. The number of skeletons legally exported to Lao PDR thus grew from zero in 2007 to at least 197 in 2009 and up to 519 in 2011. In a six month period in 2012, 11 shipments of Lion bones to East–Southeast Asia totalled >3800 kg (or >395 Lions). From 2008 to 2011, the official number of skeletons legally exported with CITES permits totalled 1160 skeletons (about 10.8 metric tonnes). National data for 2012 and 2013 were not available at the time of this investigation.

Up to 2006/2007, the combined quantity of live Lions and Lion parts and derivatives exported to East–Southeast Asia from South Africa was an unremarkable blip in the broader global trade. From 2008, however, the quantities exported increased almost six-fold from the previous year. Not only did the number of live Lions exported to East–Southeast Asia reach record levels from this time, but also the first permits to export Lion skeletons were issued. The demand for Lion parts and derivatives appears to have coincided with the strengthened conservation measures adopted in 2006–2007 to protect Tigers and Asian big cats. Accordingly, Tiger parts were increasingly substituted with Lion parts obtained from Africa. The trade in Lion parts and derivatives to Lao PDR dominates the exports.

EXPORTERS, IMPORTERS AND TRADE FLOWS

The trade route for bones on the South African side of the supply chain is relatively transparent and there is presumed to be more legal than illegal trade. In general, the bones follow a linear route with "bone agents" being the middlemen between the farm/landowners and the buyers in Asia. A simplified trade flow resembles the following: landowner (breeding or hunting facility) → bone agent (an enterprise or individual who buys Lion skeletons from landowners and sells them to a buyer, usually in Southeast Asia) → freight forwarder (a company or person who organizes the transport and shipment of the bone consignment on behalf of the carrier so that the cargo reaches Asia) → ground handling agent (responsible for handling cargo on behalf of a specific airline) → airline → destination country and buyer/customer. However, the routes become less linear if the landowners and bone agents bypass the forwarders and/or handling agents. The number of landowners selling bones to bone agents in South Africa is unknown. Of the bone agents, there are only 12 known exporters; in the past DEA released the names of six agents, five names were mentioned in confidence during the interviews for this report, and one new name was mentioned in the media in 2013.

The Asian side of the trade chain is less transparent and understood, and little is known about the fate of Lion bones once they reach East–Southeast Asia. Since wildlife trade often makes use of the same established networks and supply lines, the Lion bone trade may have piggy-backed on existing wildlife routes in Lao PDR, Viet Nam, China, Thailand and possibly Myanmar, and is worthy of further investigation. If Lion bones are being traded between countries in East–Southeast Asia, then the trade is presumed to be mainly illicit given the absence of CITES export-import permit records to legitimize the trade. The name of a company that repeatedly appears in reports published by the South African government and environmental interest groups is Xaysavang Export-Import Company in Bolikhamxay Province, central Lao PDR. In November 2013, the US Department of State issued a reward of up to USD1 million for information leading to the dismantling of the Xaysavang Network as part of a larger strategy to disrupt the illicit trade in wildlife (U.S. Department of State, 2013), estimated at USD8 to USD10 billion per year.

VALUE OF THE LION BONE TRADE

The value of a Lion skeleton is determined by the completeness of the "set" (i.e. whether the skull and/or limb bones are included, and accordingly a premium is paid to sellers if these bones are included) and where (and what country) the skeletons are in the supply chain. There are at least two tiers to the South African end of the Lion bone trade chain to consider when determining the value of the bones: (1) the price paid to landowners for skeletons by the bone agents, and (2) the price paid to the bone agents/wildlife traders/intermediaries by the Asian importers. One must be cautious when evaluating the South African side of the supply chain not to use erroneously the same US dollar prices that are reportedly paid for Lion parts and products once they enter the supply chain in Asia. The price being paid to South African farmers/landowners by the bone agents in 2013 was ZAR12 000 to ZAR15 000 (USD1260 to USD1560) per set without skulls, and up to ZAR18 000 to ZAR20 000 (USD1890 to USD2100) with skulls (depending on the size of the skeleton).

Thereafter, the bone agents charge the importers a fee of about ZAR3000 (USD315) per set. Thus, the prices paid to South African landowners are substantially less than USD10 000 to USD15 000 per complete set that is frequently alleged to be paid. Ascribing such erroneously high values on the South African side of the supply chain would make it seem plausible that poaching wild Lions would be a cheaper alternative to sourcing bones from hunted captive animals and thereby incentivize illegal hunting – which is not the case in South Africa.

The value of Lion bones generated as a secondary by-product of the trophy hunting industry have allegedly motivated farmers to exhume carcasses that were discarded after past trophy hunts and captive mortalities. And, whereas Lionesses formerly had little or no value to breeders from a trophy hunter's perspective, the emergence of the Lion bone trade has generated a previously unexploited value for females. A concern raised during the research was the incentive to breed Lions solely for the Lion bone trade. What the representatives from SAPBA, the various provinces and DEA are firm on is this: there is currently no economic incentive to farm Lions solely for bones, especially given the costs involved in raising Lions and the current prices paid for skeletons. Since a skeleton was worth, at most, ZAR20 000 (USD2100) in 2013 and a trophy hunted male Lion of at least six years old generates ZAR160 000 to ZAR170 000 (USD16 800–USD17 900), it makes no business sense for farmers to breed males for the bone industry and forfeit at least ZAR142 000 (USD14 900) in the process. Thus, selling the bones is of secondary benefit to their operation. Lionesses and juveniles are, however, at risk of being culled – but current data on the average mass of an exported skeleton suggests that the practice of exporting bones obtained from females and juveniles is in the minority for the time being.

ILLEGAL TRADE IN LIONS

The Lion bone trade in South Africa is juxtaposed within a network of dealers that operate both legally and illegally. The illegal trade in Lions and their body parts usually involves restricted activities for which offenders are not in possession of a permit to breed, keep, hunt, catch, sell, convey or export a live animal or parts thereof. Since African Lions are listed in Appendix II of CITES, any international trade requires a CITES export permit. There have been various reports of illegal Lion trade over the years, which seems to have escalated since 2008, but there are no specific official figures available for South Africa besides what are reported in the media or by the annual reports on seizures and prosecutions by TRAFFIC (e.g. TRAFFIC, 2013). Most reports refer to illegal translocations of animals, especially between the Northern Cape province and Botswana.

TIGER TRADE FROM SOUTH AFRICA

The trade in Tigers was a peripheral aspect to this study and not part of the investigation as set out in the aims. However, concerns were raised towards the finalisation of this report and therefore a preliminary assessment was made. There appears to be a growing trade in Tigers and their parts and products from South Africa, and there have been calls for more transparency on the matter. An emerging concern is that Tiger bones from South Africa may be laundered as Lion bones using CITES Appendix II (instead of Appendix I) permits. Limitations in the South African legislation applying to endangered exotic animals have made it possible for an unregulated domestic trade in Tigers.

IMPACT ON WILD LION POPULATIONS IN SOUTH AFRICA

In South Africa, the trade in Lion bones currently has a negligible impact on wild Lion populations. The trade in bones appears to be a sustainable by-product of the sizeable trophy hunting industry in South Africa, and Lions that are hunted are almost exclusively captive-bred. There are few records of wild-hunting and poaching in the country, especially at a level that could supply the sizeable bone trade. The impact of the bone trade on wild Lion populations outside of South Africa, however, has yet to be determined.

RECOMMENDATIONS

While the trade in Tiger bones is an established threat to Tiger conservation and many recommendations have been made in various reports, the emergence of the Lion bone trade between South Africa and East–Southeast Asia to sustain the demand for parts and derivatives (especially bones) from big cat species is as recent as 2008 and growing. This is the first full research report on the matter and many issues and concerns were raised by all of the interviewees during this investigation. Since it seems unlikely that the trade in Lion bones will be banned in South Africa in the near future, or that syndicates, traders and Southeast Asian consumers will cease consumptive practices involving Lions and Tigers, the pragmatic blanket recommendation is that measures currently in place to impede opportunities for illegal activities are strengthened across the entire supply chain from Lion breeding to skeleton exports.

In view of the research findings, the following actions are recommended:

- Develop an integrated national system for issuing permits that can be crosschecked by all enforcement and Customs officials in other provinces.
- CITES export permits should record the number of sets of skeletons and the combined mass thereof in a shipment. There is no benefit to recording the number of individual bones on a permit since this obscures the total number of bone sets and therefore the number of animals in trade.
- National and Provincial permit issuers, law enforcement and Customs officials should use the graph provided in Appendix 5 as a way of cross-checking the accuracy of declared skeleton quantities versus bone/consignment mass recorded on the applications for CITES export permits and/or the waybills. Recording the mass and number of skeletons on the CITES permits will assist vigilant Environmental Management Inspectors (EMIs) and freight forwarders with identifying discrepancies and anomalous declarations in shipments that contain more animals than were declared on the export permit and waybill.
- Develop a user-friendly means to determine whether a skeleton is that of a Lion or a Tiger. We have recommended one way to distinguish between Lion and Tiger skulls (Figure A1 in Appendix 4), but other characters may exist and require further development.
- Since it is not currently possible to determine whether CITES Appendix I Tigers are being illegally shipped as Appendix II Lion bones, spot checks and DNA tests of the exported consignments should be conducted to determine whether a skeleton is that of a Lion or Tiger. The relevant officers could be provided with DNA collecting kits and trained to collect tissue in a manner that would be acceptable to the justice system.
- Investigate the use of South African seaports as a gateway for Lion and Tiger product exports.
- Conduct a trade study on what happens to Lion bones and derivatives once they reach Asia and especially East–Southeast Asia, including an assessment of the trade routes and the value of the products along the supply chain.
- Investigate the Tiger trade in South Africa, including an assessment of the *ex situ* population, consumptive and non-consumptive utilization, national and provincial legislation with respect to keeping and hunting exotic animals, and, the inappropriate use of CITES Appendix II permit to trade products.
- Investigate the trade in Lion products (especially bones) in other African countries besides South Africa to determine: (a) the extent to which the products are available through legitimate and illegitimate sources, (b) the origin of the products (wild or captive bred), and (c) whether there are negative impacts on regional wild Lion populations across Lion range States in Africa.
- Although the compliance of provinces to national and provincial statutes relevant to Lions was researched at a broad level, time constraints precluded detailed examination of alleged individual transgressions. There remains a need to evaluate and, where necessary, synchronize the South African national and provincial legal frameworks to remove loopholes creating opportunities for non-compliance and illegal activities.
- It appears that more Lion hunting is taking place than is being reported by professional hunters. The sources of the discrepancies should be determined and various departments must find an appropriate way of "fixing" the hunting register and not issue permits without the register. The extent of the domestic hunting market for Lion should also be evaluated.
- Improve transparency within the bone trade, by considering a system (possibly including the use of studbooks and microchips) that tracks individual captive bred Lions from birth to death and from origin to final destination so that all exported skeletons and trophies can be traced back to the original source and mode of mortality
- The South African Revenue Service (SARS) must insist that all wildlife related cargos be stopped for inspection by EMIs and not simply released without examination.
- Conduct awareness campaigns targeting all cargo handlers/freight forwarders/cargo agents on a regular basis so that they are aware of sensitive wildlife cargoes and are able to identify illegal or suspicious shipments.

INTRODUCTION – LION BONES & TIGER WINE

INTRODUCTION

Severe habitat loss, human-wildlife conflict, poaching, persecution and especially the illegal trade in body parts and products have become major drivers in the extirpation of Tiger *Panthera tigris* subspecies and subpopulations across their ranges. Of the nine subspecies that once occurred in 24 range States across Asia, only 13 countries currently have confirmed subpopulations (Chundawat *et al.*, 2011). Three subspecies are Extinct, two are Critically Endangered and four are Endangered. The global Tiger population is estimated to have as few as 3200 Tigers in the wild, with fewer than 2500 being mature breeding individuals and no one subpopulation having more than 250 mature individuals (Chundawat *et al.*, 2011; EIA, 2013; Goodrich *et al.*, (2015); Nowell and Pervushina, 2014; SSN, 2014). In China, the wild Tiger population is estimated at 40–50 individuals (Nowell and Pervushina, 2014; SSN, 2014).

A prevailing opinion is that booming Asian economies, rising "Asian affluence" and an expanding "wealth-not-health" driven demand for Tiger products by a growing newly rich Asian population, particularly in China, is concurrently endangering the world Tiger population and thereby facilitating their sharp decline (EIA, 2014a; Graham-Rowe, 2011; Nowell and Pervushina, 2014; TRAFFIC, 2008; UNODC, 2013; Zabarenko, 2010). While the demand for traditional medicines is frequently cited as a primary driver in the commercial trade of bones and body parts, a market also exists for non-essential "luxury" products such as Tiger meat, skins and ornaments. There is a range of products claiming to contain Tiger bone derivatives available on the market, such as "plasters" (poultices), wine, powder and "gelatin" (Gratwicke *et al.*, 2008; Nowell, 2010; Stoner, 2014). It is likely, however, that many of these products do not actually contain Tiger derivatives (Gratwicke *et al.*, 2008) or, the concentrations are so low that detection of the DNA is not possible (Wetton *et al.*, 2004).

"Tiger bone plasters" and "Tiger bone wine" are two of the products most likely to be purchased by consumers and advertised on online auction sites (Gratwicke *et al.*, 2008; Stoner, 2014). The "wine", considered a popular traditional health remedy, is used in the treatment of rheumatism, arthritis, traumatic injuries, and to give the drinker the "strength of a Tiger" (Ellis, 2005; Gratwicke *et al.*, 2008; Nowell and Jackson, 1995; Nowell and Ling, 2007; Penman, 2007). While the "wine" (technically a tincture) is purported to have medicinal properties for treating illnesses, the drink is also used equally as a high-value nourishing health tonic to promote health and well-being (Gratwicke *et al.*, 2008; Nowell and Ling, 2007). One newspaper reported that to produce the wine, Tiger carcasses are steeped in vats of rice wine for up to nine years (Penman, 2007), and the price of one bottle depends on how long the bones were steeped in alcohol (Gratwicke *et al.*, 2008).

Despite China outlawing all use and domestic trade in Tigers and their parts and removing Tiger bone from the approved traditional Chinese medicine (TCM) pharmacopoeia in 1993, there is a persistent demand for medicinal products and tonics with ingredients claiming to be Tiger (EIA, 2013; Graham-Rowe, 2013; TRAFFIC, 2013a). Chinese conservation officials have been quoted in newspapers as saying that it is irresponsible to blame the practice of using Tiger bones in TCM *per se* for the drastic decline of wild Tigers because practitioners abandoned the practice of using Tiger parts after the 1993 trade ban and are using alternatives instead (Ru and Juan, 2010; Zhuoqiong, 2010). Rather, they say, it is individual people's belief in the various products that has driven the demand in China and Southeast Asian countries (Zhuoqiong, 2010). Moyle (2009) wrote that it is doubtful that the formal TCM sector is responsible for distributing Tiger parts since criminal organizations in China seem to have avoided the use of the TCM retail system.

Tiger bones are one of the most lucrative animal products sold on the illegal wildlife market (Haken, 2011), and the poaching of Tigers is driven by demand principally from China and Viet Nam (Moyle, 2009; SSN, 2014). Tiger conservation breeding programmes and farms were established in China in the 1980s, ostensibly "*to save…subspecies from doom*" in response to the declining wild population (EIA, 2013). However, some farms or their subsidiary companies openly sell products such as Tiger bone wine. And, since wild and farmed Tiger products are virtually indistinguishable, there are legitimate concerns that products from wild Tigers could be laundered through such establishments if the trade in products from farmed Tigers were to be legalized (Gratwicke *et al.*, 2008). Chinese

officials, however, have repeatedly denied that the establishment of these breeding facilities is linked to the illegal trade in Tiger products and the decline of wild populations (e.g. CITES 2010a; Ru and Juan, 2010).

In 1984 there were around 200 wild Tigers left in China and none in captivity, but within 20 years the numbers of captive Tigers has increased to over 5000 individuals being held in more than 200 facilities (EIA, 2013, 2014a; Nowell and Pervushina, 2014; SSN, 2014). The disconcerting conditions under which animals are kept in these facilities are a cause for concern and have resulted in demands for them to be shut down. But such is the demand for Tiger products (alleged to be millions of consumers across East–Southeast Asia by Graham-Rowe, 2011; Gratwicke *et al.*, 2008; Moyle, 2009) and an unhurried regional approach to modifying consumptive utilization practices, that shutting down these facilities in the near future (thus severing the captive source of bones to supply the product manufacturers) could bring the remaining wild Tigers closer to being extirpated. Gratwicke *et al.* (2008) reported that 71% of consumers who had used products claiming to contain Tiger parts preferred products from wild Tigers; thus, if farmed Tigers are a substitute for wild Tigers, then terminating the supply of farmed Tigers is unlikely to terminate the demand, and poaching of wild Tigers would almost certainly intensify. One must consider, however, that farming Tigers does not necessarily reduce or satisfy demand since the availability of captive-sourced products could increase the demand beyond what the facilities can supply (UNODC, 2010). Thus, measures to limit the utilization and trade of Tiger products effectively will also have to be accompanied by globally successful demand reduction measures aimed at strengthening compliance of the trade bans and transforming consumer behaviour by creating awareness regarding the implications of their consumptive actions. However, as Graham-Rowe (2011) writes *"…getting users of traditional Asian medicines to change their ways is as much about changing tradition as it is about advancing medicine"*. But, while the race is on to protect Tigers and effect constructive demand reduction measures, there are felid substitutes for Tigers that are maintaining the bone supply and foiling efforts to reduce the demand – notably Lion *Panthera leo* bones.

As the Chinese Tiger population headed towards extinction, purveyors of Tiger products turned their attention to Tigers in Russia as well as range States in South and Southeast Asia. Tiger poaching in India, for example, was noted in the mid-1980s (Badhwa, 2002; EIA, 2013; Ellis, 2005; Johnsingh, 2009) and eventually incidents involving leopards *Panthera* sp. and the Asiatic Lion *Panthera leo* ssp. *persica* were reported there about 20 years later when Tiger numbers in States such as Madhya Pradesh and Rajasthan declined considerably (EIA, 2014b; Fair, 2009; Johnsingh, 2009; Wildlife Protection Society of India, 2007) (Appendix 1). The increasing prevalence of Tiger substitutes derived from felids such as leopards was noted across East Asia and in shops selling TCM in the USA and Australia (Callister and Bythewood, 1995; Henry, 2004). But one of the earliest predictions that Tigers would eventually be substituted by parts from Lions and leopards was made by Khoshoo (1997) who, in connection with the demand and consumption of Tiger parts for TCM, wrote: *"once tiger is decimated, the next target will be lion, followed by leopard (even bear) and all other felines from Asia and Africa"*.

Prior to confirmed reports of Asiatic Lions being killed for TCM in 2007, images of Lions began appearing on the labels of manufactured Chinese medicines in the mid-1990s (Mills, 1997; Nowell, 2000). At the time there was no evidence that bones from wild Lions were being used, but there was speculation that bones from captive Lions were being substituted illegally (Nowell, 2000). Nowell (2000) reported: *"A medicine labelled as musk and tiger-bone plaster, depicting a tiger on its label has now substituted leopard bone for tiger bone in the ingredients list, been renamed as "Heavenly Emperor" plaster, and features a lion on the packet"*.

An investigation by TRAFFIC in 2005 found evidence that African Lions were an ingredient in "tiger" "bone strengthening wine" (Nowell and Ling, 2007). The Xiongsen Wine Producing Ltd in Guilin, Southeast China, was given permission to produce 400 000 bottles of "wine". While the name sounded like "tiger bone wine" and the bottle was in the shape of a Tiger, the approved ingredient was *"Panthera leo"* bones – which only experts knew referred to Lion and not Tiger (Nowell and Ling, 2007). The nearby Xiongsen Bear and Tiger Mountain Village (of which the Xiongsen Wine company was later revealed to be a subsidiary; China CITES Management Authority cited in EIA, 2013), reported having African Lions in captivity that were being reared with three Tiger subspecies and Asiatic Black Bears *Ursus thibetanus* (CITES, 2007a). When Beijing-based news reporters investigated the incident, staff at the wine producing company and the breeding facility allegedly insisted that the wine was made from Tiger carcasses. However, when the Chinese government subsequently conducted an investigation they reported in October 2006 *"only 16 legally obtained lion carcasses were found, and no tiger bones were used to produce the wine"* (Nowell and Ling, 2007)[1]. By

[1] Nowell and Ling (2007) included this footnote about the incident: *"The conservation community does not recommend that any other felid species be used as an alternative to tiger bone; rather, the emphasis has been on eliminating demand. Allowing the use of lion as a substitute for tiger is a dangerous precedent. The African conservation community is concerned about the potential for lion bone to serve as a substitute for tiger bone, a concern reflected in two regional lion conservation strategies developed by African range State governments in partnership with conservationists and stakeholders".* The strategy proposed by the Cat Specialist Group (2006) was to prevent illegal trade in lion products by reviewing and amending relevant legislation and policies and prohibiting the trade in lion bones.

2007, the African Lions at the Xiongsen facility numbered more than 200 and were being reared for food and medicine alongside 1300 Tigers (CITES, 2007a; Penman, 2007).

Khoshoo's (1997) prediction that Asiatic Lions would eventually be a target of the TCM trade was not confirmed until a decade later (Appendix 1). In August 2006 a live Asiatic Lion was observed in a market in Mong La (Oswell, 2010) – a town in northern Myanmar less than 2 km from the Chinese border and known for incidents of wildlife trafficking. Months later in early March 2007 the first of three incidents occurred that implicated TCM and confirmed that Asiatic Lions *were* at risk of being poached and the bones sold into the "tiger" trade (Anon., 2007; EIA, 2014b; Fair, 2009; Johnsingh, 2009; Kotecha, 2007; T. Ghose, *in litt.*, 11 April 2014) (Appendix 1). TCM was suspected because the bones, skulls and teeth had been removed and the skins were left behind (Ramesh, 2007). A gang of poachers from the Baheliya tribal community were eventually arrested and convicted for the killing of eight lions, and the TCM trade was proven to be the motive behind the crime according to the Gujarat Criminal Investigation Department (EIA, 2014b; Fair; 2009; Srivastava, 2007). Then in April 2009 came the first newspaper reports in South Africa of the illegal *"slaughter"* of several Lions – by an illegal Vietnamese immigrant, Nguyen van Hai, at a residence in Pretoria (Groenewald, 2009; Hosken, 2009; Miller, 2009; Otto, 2009a). Lion carcasses were reportedly *"lying all over the floor, everywhere in the house"* (Miller, 2009). The story made headlines and conservation officials were alerted to a potential threat to another of South Africa's big five flagship species. Already in the grips of an escalating rhino poaching crisis, this event took people by surprise. However, as will be discussed later, permits to export bones to Lao PDR had already been issued in 2008.

When Nguyen van Hai was arrested on 30 March 2009, several[2] *"recently-executed lions and…rhino carcasses"* were found in his possession (Anon., 2009a; Miller, 2009). Detectives speculated that van Hai had been killing endangered African mammals *"to-order"* for a gang operating from the Far East (Miller, 2009; Otto, 2009b). After that incident, the face of the Lion bone trade didn't overtly raise its head again until December 2009 when it was reported that a Free State Lion farmer had been granted a CITES permit to sell Lion bones (Rademeyer, 2012a; Smith, 2009). Although the permit only allowed the sale of bones to someone in the adjacent province of Gauteng, the bones were ostensibly destined for Asia where they were alleged to be sought after as substitutes for "tiger bones". Smith's (2009) newspaper report further claimed that there was a growing demand for Lion bones in the East, and that the "*demand in Asia had suddenly become so great that many farmers in the Free State who practiced illegal lion hunting in the past and buried the carcasses are now digging up these carcasses to sell to people in the Far East"*. What's more, *"The door to the enormous market for 'tiger bones' has now been opened"* (Smith, 2009).

With the doors to South Africa's participation in the Tiger bone market now firmly opened, legal exports of Lion skeletons (i.e. with CITES permits) rapidly escalated from approximately 50 skeletons in 2008 to 573 in 2011. To the importers, bones from Lions were a plentiful, cheaper and mostly legally sourced alternative to Tiger bones that were usually obtained from the carcasses of captive bred animals following a trophy hunt (where normally only the skull and skin are taken as a token by a hunter). However, concerns were raised about the potential negative impacts on wild African Lion populations as a result of the trade – and this research report was initiated by TRAFFIC and WildCRU (Oxford University) to examine the basis for these concerns.

One critical question that arises when scrutinising the Lion bone trade is: what events (if any) impelled the adaption from the traditional use of Tiger bones in Asian zootherapeutic practices, to substituting the bones of other Asian large cats in place of Tigers, and ultimately including the bones of Asiatic and then African Lions as ingredients in traditional remedies? A retrospective examination of the timelines for key events in Tiger conservation and the regulation of the Tiger products trade is one constructive way of responding to the question. Accordingly, we speculate on what factors elicited the Lion bone trade and what unexpected, secondary impacts it might have had.

TIMELINES IN THE TIGER TRADE RELEVANT TO LIONS

Much has been written about the trade in products from Tigers and other Asian big cats. Reports by Callister and Blythewood (1995), EIA (2014b), Gratwicke *et al*. (2008), Henry (2004), Mills (1997), Mills and Jackson (1994), Oswell (2010), Shepherd and Nijman (2008), SSN (2014), Verheij et *al*. (2010), Williamson and Henry (2008), and particularly by Nowell (2000), Nowell & Ling (2007) and Nowell & Pervushina (2014), are especially comprehensive

[2] Newspaper reports differ on the number of lion carcasses discovered in the house. Groenewald (2009) alleges that *"10 lion and rhino carcasses were found"*; Otto (2009c) reports that three carcasses, four lion molars, two lion teeth and one lion claw were found; whereas Miller (2009) alleged that *"carcasses of 13 lions and rhinos were found"*. Nguyen (Nguxen) van Hai, who had entered South Africa illegally in November 2007, eventually pleaded guilty to five charges under NEMBA and was deported on May 28th, 2009 (Anon., 2009b,c). He stated in a plea agreement to the Pretoria Regional Court: *"A few weeks prior to his arrest, the accused bought the items on the black market. He was planning to sell them to generate cash to send to his family in Vietnam"* (Otto, 2009c).

with detailing the background and extent of the trade. To explore the theory that the strengthening of regulatory measures intended to protect Tigers was one factor that might have inadvertently initiated the Lion bone trade, key measures and events intended to protect Tigers and deter the trade, and the years in which these measures were adopted, are summarized in Table 1. Accordingly, inferences are made as to how these measures might be relevant to the Lion bone trade (Table 2).

Tigers were first listed in Appendix I of CITES in 1975 (with the exception of the Siberian Tiger, which was initially listed in Appendix II before being transferred to Appendix I in 1987) (UNEP-WCMC, 2014; Williamson and Henry (2008), and international commercial trade was thus prohibited. When China acceded to CITES in 1981, their compliance with the international trade ban thus became obligatory. Five years later in 1986 the Siberian Tiger Park in Harbin, China, was established when a wildlife biologist *"decided to breed captive tigers as a source of tiger-bone medicine with the hopes of decreasing poaching pressures on wild cats"* (Morell, 2007) – but China banned the Tiger trade before the farms were operational and any captive Tiger parts were sold (Dutton *et al.*, 2013; Morell, 2007).

Table 1 National and international measures adopted to protect Tigers and other Asian big cats

Year effective	Action	Implications
1975 – Jul	Most Tiger subspecies listed in Appendix I of CITES; Siberian Tiger listed in Appendix II.[1,2,3]	International commercial trade in most subspecies of Tigers and their body parts is banned. However, trade in Siberian Tigers (*Panthera tigris* ssp. *altaica*) remained permissible, with regulation, until 1987.
1987 – Oct	Siberian Tiger listed in Appendix I of CITES.[1,3]	Siberian Tiger transferred from Appendix II to Appendix I of CITES, hence the international commercial trade in all subspecies of Tigers and their parts/products is prohibited.
1989	China passes the *1988 Law of the People's Republic of China on the Protection of Wildlife.*[4,5]	Law passed to protect, develop and rationally utilize wild animal resources. Tigers listed as a Category 1 species, thereby affording it the maximum level of protection from hunting, sale, purchase and use of Tigers and Tiger products – but breeding, "domestication" and utilization is encouraged.[6]
1993 – May	China promulgates the *1993 Notification on Banning the Trade in Tiger Bone and Rhino Horn* – a complete domestic ban on the trade in/use of Tiger bone and derivatives implemented by China.[4,5,6,7]	The regulation was meant to strengthen protection measures for Tigers. The 1993 ban reiterated the 1989 ban, and took further measures to extend the ban to derivatives not readily recognisable as Tiger parts – including the manufacturing of Tiger medicines. Specifically, the notifications forbid *"...import and export of...tiger bone and their products, forbids selling, purchasing, transporting, carrying and mailing...tiger bone and their products (except for uses on researches of substitutes). The national standard of using...tiger bone in medicines was annulled"*. Tiger bone is removed from the traditional medicine pharmacopoeia.[6]
1994 – Nov	CITES adopts *Resolution Conf. 9.13* (CoP9).[3,4,6]	The Resolution (i) directed Parties to implement certain Tiger conservation measures, (ii) urged Parties to voluntarily prohibit the domestic trade and sale of Tigers and Tiger parts and derivatives to stem poaching and illegal trade, and (iii) recommended bilateral and multilateral co-operation on enforcement and information sharing.
2002 – Nov	CITES *Resolution Conf. 9.13* was superseded by *Resolution Conf. 12.5* (CoP12).[4,8,9,10]	The action was taken because there was evidence that as "*tiger populations declined and as illegal trade in tiger parts became more difficult (due to enhanced enforcement), other Asian big cats were being increasingly used as substitutes*". *Resolution Conf. 12.5* extended many of the recommendations for the Tiger to the Leopard, Snow Leopard and Clouded Leopard.
2006 – Mar	Regulation by the State Forestry Administration (China) in 2005.[4,5]	From 2006, all activities of hunting wild leopard and purchasing leopard bones banned. Hence, the loophole that allowed leopards to be used as a substitute for Tiger bones in Chinese medicines is closed.
2007 – Jun	CITES (CoP14) approves *Decision 14.69*.[11]	CITES CoP approves Decision stating Tiger farms should be phased out and that Tigers should not be bred for trade, including domestic trade, in their parts or products.[6,12]

References: 1=UNEP-WCMC (2014); 2= Nowell (2000); 3=Williamson and Henry (2008); 4=Nowell and Ling (2007); 5=People's Republic of China (2006); 6=EIA (2013); 7=Gratwicke *et al.* (2008); 8=CITES (2002); 9=Henry (2004); 10=Nowell and Pervushina (2014); 11=CITES (2007b); 12=SSN (2014)

In 1993, China implemented a complete ban on the domestic trade in Tiger bones and their derivatives that was aimed at strengthening protection for the species (Gratwicke *et al.*, 2008; Nowell and Ling, 2007). The ban reiterated the *1988 Chinese Law on the Protection of Wildlife* that prohibited the hunting, sale, purchase and use of Tigers and Tiger products (but which encouraged breeding and domestication) AND extended that ban to include derivatives not immediately recognizable as Tiger parts – such as Tiger medicines and tonics (EIA, 2013; Nowell and Ling, 2007) (Tables 1 and 2). The ban was necessary in light of the massive trade in Tiger parts and derivatives – estimated to be as high as 27 million units exported from China between 1990 and 1992 (Gratwicke *et al.*, 2008; Mills and Jackson, 1994). (*Note*: all countries except North Korea have since taken similar legal measures to ban the Tiger trade, and the demand is reported to persist among a minority in number of countries. S. Broad, *in litt*., April 2015).

After the Chinese trade ban was implemented in 1993, there was a continuous and corresponding decline in the availability of Tiger bone products and medicines in outlets across the world selling Chinese traditional medicines and tonics (e.g. Gratwicke *et al.*, 2008; Henry, 2004; Nowell and Ling, 2007). The declines were proposed to be the result of: (1) heightened awareness of the illegality of the trade and the protected status of Tigers, (2) increasingly successful compliance by the Chinese medicinal industry with the trade ban, (3) adaptation by the TCM industry in finding effective alternatives, and (4) the Chinese medicine community embracing support for Tiger conservation as a necessary social responsibility (Gratwicke *et al.*, 2008; Nowell and Ling, 2007). But by 1994 medicinal substitutes for Tiger bones were being detected during surveys of pharmacies and markets (Mills, 1997). Leopard bone was the most common substitute, but images of Lions also started appearing on the labels of some manufactured medicines (Mills, 1997; Nowell, 2000) (Table 2). Since sales of products with Tiger bone are not banned in China (Gratwicke *et al.*, 2008), using these labels was one way of avoiding regulatory action for products that did not contain Tiger (S. Broad, *in litt*., April 2015).

Less than a decade after the 1993 Chinese trade ban it was noted that as Tiger populations declined, the demand and illegal trade in other Asian big cats such as Leopard *Panthera pardus*, Snow Leopard *Panthera uncia* and Clouded Leopard *Neofelis nebulosa* increased (Henry, 2004; Nowell and Ling, 2007). And, while market surveys showed there to be a decreased presence of Tiger products, China's seizure records indicated a continuing demand (Nowell and Ling, 2007). Further evidence indicated that while trade bans helped protect Tigers in the wild, the *"illegal wild tiger trade would likely persist even if an alternative source of supply (e.g. captive-bred tigers) were available"* (Nowell and Ling, 2007), in part because survey evidence indicates that wild Tiger products are preferred by the public (Dutton *et al*., 2013; Gratwicke *et al.*, 2008). Thus in November 2002, CITES adopted a Resolution to extend the Tiger trade ban to include other Asian big cats (Tables 1 and 2). In addition to it becoming clear that many of the Asian big cats were facing similar threats to Tigers, including the use of their body parts for traditional medicines and tonics, it was further recognized that *"as tigers received greater protection and attention, the demand for tiger parts used in traditional medicines shifted to other Asian big cats and further threatened their survival"* (Henry, 2004) – hence it became necessary to extend the protection measures to other Asian big cat species. While the main aim of the Resolution was to counter the skin trade, it also covered medicinal use (S. Broad, *in litt*., April 2015)

A loophole in the 2002 resolution was that the use of leopards as a substitute for Tigers in traditional medicine was still permitted in China – so in March 2006, measures to ban leopards as substitutes for Tigers in TCM were implemented in China (Nowell and Ling, 2007) (Table 1). One year later in 2007, after the number of Tigers in captivity reached over 5000 and surpassed the number of Tigers in the wild, CITES (CoP14) approved *Decision 14.69* against Tiger farming and the breeding of Tigers for their parts and products; the Decision stated that *"Parties with intensive operations breeding tigers on a commercial scale shall implement measures to restrict the captive population to a level supportive only to conserving wild tigers; tigers should not be bred for trade in their parts and derivatives"* (CITES, 2007b; EIA, 2013; SSN, 2014). Thus, in terms of the Decision countries with breeding programmes, such as China, Viet Nam, Thailand and Lao PDR, were urged to phase out Tiger breeding for any commercial trade in their parts and products and implement measures to restrict the size of the captive population. That same year, in March/April 2007 the three confirmed incidents of at least eight Asiatic Lions being poached in India's Gir National Park was reported – specifically for bones for TCM (EIA, 2014b; Fair, 2009; Ramesh, 2007; T. Ghose, *in litt.*, 11 April, 2014) (Table 2). And in 2008, the first permits to export Lion bones from South Africa to Lao PDR were issued (see Table 9). From 2009, illegal activities and reports of seizures of African Lion parts were reported with increasing frequency (see Table 13).

Table 2 Notable regulations and activities in the timelines of the Tiger and Lion trade

Activities involving Lions and Tigers	Year	Legislation (details in Table 1)
Asiatic Lion (*Panthera leo* ssp. *persica*) listed in Appendix II of CITES.[1]	1975	Most subspecies of Tigers listed in Appendix I of CITES, except for Siberian Tigers which was listed in Appendix II.[1,2,3]
African Lion *Panthera leo* ssp. *leo* in Ghana listed in Appendix III of CITES.[1]	1976	
Asiatic Lion transferred to Appendix I of CITES; African Lion listed in Appendix II of CITES (including Ghana transferring from III to II).[1]	1977	
	1978 | 1980	
	1981	China acceded to CITES.[4]
	1982 | 1985	
The Siberian Tiger Park (Harbin, China) is established as China's first commercial Tiger farm to breed Tigers for profit, primarily to supply bones for medicinal use.[5,6]	1986	
Chinese National Pharmaceutical Bureau gives the Beijing Pharmaceutical Company remit to use Tiger farming to address the shortage of Tiger bones.[6]	1987	Siberian Tigers transferred from Appendix II to Appendix I of CITES.[1,3]
	1988	
	1989	*1988 Law of the People's Republic of China on the Protection of Wildlife*. Hunting and killing of Tigers strictly forbidden (May).[4,6,7,8]
	1990 | 1992	
The Xiongsen Bear and Tiger Mountain Village (Guilin, China) is established.[6]	1993	China implements a complete ban on the domestic trade in Tiger bone and also removes it from the TCM pharmacopoeia.[4,6,7]
	1994	CITES *adopts Res. Conf. 9.13* (CoP9), the first Tiger resolution (Nov).[3,4,6,8]
Images of Lions reported to have replaced Tigers on some manufactured Chinese medicines, but no evidence of wild Lions being used.[2,9]	1995	
	1996	
Khoshoo predicts that Lions and other felines in Asia and Africa will be the next target for parts for TCM once the Indian Tiger *"is decimated"*.[10]	1997	
	1998 | 2001	
	2002	CITES *Res. Conf. 9.13* is superseded by *Res. Conf. 12.5* (CoP12). (Nov).[4,11,12]
Mention of Asiatic Lion parts allegedly used in traditional medicine.[13]	2003	
	2004	
Nowell & Ling report evidence that "tiger bone wine" was being made with African Lion bones by a Chinese wine producing company.[4]	2005	
* Live Asiatic Lion observed in a market in Mong La, Myanmar (Aug).[14] * Alleged by the Gujarat Criminal Investigation Department that since the winter of 2006, poachers from Madhya Pradesh were specifically targeting Asiatic Lions for use in TCM.[15] (Appendix 1)	2006	China implements a regulation banning leopard hunting and the purchase of leopard bones in China (Mar).[4,6]
* The Gujarat Criminal Investigation Department confirm that eight Asiatic Lions were poached for bones for TCM in Gir National Park (March/April).[15,16,17,18,19,20] (Appendix 1). * The Xiongsen breeding facility reports that it has more than 200 African Lions in captivity.[21]	2007	CITES (CoP14) approves *Decision 14.69* against Tiger farming and breeding for trade in their parts and products (Jun).[8,16,22]
First permit to export African Lion parts to Lao PDR from South Africa issued for 10 skulls/skins & 20 floating bones (Feb). This was followed in July by the first permit issued to export Lions skeletons – an amount of 35 African Lion skeletons to Lao PDR from South Africa (Jul), followed by a second permit for 15 skeletons a few months later. Media unaware of this.	2008	
* First report in South Africa: Vietnamese man arrested in Pretoria for having illegally *"slaughtered"* several Lions (Apr).[23,24] * First report of a CITES permit being issued to legally export Lion bones to an Asian country.[25]	2009	
Growth of exports of Lion bones to Southeast Asia from South Africa (See Table 9, Figures 23 & 24)	2010	The State Forestry Administration of China tells CITES Parties that China's laws encourage captive breeding and the use of Tiger products.[6,8,16]
	2011	
	2012	

References: 1=UNEP-WCMC (2014); 2= Nowell (2000); 3=Williamson and Henry (2008); 4=Nowell and Ling (2007); 5=Morell (2007); 6=EIA (2013); 7=People's Republic of China (2006); 8=CITES (2010a); 9=Mills (1997); 10=Khoshoo (1997); 11=CITES (2002); 12=Henry (2004); 13=Ali (2003); 14=Oswell (2010); 15=Srivastava (2007); 16=EIA (2014b); 17=Fair (2009); 18=Balakrishna (2008); 19=Wildlife Trust of India (2008); 20=T. Ghose, in litt. (11 April 2014); 21=CITES (2007a); 22=CITES (2007b); 23=Hosken (2009); 24=Miller (2009); 25=Rademeyer (2012a)

When timelines in the Tiger and large Asian felid regulations are overlaid on graphs plotting the growth in Lion product exports to East–Southeast Asia, the events appear to be linked (see Figure 23). Was the establishment of the Lion bone trade thus inadvertently and directly related to the adoption of regulatory mechanisms intended to diminish the trade in Tiger products and thereby protect Tigers (and later other Asian big cats)? And, did the sudden surge in the trade of large quantities of Lion bones between South Africa and East–Southeast Asia increase as a consequence of the strengthening of the regulatory measures that gave Asian traders and syndicates a motive to find alternative sources for bones to circumvent the increasingly restrictive measures applicable to a CITES Appendix I species? This correspondence in the timelines is seemingly too strong to disregard, especially following the measures adopted in 2002 and 2006/2007 (Table 2). The trade in Tigers and other large cats is clearly a global problem; despite the protective measures implemented by China and CITES, Tiger subpopulations continue to decline (CITES, 2010b) and the number of Tigers in captivity have quintupled in less than a decade from 2002 (Figure 1). Thus, did measures intended to protect one popular charismatic species on one continent have unintended consequences that have led to increasing threats to other Asian big cats and ultimately African Lions on a different continent? Accordingly, in rephrasing the words of Henry (2004), "did eliminating one problem lead to another"?

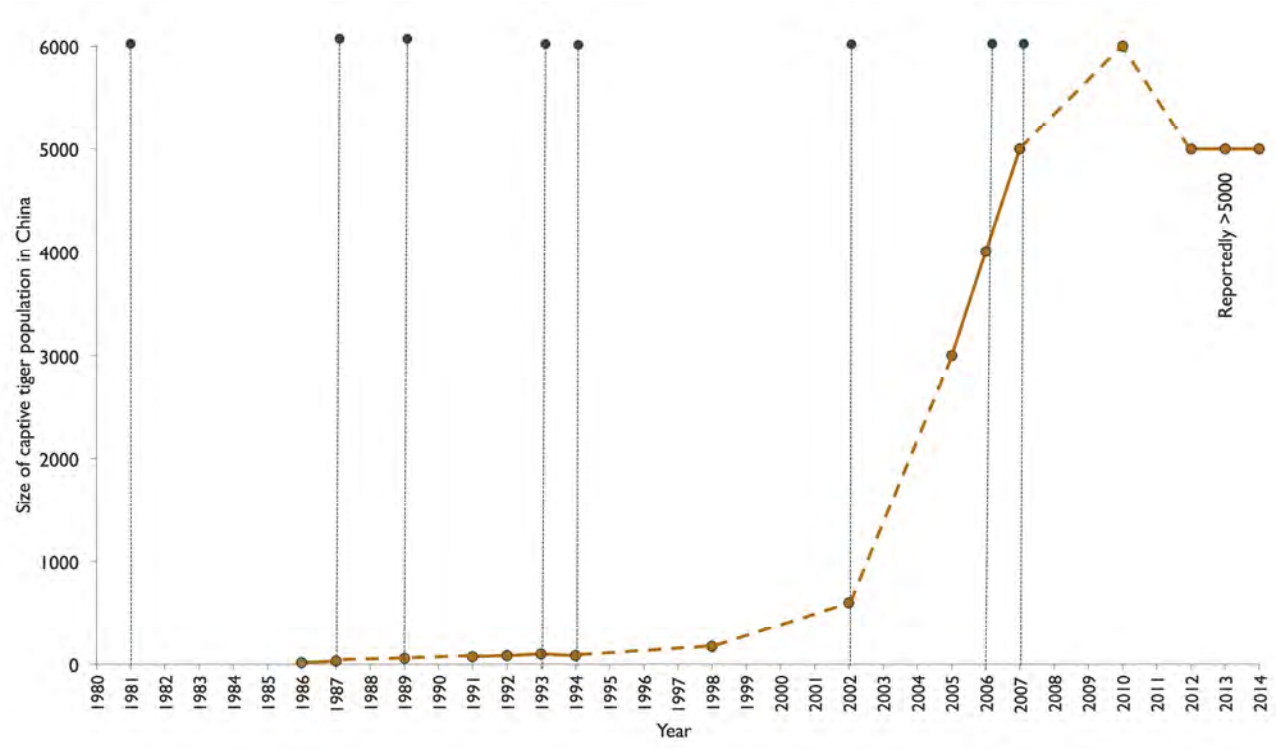


Figure 1 Growth of the captive Tiger population in China in relation to the regulatory measures (vertical lines) adopted to protect Tigers and Asian big cats (Table 1). Solid lines join records available for consecutive years; dashed lines join non-consecutive records (*Source*: CITES, 2010a, 2012, 2013; EIA, 2013, 2014a,b; Nowell and Ling, 2007; Nowell and Pervushina, 2014; People's Republic of China, 2006; SSN, 2014)

LETTING THE CAT OUT OF THE BAG: THE EMERGENCE OF THE LION BONE TRADE IN SOUTH AFRICA

The first newspaper reports alerting South Africans to an emerging market for Lion bones occurred in March 2009 when the Vietnamese Nguyen van Hai was arrested in Pretoria (and subsequently deported) for being in possession of Lion carcasses and parts (Anon., 2009a,b,c; Hosken, 2009; Miller, 2009; Otto, 2009a,b,c). Eight months later in December 2009 the public were made aware that a CITES permit had been issued to a Free State farmer to export Lion bones legally (Rademeyer, 2012a; Smith, 2009). It was assumed that the bones were being sold directly to China, but there are no official records of Lion skeletons/bones being exported there that year or the year thereafter (*Source*: UNEP-WCMC CITES trade database; see Figure 23a). Unbeknownst to the public however, and contrary to what has

been publically reported, the first CITES permit to export Lion body parts to Lao PDR was for 10 skulls/skins and 20 floating bones (derived from 10 Lions) in early 2008 (Table 2). Then in mid-2008 the first permits to export skeletons to Southeast Asia were issued for the sale of 35 skeletons to Lao PDR (Anon., Issuing Authority, *in litt.*, 2013) – but the investigation for the current study revealed that the destination country was incorrectly reported as "Viet Nam" (deduced from *in litt.* correspondence with Anon., Issuing Authority, June 2013) (see also Table 8). This error was only detected during our investigation in June 2013. A second permit was issued later in 2008 to export 15 skeletons, also incorrectly recording the shipment as being bound for Viet Nam instead of Lao PDR.[3]

Annual CITES fauna/flora import/export statistics are usually compiled about a year or more after the end of a calendar year. Hence, there was no way of knowing in 2009/2010 that what was believed to be a "limited trade" was growing rapidly. And, since it was known (1) that markets in East–Southeast Asia were driving the demand, (2) that cat bone traders were prepared to accept Lion bones as an alternative to Tiger bone, (3) that Lion bones were being passed off as free-ranging Tiger bones in medicines and tonics, and (4) that it is difficult to distinguish between Lion and Tiger bones, the conservation world was becoming increasingly nervous about where the trade might be headed and what impact it would have on wild populations.

In response to several questions from members of the South African parliament to the Minister of Water and Environment Affairs in 2011, details of the quantities of Lion bones exported to Lao PDR in 2009 and 2010, as well as the names of the exporters and recipients of each consignment exported to Lao PDR in 2009 and 2010, were made public for the first time and published on the Department of Environmental Affairs (DEA) website (National Assembly, 2011a, 2011b, 2011c, 2011d). The following information was released by DEA and caused a stir across South Africa:

1. In 2009 and 2010, 85 and 235 carcasses/skeletons were exported to Lao PDR respectively under the provisions of CITES;
2. Most of the skeletons originated from the North West Province;
3. Of the 16 consignments listed as being exported to Laos:
    a. The importers were:
        i. Vixay Keosavang – received 9 consignments
        ii. S. Durosagham/Duarseram – received 4 consignments
        iii. Bounpasong Paphatsalang – received 2 consignments
        iv. Jacek Raczka received – 1 consignment
    b. The exporters were:
        i. Mr JJ van der Westhuizen from Letsatsi la Africa – exported 7 consignments
        ii. Mr GJ van Zyl from Hatari Taxidermy – exported 3 consignments
        iii. Sandra Linde taxidermy – exported 2 consignments
        iv. SH Rothman exported – 2 consignments
        v. Mr T Cloete and Marnus Steyl (c/o Williamson Savuti Taxidermy) – exported 1 consignment each.

After Nguyen van Hai's arrest in March 2009, the next arrests in connection with Lion bones occurred in June 2011 when two Thai men (Phichet Thongphai and Punpitak Chunchom) were found in possession of 59 Lions bones hidden in a house in Edenvale, east of Johannesburg (Du Plessis, 2011a; South African Revenue Service, 2011). During their June 2011 court appearance, Thongphai and Chunchom admitted in an affidavit that they worked for *"Vichai Company"* in Lao PDR, and that the *"main business"* of the company was to trade in Lion bones (Du Plessis, 2011a,b). Furthermore, they *"were sent to South Africa by the company to view and approve lion bones to be bought and shipped to the company"* (Du Plessis, 2011a,b). Thongphai also revealed that the *"company for which I worked is usually contacted by farm owners in South Africa and advised that they have lion bones for sale"*. There is no information on when exactly these visits to South Africa commenced, or when the farm owners allegedly first made contact, however evidence presented during the court case of Chumlong Lemtongthai suggests that this may have been in 2008 or earlier (inferred from Fuller, 2013). Both men were fined R10 000 each and a heavier sentence was suspended on condition that they leave South Africa on pre-booked flights within two days of their conviction (Du Plessis, 2011a).

The Lao-based "Vichai Company" that Thongphai and Chunchom admitted working for is the Xaysavang Export-Import Company in Paksane, Bolikhamxay Province, central Lao PDR, which is believed to be led by Vixay

[3] The mistakes were detected when the author queried the relevant Issuing Authority about two permits issued to export skeletons to Viet Nam. When the Issuing Authority re-examined the permits on our request, they realized that both "Lao PDR" and "Vietnam" were listed in the address. Clearly the cargo was destined for Lao PDR, not Viet Nam. In retrospect, no exports to Lao PDR from South Africa had ever occurred until then and the country was possibly an improbable destination to the official concerned. In addition, air cargo flies to "Vientiane", the capital city of Lao PDR – which sounds similar to "Viet Nam". It is thus also likely that some of the other initial exports were incorrectly recorded as Viet Nam instead of Lao PDR.

Keosavang (EIA, 2014b; Rademeyer, 2012a; U.S. Department of State, 2013). Paksane is on the Mekong River bordering Thailand and two hours drive from the Laotian capital of Vientiane (see Map 2). Keosavang and/or the Xaysavang Company have been repeatedly associated with exports of Lion bones to Lao PDR (*Source*: EIA, 2014b; National Assembly, 2011d; Rademeyer, 2012a; U.S. Department of State, 2013; anonymous personal communications accumulated between January and July 2013) – starting in or before 2008. In 2013, the U.S. Department of State (2013) offered a reward of up to USD1 million for information leading to the dismantling of the Xaysavang Network.

The Xaysavang Company was not only trading in Lion bones however (U.S. Department of State, 2013). Evidence linking the Lion bone trade to that of rhino horn trade emerged when, seven days after Thongphai and Chunchom were repatriated, police arrested Chumlong Lemtongthai, the leader of an alleged Thai rhino poaching syndicate, at the same Edenvale residence on 9 July 2011 (Du Plessis, 2011c; Macleod, 2011; Rademeyer, 2012a; South African Revenue Service, 2011). During Lemtongthai's court appearance days later it emerged that he was arrested after a Thai Airways employee allegedly working with the syndicate for more than three years decided to inform authorities of the syndicate's activities, including that a Free State game farmer would source rhinos and inform Lemtongthai of the number of animals that were in place to hunt (Fuller, 2013; Macleod, 2011; Rademeyer, 2012a; Smillie, 2011). Lemtongthai would then contact Chunchom to source the "hunters", and Chunchom would recruit Thai sex workers to "hunt" and pose with the dead rhinos (Macleod, 2011; Rademeyer, 2012a; Smillie, 2011). Hence, Lemtongthai and Chunchom were part of the same Edenvale-based Asian syndicate and working for Xaysavang (du Plessis, 2011c; Rademeyer, 2012a; Smillie, 2011). Details of the activities of Lemtongthai and the Free State game farmer with respect to the rhino horn trade and factors driving the escalating rhino horn trade are covered extensively by Julian Rademeyer's 2012 book *"Killing for Profit"* (information on the Lion bone trade is also reported therein) (Rademeyer, 2012a) and TRAFFIC's 2012 report on the rhino horn trade (Milliken and Shaw, 2012). Noteworthy, however, is the link of the Lion bone trade to some of the key people proven in court to be involved in the illicit trade in rhino horns.

It is curious to note that, despite the connections of Lemtongthai to the Lao-based wildlife export company, the only two known legal exports of rhino horns to Lao PDR occurred in 2010 and 2011 when four and eight rhino horns respectively were exported there (UNEP-WCMC CITES trade database, accessed June 2013). Instead, the majority of exported rhino horn was destined for Viet Nam. The number of Vietnamese hunters and the number of rhino horns exported to Viet Nam had been on the rise since 2003, but the numbers began escalating in 2006 (see Figures 14 & 16 and Table 9 in Milliken and Shaw 2012; also Figure 2 and Table 5 in this report), and especially from 2009 (UNEP-WCMC CITES trade database; Milliken and Shaw, 2012). Disturbingly, incidents of rhino poaching took a turn for the worse in South Africa in 2008 when the number of rhinos killed rose to 83; in 2009 the number killed increased to 122, and by 2011 448 rhinos were killed in one year (Figure 2). Previously the national average for 2003–2007 was 20 rhinos per year (from Figure 21 in Milliken and Shaw, 2012).

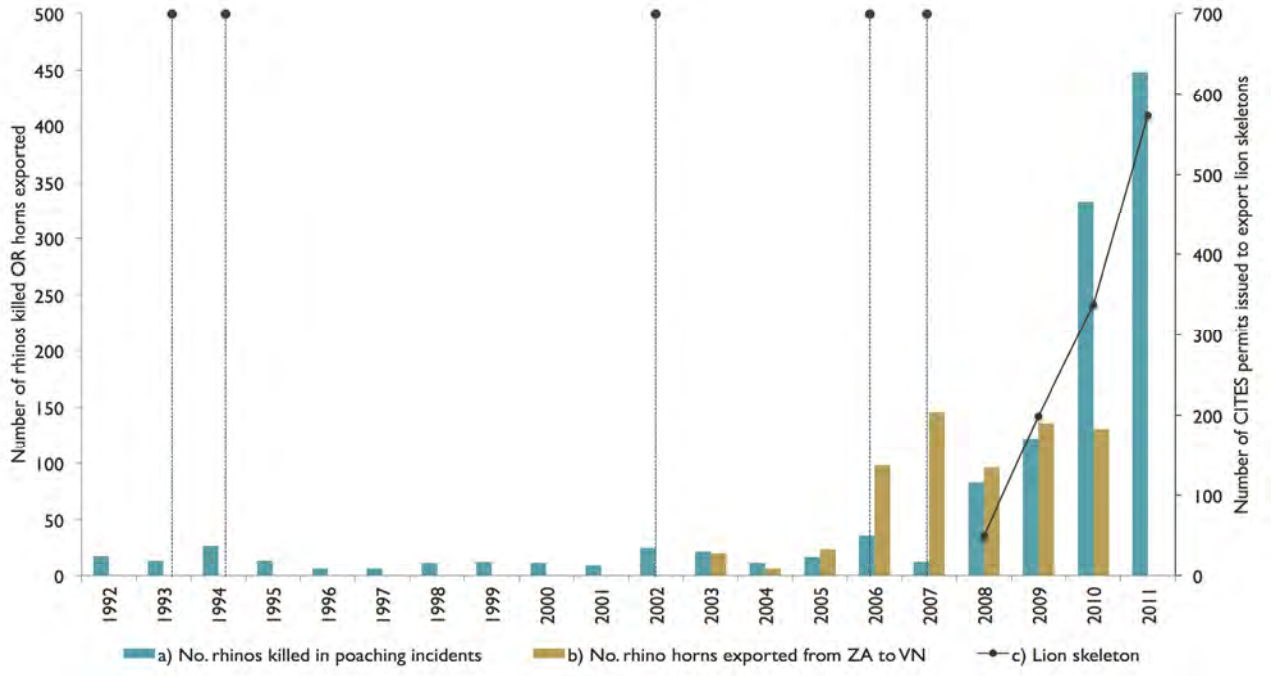


Figure 2 (a) The number of rhinos killed in South Africa, (b) the number of rhino horns exported to Viet Nam from South Africa, and (c) the combined number of Lion skeletons listed on permits issued for export to China, Lao PDR, Thailand and Viet Nam from South Africa. Vertical lines indicate years that measures were adopted to protect Tigers and Asian big cats. [*Sources*: Rhino data obtained from Figure 21 & Table 9 in Milliken and Shaw (2012). Lion data from this report]

Punpitak Chunchom was rearrested with another Thai national at OR Tambo airport on 4 November 2011 after re-entering the country using a passport in which his first name had been changed (du Plessis, 2011d). It was suspected that Chunchom had returned to *"engage in illicit activities"* and to buy Lion bones from South African game farmers to export to Southeast and East Asia – but this time he was also accused of running the rhino horn smuggling syndicate with Lemtongthai (du Plessis, 2011b,e; Mail & Guardian, 2011). When the case came to trial a year later, Chunchom had his case joined with that of Lemtongthai and the Free State game farmer. Lemtongthai was eventually sentenced to 40 years in jail in November 2012 for charges relating to illegal rhino hunting and horn exports. The charges against his co-accused, including Chunchom, were dropped in exchange for Lemtonghthat's guilty plea. Less than a month later however, new charges of illegal hunting were laid against Lemtongthai, Chunchom and the Free State farmer – but Chunchom had skipped the country on a false passport on 10 November 2012. A warrant for Chunchom's arrest was issued, but he remains a fugitive and is listed on INTERPOL as a wanted person.[4] Lemtongthai appealed his 40-year sentence in 2013 and had it reduced to 30 years[5]; in September 2014 he appealed the sentence again and had it reduced to 13 years.[6]

In the court judgement from the 2014 appeal[6], the following admissions made by Lemtongthai to authorities in 2012 in connection with the Lion bone trade were published: (1) Vixay Keosavang is the director of Xaysavang Trading Export-Import company in Bolikhamxay Province, Thailand; (2) the company deals in the trade of rhino horn and Lion bones, teeth and claws; (3) Lemtongthai is a director of the company and was sent to South Africa by "Mr Qua Savang" (Mr Keosavang) to enquire about the purchase of Lion bones; (4) on Lemtonghtai's arrival in South Africa he saw various advertisements of the hunting of the big five, including rhino; and (5) Keosavang said that he would fund any trade in rhino horn. It was also reported that Lemtonghtai wanted to buy 300 sets of Lion bones (Fuller, 2013; Rademeyer, 2012b). The admissions made by Lemtongthai, Chunchom and Thongphai to the police during their 2011–2012 trials indicate that Xaysavang's involvement in the Lion bone trade precedes their involvement in the rhino horn trade, i.e. from at least 2008 or earlier, and that the company might have been one of the first to procure Lion bones from South Africa. This is deduced from their admissions that representatives from the Xaysavang Export-Import Company had visited South Africa to source Lion bones from game farmers – ostensibly at the invitation of South African farmers. Since the first known exports of Lion bones to Lao PDR took place in early 2008 (see text for Table 8), representatives from Xaysavang must surely have visited South Africa in 2007 or earlier to reconnoitre a source for the bones.

While exports of rhino horn had risen from 2006, it was the surge in rhino poaching incidents that is notable from 2008 (Figure 2). Was this increase in poaching related to the activities of Xaysavang in South Africa around that time? Xaysavang's involvement in the worsening of the rhino horn trade is hard to refute given their admissions and the court evidence presented against the company and Lemtongthai. However, we have no evidence regarding the year that Xaysavang representatives actually first visited South Africa and established ties to South African Lion breeders – hence their involvement in the increased exports of rhino horns to Southeast Asia c.2006/2007 cannot be demonstrated. If further information one day becomes available that establishes that Xaysavang was procuring Lion bones illegally c.2006/2007, then their answerability for the increase in rhino horn exports for that period could be interrogated. Based on the available evidence, however, only rhino poaching and the issuing of permits to export Lion skeletons can be coincided at this time (Figure 2). After Lemtongthai's arrest in July 2011, Macleod (2011) reported (presumably quoting the forensic investigator Paul O'Sullivan) that *"Before it moved into rhino poaching in South Africa the company traded in large quantities of lion carcasses and bones supplied by breeders in the North West and Free State"*. One wonders, therefore, if, when and how many Lion carcasses were illegally exported before 2008?

If the illicit trade in rhino horn worsened after the commencement of the Lion bone trade, then is the trade in Tiger bones similarly intricately linked to Lions? Furthermore, if, in addition to economic growth in Asia and the demand for Tiger products, the trade in Lion bones was inadvertently initiated by the measures adopted to protect Tigers, does this mean that the Tiger conservation crisis inadvertently set off a chain reaction of interlinking and unexpected events with some unforeseen consequences for another species on a different continent? It is an issue worth debating.

[4] http://www.interpol.int/notice/search/wanted/2013-33085. "Punpitak Chunchom" is listed on the INTERPOL website as being wanted by the South African judicial authorities for prosecution/to serve a sentence in connection with dealing in rhino horns.

[5] *Lemthongthai* v S (A82/2013) [2013] ZAGPJHC 294 (30 August 2013) (http://www.saflii.org/za/cases/ZAGPJHC/2013/294.pdf)

[6] *Lemthongthai* v S (849/2013) [2014] ZASCA 131 (25 September 2014) (http://www.saflii.org/za/cases/ZASCA/2014/131.pdf)

RESEARCH AIMS AND KEY ACTIVITIES

In light of concerns for the emerging trade in Africa Lion bones as a substitute for Tiger bones in Chinese and Southeast Asian markets, the aim of the research was to assess the South African trade in African Lion bones and other body parts, and to:

1. Examine the extent to which Lion bones were available through legitimate and illegitimate sources within South Africa;
2. Determine the source of the bones and parts (such as wild or captive bred); and,
3. Assess the potential impacts on South African wild Lion populations.

Key activities that needed to be undertaken:

1. Review and summarize scientific and grey literature containing reference to the Lion bone trade (but also summarising where possible trade in other Lion parts) and documenting linkages to the Tiger bone trade.
2. Compile and analyse South African government data, industry trade statistics, and field research data (for instance government conservation agencies, private landowners etc.) on the scale and frequency of legal and illegal bone trade within South Africa.
3. Develop interim research recommendations resulting in a publishable research report.

METHODS

Starting in January 2013, the research was conducted over five months in three phases: (1) the literature survey, (2) a compilation of South African government data and industry trade statistics, and (3) semi-structured and telephonic interviews with public and private sector stakeholders. The draft report was written and edited over two months and reviewed from August 2013 to August 2014. Except where specified, most quantitative trade data are correct to mid-2013.

LITERATURE SURVEY AND DATA COLLECTION

A comprehensive literature and database search was conducted to collect as much information as possible on any historical and current issues relevant to Tiger and Lion conservation, population size (captive and wild), anatomy and morphometrics (Appendix 4), legislation, the captive breeding and hunting industries, the legal and illegal trade in large cat products and bones, trade flows, the value of the bones and derivatives, the impacts of hunting on populations, and the South African traditional medicine trade. One goal was to crosscheck all information and trace it back to a verifiable and original primary source, where possible, rather than relying on secondary and tertiary accounts for the information.

Sources of information include: articles in peer-reviewed and non-peer-reviewed journals and books; online media sites for newspapers and magazines across the world (e.g. http://www.lexisnexis.com); documents from South African government websites (national and provincial, e.g. National Department of Environmental Affairs [DEA, http://www.environment.gov.za)], South African National Parks [SANPARKS]); a variety of reports and resources from inter-governmental organizations such as CITES, INTERPOL, IUCN and others; conservation NGO reports including from TRAFFIC and WWF; professional hunter websites (e.g. PHASA, African Indaba); informal blogs and opinion pages; anti-poaching groups; university websites; and many others. More than 300 different websites were consulted in total. Trade data on legal exports of Lions and Tigers were obtained from the UNEP-WCMC CITES trade database. In addition to online sources, DEA and the South African CITES Scientific Authority made valuable unpublished data and reports available on request.

Regarding nominal information, the only names mentioned in this report were for persons: (1) who were arrested, prosecuted and convicted in South Africa, and their names are recorded in court documents; (2) whose names were published in publically available South African government documents that can be downloaded from the appropriate websites; and (3) wanted by INTERPOL and/or the U.S. State Department.

Once the baseline literature survey was completed, the information was synthesized to assess what was known and the gaps in the information. Based on this synthesis, a list of potential people and organizations to be interviewed was drawn up and a wish list of questions they could be asked was compiled.

INTERVIEWS

Semi-structured interviews were conducted from April to July 2013 with representatives from various government departments, non-government organizations and people from the private sector. The interviews were semi-structured in that the list of questions was used as a guide during the discussions. Most interviews were electronically recorded with the prior consent of the interviewees. The interview recordings, totalling more than 15 hours, were later transcribed verbatim. Where necessary, email and telephonic follow-ups were made to obtain clarity on any matters that required it.

Interviewees included: provincial nature conservation and/or law enforcement officers from the Free State, Mpumalanga, Northern Cape, Eastern Cape and North West (time constraints prevented interviews with remaining provinces); the NSPCA (National Society for the Prevention of Cruelty to Animals); PHASA (Professional Hunters Association of South Africa); SAPBA (South African Predator Breeders Association); various representatives from SARS (South African Revenue Services); SAPS (South African Police Service), the Endangered Wildlife Trust, and other persons who requested to remain anonymous.

LION POPULATION IN SOUTH AFRICA

OVERVIEW

Globally, the free-ranging Lion population (including the Asiatic Lion *Panthera leo* ssp. *persica*) is estimated to be <20,000 animals across 26 range States (Bauer *et al*., 2015). According to the most recent global IUCN Red List Assessment, Lions are Vulnerable (VU A2abcd), having declined approximately 42% over the last 21 years (Bauer *et al*., 2015). The South African Lion population, however, has not declined and the species is not currently threatened. In 2004 the population was assessed nationally as Vulnerable (VU D1) because there were estimated to be <1000 free-ranging mature breeding individuals (Friedmann and Daly, 2004). The status of the South African population will, however, be downgraded to Least Concern on the national Red List in preparation (Bauer *et al.*, 2015).

Worldwide, one of the biggest threats to the species has been habitat loss, which has reduced the Lion's range by 75% in the past 100 years (Riggio *et al.*, 2013). Further threats to Lions include: human-Lion conflicts; prey-based depletions; a poorly regulated sport hunting industry; and inbreeding (Funston and Miller, 2013; Macdonald and Willis, 2013; Packer *et al*., 2013). The trade in Lion bones is a potentially *"looming"* threat (Funston and Miller, 2013), and the impact on wild populations in South Africa is addressed later in this report.

BOX 1: Definitions for wild, free-roaming and captive lions used in the report (as created by the authors)

- **Wild:** genuinely wild and natural lions are those in 'founder' populations of the Kruger National Park and the Kgalagadi in South Africa, or Etosha National Park in Namibia;
- **Secondary-wild:** lions from founder stock that have been translocated and reintroduced into areas where they were previously extirpated and can be considered free-roaming;
- **Introduced:** lions from founder stock that have been translocated and introduced into areas where they previously did not occur and can be considered free-roaming;
- **Free-roaming:** does not necessarily always equate to lions of wild origin, but also includes lions that were bred in captivity and released into a free-roaming system where they are now self-supporting.

A distinction is also made in this report between '**captive breeding**' and '***ex situ***' facilities. While captive breeding facilities are generally considered to be 'off-site' conservation facilities, the purpose of most captive facilities in South Africa is to breed lions commercially for consumptive purposes such as trophy hunting – thus animals are 'produced' rather than 'protected' outside of their natural habitat and there is rarely genetic input from wild lions. '*Ex situ*' facilities in this report refer to places such as zoos and sanctuaries where some breeding may occur but the lions are protected.

WILD LION POPULATION IN SOUTH AFRICA

The southern African Lion population is ≈35% of the global population (derived from Riggio *et al.*, 2013), mainly living in protected areas like the Kruger National Park. Various figures have been cited for the size of the wild/free-roaming population in South Africa, but 2013 estimates by the CITES Scientific Authority (2013) were 2743 Lions. Introductions and reintroductions of Lions into State- and privately-owned reserves across South Africa have augmented the population numbers over the years. While the number of Lions within State-owned reserves in most provinces has remained stable, the population in KwaZulu-Natal increased three-fold over a seven year period (2004–2010) due to recent reintroductions to both State- and privately-owned reserves (CITES Scientific Authority, 2013). There have also been (re-)introductions of Lions within other provinces in the last decade that have similarly increased population numbers across the region. The Free State is the only province not to have any free-roaming Lions (Appendix 3, Table A11).

Lions reintroduced into South African reserves come from three founder populations: the Greater Kruger ecosystem (the Kruger National Park and surrounding areas), the Kgalagadi Transfrontier Park and surrounding areas, and the Etosha National Park in Namibia (Slotow and Hunter, 2009; Hunter *et al*., 2012). Secondary populations have been established by translocating Lions from the smaller, newly restored populations (Hunter *et al*., 2012), for example the

Lions introduced into Mountain Zebra National Park in April 2013 are from the Karoo National Park and the Welgevonden Game Reserve. Hence in South Africa, the Lions from Kruger and Kgalagadi are the only naturally occurring "wild" populations. In all other areas, free-roaming Lions were locally extirpated as a result of hunting and changes in land use (mostly to farming) by the mid-20th century (CITES Scientific Authority, 2013). In the 1990s, there was a change in land-use patterns and a growth in the establishment of private game reserves accompanied by the private ownership of game animals. Lions were not only reintroduced into private reserves, but also State-, State-community and State-private owned reserves (Slotow and Hunter, 2009) in all provinces except the Free State and, until recently, Gauteng.

© JEALOUS MPOFU, PAINTED DOG CONSERVATION, HWANGE

Africa Lions at Nyamandlovu in Hwange National Park, Zimbabwe.

CAPTIVE LION POPULATION IN SOUTH AFRICA

In addition to Lions occurring within protected areas, the majority of South African Lions are in captivity and the numbers of animals and breeding facilities have increased since 2005 (Figures 3 & 4). The number of facilities, however, dropped to 149 in 2013 from the highs of 167–200 between 2008 and 2012. The biggest drop in the number of breeding facilities has been in the Free State, where levels reached 98–107 in 2008–2009 but were 70 in 2013 (Cadman 2009; Taljaard 2009; W. Boing, pers. comm., May 2013). Reasons for this drop include the strengthening of regulations within the province that have made it difficult for some breeders to comply with legislation and they have thus closed down the facilities or moved them to the North West province (Provincial Gazette [Free State Province] No. 119 of 2012; W. Boing, pers. comm., May 2013).

Most Lions in captivity originate from captive-bred stock that "services" the trophy hunting industry and, since 2008, the Lion bone trade, as: (1) a source of male Lions for trophy hunters, the skeletons of which are sold to East–Southeast Asia; and, (2) the females for breeding stock and purportedly the bone trade once they have ceased to be bred. In terms of South Africa's TOPS (Threatened Or Protected Species) regulations, wild Lions should not be introduced into captivity – but illegal incidences of adult Lions and cubs being brought into South Africa from the Kgalagadi have been confirmed (CITES Scientific Authority, 2013; Macleod, 2012a; W. Willson, pers. comm., May 2013).

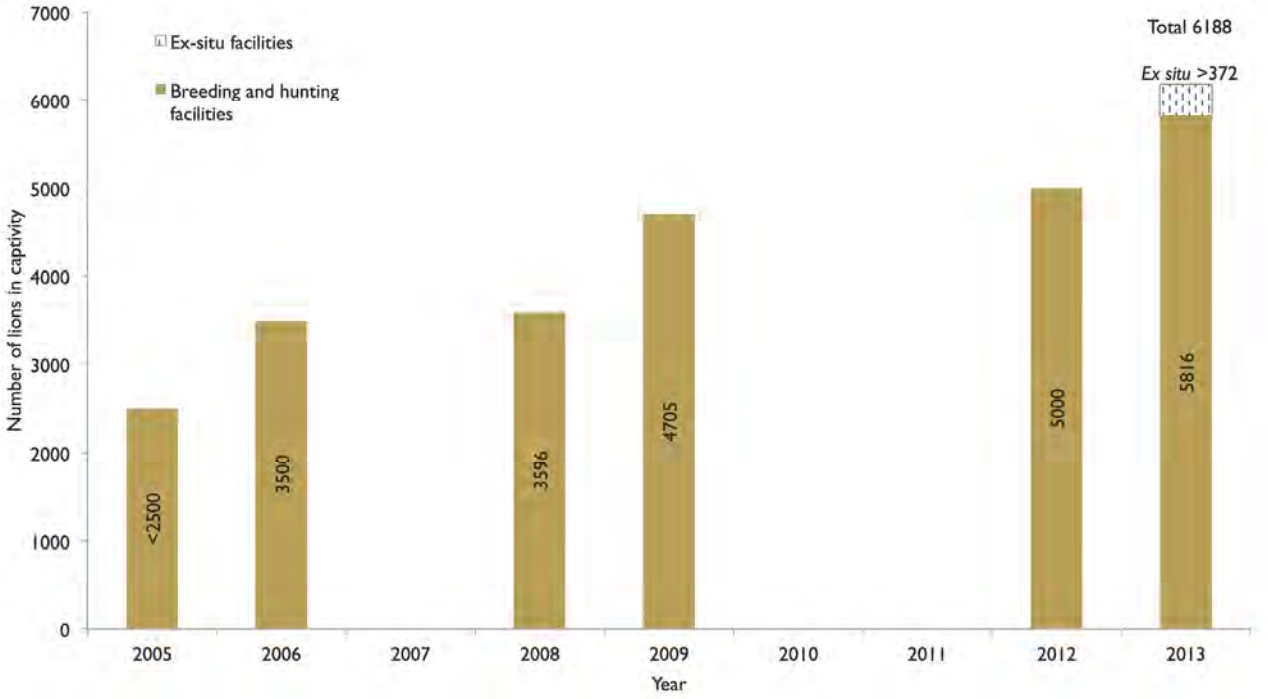


Figure 3 Estimated number of Lions in captive facilities in South Africa. *Ex situ* estimates for 2013 only (see definition in Box 1). (*Sources*: Cadman, 2009; CITES Scientific Authority, 2013; National Assembly, 2009a,b; Pickover, 2005; Taljaard, 2009; Anon., pers. comm., 2013)

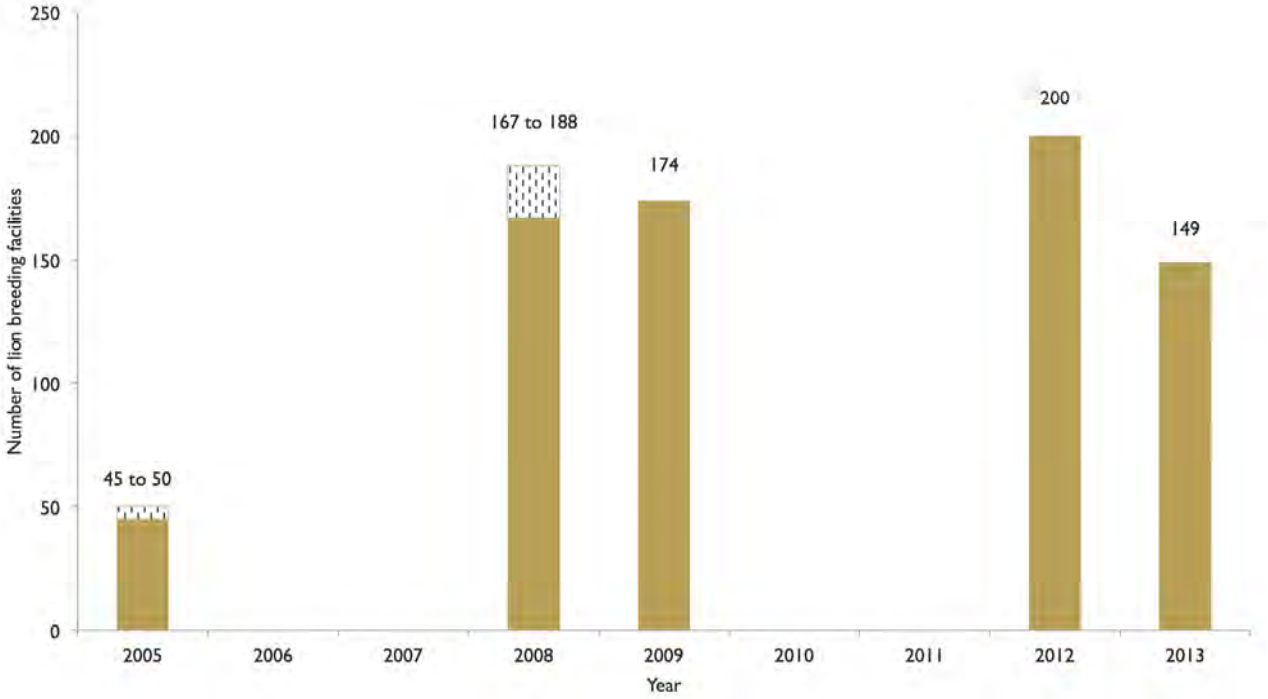


Figure 4 Number of captive breeding facilities in South Africa; data for estimates in 2012 may have been collected in 2011. (*Sources*: Cadman, 2009; CITES Scientific Authority, 2013; Macleod, 2012b; Pickover, 2005; Taljaard, 2009; K. Marnewick and W. Boing, pers. comm., May 2013)

Captive Lion stocks have occasionally been introduced into fenced reserves and erroneously called "wild". Even more erroneous, until corrected in early 2012, was the practice by some provincial permit Issuing Authorities of reporting captive bred Lions hunted for trophies as "wild sourced" on the CITES export permits. This practice led to incorrect reporting of the CITES trade records (CITES Scientific Authority, 2013) and was related to the regulation that Lions must be free-roaming for a specified period before they can be shot (*hence, no differentiation is made between "wild" and "captive" sourced lion derivatives in the trade analyses presented later in this report*). However, "free-roaming"

does not equate to "wild", and Lions are not transformed into self-supporting wild animals after 96 hours in a hunting camp (the minimum release period before hunting can occur in the North West Province, for example. See Table 3 for a provincial comparison of the release periods).

The prevailing view amongst carnivore specialists is that captive-bred Lions do not contribute to the conservation of the species, especially for population restoration purposes, since inbreeding is known to occur and thus compromises genetic integrity and provenance (Slotow and Hunter, 2009; Hunter *et al*., 2012; CITES Scientific Authority, 2013; Packer *et al*., 2013). Lion trophy hunting generates more revenue annually than any other hunted mammals (see Figure 11). Accordingly, economic outputs from the captive-bred Lion industry are assumed to have increased significantly (Lindsey *et al*., 2012a) as exports of products have increased. However, Lion breeding is regarded by many as a controversial "conservation" tool that purportedly reduces consumptive impacts on wild Lions through the targeting of captive-bred animals in the trophy hunting industry (CITES Scientific Authority, 2013; Lindsey *et al*., 2012a; Macdonald and Willis, 2013).

Most hunting (>95%) takes place on private property in the North West, Free State and Eastern Cape provinces using captive bred Lions (CITES Scientific Authority, 2013) – areas not normally associated with free-roaming Lions. Hunting of wild Lions on private properties in Limpopo, Mpumalanga and KwaZulu-Natal is limited, with less than 5% of all successful Lion hunts conducted in South Africa from 2008 to 2010 targeting wild Lions (CITES Scientific Authority, 2013). Lindsey *et al*. (2012a) reported that 0.9% and 1.1% of Lions hunted in 2009 and 2010 respectively were wild/free-roaming). Since wild Lions in small fenced reserves are an important source of non-consumptive revenue for the tourism industry (e.g. phototourism), especially Limpopo and Mpumalanga, there is no real benefit to hunting wild Lions except as the occasional source of revenue to contribute to the maintenance of areas where these Lion populations can continue to exist (CITES Scientific Authority, 2013).

Another segment of the South African captive Lion population are animals kept in *ex situ* facilities (e.g. sanctuaries, zoos, Lion parks) where roaming is restricted and there is a high level of human contact. For the most part these facilities are marketed as tourist attractions. Animals at these facilities: (1) may have been rescued from zoos, the "canned" hunting industry, or other circumstances; (2) may have been born in the wild or in captivity; (3) may or may not be sterilised; and, (4) may or may not be kept for breeding purposes. For reasons indicated in Box 1, this report treats animals in *ex situ* and captive-breeding facilities separately.

Africa Lion in the Johannesburg Zoo.

The following statement made by Buti Mathebula (Chief Director Free State Environment and Conservation) sums up one controversial view on the status of captive Lions: *"In the Free State, lions bred in captivity are kept for the purpose of trophy hunting. Bones which aren't used are removed as waste products. Lions in the Free State are not of any value*

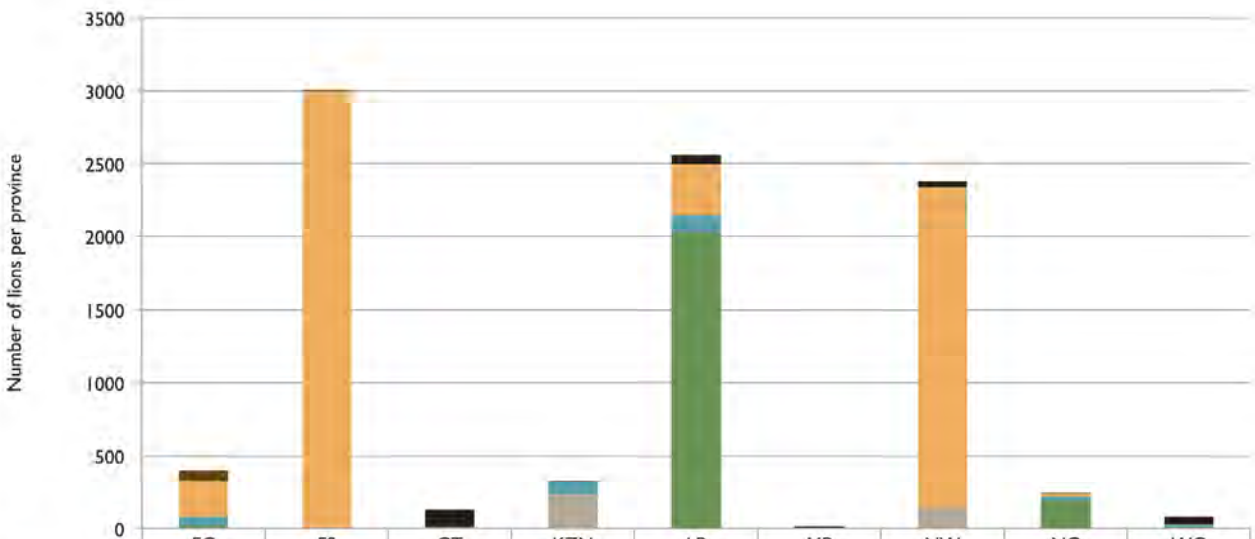
to us from an environmental point of view…if someone wants to hunt lions in the Free State, that's fine. We don't want these lions here. We're better off without lions in the Free State. There are problems with fences. If they escape, they kill people" (Smith, 2009).

2013 ESTIMATES OF THE SOUTH AFRICAN LION POPULATION

Lion population numbers for 2013 are updated in this report using information from published and unpublished sources, information provided by the provinces, personal communications and a non-exhaustive internet search for facilities that keep Lions. The population estimates are divided into five categories and summarized for each province. Appendix 3 gives a detailed account of the population per province, whereas Figures 5–7 and Box 2 summarize Appendix 3. The categories are:

1. Number of wild and secondary-wild Lions protected within South African National Parks (SANParks);
2. Number of secondary wild and introduced Lions protected within State-owned provincial game reserves;
3. Number of Lions of varying genetic origins that are managed in private mainly small, fenced reserves;
4. Number of Lions in *ex situ* facilities (i.e. Lions not kept/bred for consumptive purposes);
5. Number of captive-bred Lions.

The genetic origins of Lions in reserves, where they were born (in captive-breeding facilities or not) and the conditions under which they were raised beyond adulthood (captive or free-roaming), are important to the classification of what is truly wild, free-roaming and captive. South Africa is unique in terms of the large size of its captive-bred Lion population, the number of Lions that are privately owned, and the number of (re-)introductions. Lions of different genetic origins are regularly translocated across the country and owning them has become a big business – both for hunting and as tourist attractions. The proliferation of consumptive and non-consumptive breeding operations seems to have fostered ambiguities regarding the definitions of Lions that are "wild", "free-roaming", "captive", and "canned" and these terms are explained in Box 1 and throughout the report. A further note is that other free-roaming Lions in private reserves have not necessarily originated from founder and secondary populations, and broader-level conservation genetics may not be a consideration in their management.



	EC	FS	GT	KZN	LP	MP	NW	NC	WC
Ex-situ	72	6	118	10	64	10	40	2	50
Captive bred	250	3000	0	0	350	0	2196	20	0
Private GR	61	0	8	82	122	4	0	30	20
Province GR	0	0	0	234	0	0	140	0	0
SANParks	17	0	0	0	2023	0	0	190	8

Figure 5 The number of Lions per province (See Map 2 for abbreviations for the provinces). *[Note: the number of Lions in SANParks in LP is shared with MP]*

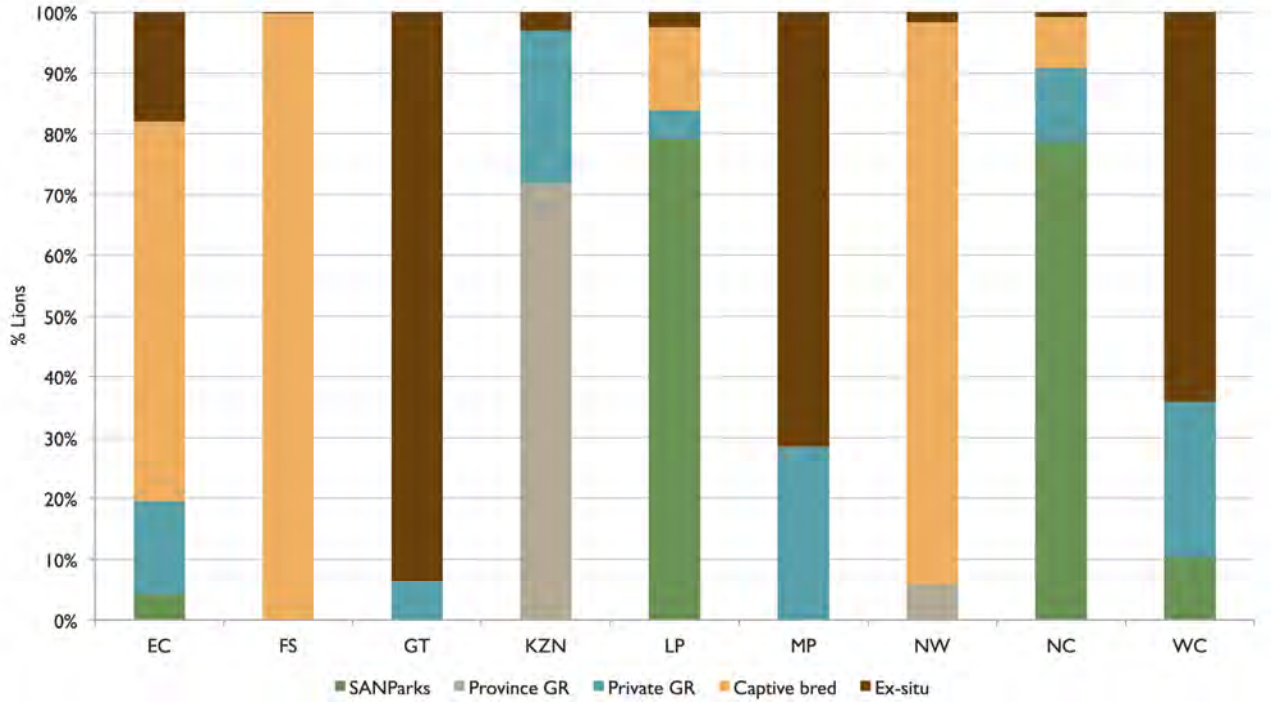


Figure 6 The proportion of Lions from different reserves types and facilities per province (See Map 2 for abbreviations for the provinces)

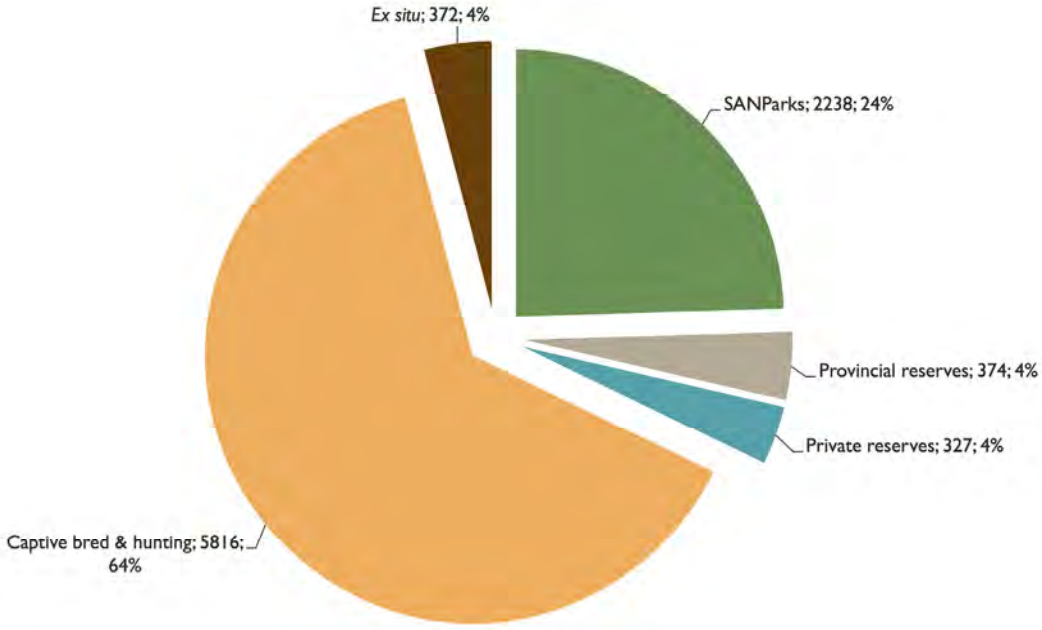


Figure 7 2013 estimates for the number and proportion of Lions in South Africa

BOX 2: The South African lion population in summary (2013)

- Revised estimates indicate that there are ≈9127 lions in South Africa:
  - 2939 (32.2%) free-roaming (including 2190 wild lions from naturally occurring founder populations)
  - 6188 (67.8%) in captivity (including 5816 from captive-breeding facilities)
- The majority of free-roaming lions are protected in SANPark reserves, and the populations in these reserves are stable
- The number of captive-bred lions almost doubled from 2005 to 2013 (Figure 3)
- The Free State is at the epicentre of the captive lion breeding industry, and has ≈3000 lions in 70 breeding and 2 hunting facilities (Figure 4; Appendix 3)
- The North West has ≈2196 captive animals in 64 hunting 'reserves'
- The number of lions in the North West and Free State constantly fluctuates because of the large number of translocations. The number of translocations from the Free State reached 30 per day at one stage (W. Boing, pers. comm., May 2013).
- All raw data in Appendix 3.

LEGISLATION

OVERVIEW

South Africa has a well-developed legal framework for the conservation, regulation and sustainable use of its biodiversity (http://www.sanbi.org). The legislation includes NEMBA (*National Environmental Management and Biodiversity Act, No. 10 of 2004*) and various provincial nature conservation ordinances used by nine provinces for protecting wildlife and regulating the trade thereof. However, implementation complexities and inconsistencies resulting from the provincial legislation (most of which pre-date 1994) have raised concerns that there are loopholes for illicit activities (Bürgener *et al*., 2001; Milliken and Shaw, 2012) and thus present compliance challenges.

Instead of a detailed analysis of all the regulatory mechanisms applicable to Lion conservation, breeding, hunting and trade administered by government departments and agencies such as the Department of Environmental Affairs (DEA) and the Department of Agriculture, Forestry and Fisheries (DAFF), we present a broad overview of the legislation as is pertinent to Lions. Milliken and Shaw's (2012) comprehensive review of South Africa's biodiversity policies (mainly applicable to the rhino horn trade) is worth consulting to gain a broader awareness of the issues concerning national and provincial legislation.

There are several legislative regulatory mechanisms applicable to all activities involving Lions (CITES Scientific Authority, 2013), namely:

1. The *South African National Environmental Management and Biodiversity Act (Act No. 10 of 2004)* (NEMBA). Since Lions are Vulnerable in terms of NEMBA, the permit system is further regulated through Section 56(1) of NEMBA, namely TOPS (Threatened or Protected Species Regulations of 2007),
2. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),
3. The various provincial nature conservation ordinances and acts,
4. The *National Environmental Management: Protected Areas Act (No. 57 of 2003)*.

In addition, South Africa is a signatory to two other regulatory conservation instruments:

5. The Convention on Biological Diversity (CBD),
6. The *SADC Protocol on Wildlife Conservation and Law Enforcement*.

1. NEMBA and TOPS

Because Lions are vulnerable in terms of NEMBA, a permit (regulated through TOPS) is required with respect to seven activities involving Lions ranging from the breeding and hunting of animals to the export of the bodies and parts thereof. In order to be issued with a provincial hunting permit in the past, for example, most provinces only required a hunter to get written permission from a landowner and a hunting licence. From 2008 the provincial permit became a national permit in accordance with NEMBA and TOPS. The specific NEMBA regulations pertinent to Lions are not listed in this report, but the following is a summary of the legislation by the CITES Scientific Authority (2013):

"A permit is required in terms of NEMBA if a person intends to carry out any restricted activity involving lion; whether live or dead; whether dead specimens involve the whole animal or any part thereof; and whether dead specimens are fresh, preserved or processed. These restricted activities include keeping, hunting, catching, breeding, selling, conveying or exporting from the country. The permit system is regulated through the Threatened Or Protected Species (TOPS) regulations (2007), which have been promulgated in terms of NEMBA. The TOPS regulations also require the compulsory registration of a person who intends to operate a captive breeding facility, commercial exhibition facility (zoo), sanctuary or rehabilitation facility, or operate as a wildlife trader, involving lion."

The goal of the TOPS regulations is to *"provide a national standard for the utilisation of named threatened or protected species in both owned and wild populations across South Africa"* and to provide *"additional protection in provinces where legislation is not adequate"* (Cousins *et al.*, 2010). Guidelines for the implementation and interpretation of TOPS state, for example, that: (*a) TOPS regulations do not replace or repeal any provincial legislation, but apply in addition to it; (b) a person may not carry out any restricted activity as it applies to TOPS specimens without a TOPS permit; (c) provincial conservation authorities may apply stricter measures than required in terms of the TOPS regulations, but not less strict measures.* All permits (including CITES permits) for Lions are "integrated permits" (except Mpumalanga and the Western Cape, which don't implement TOPS); colloquially put, this means *"if the provincial ordinance and TOPS speaks to NEMBA, then it's an integrated permit"* (quote from an

interviewee, May 2013). The formal description of an integrated permit written in TOPS regulations (Section 92 of NEMBA and TOPS Regulation 4) is:

- *If a permit is required for a restricted activity in terms of both provincial legislation …..… **and** the TOPS regulations, the issuing authority may issue one permit only, which is referred to as an integrated permit.*
- *The integrated permit may be issued on the format of the provincial permit **or** on the format of the TOPS permit.*
- *If the issuing authority issues the integrated permit on the format of the provincial permit, the provincial permit can be regarded as a TOPS permit only if:*
    - *The relevant provisions of the TOPS regulations and the provincial legislation have been complied with; and*
    - *The permit contains all the compulsory information required in terms of the TOPS regulations and specifies the authority that has issued the permit.*

2. CITES

CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) is an international co-operation agreement between governments that aims, through a system of trade prohibitions and reciprocal permits and certificates, to ensure that international trade in wild animals and plants does not threaten their survival (Abensperg-Traun, 2009; http://www.cites.org). All import, export and re-export of species covered by the Convention has to be authorized through a licencing system (http://www.cites.org), and the Appendix in which a species is listed informs the requirement for import/export permits. The permits are issued through the Management Authority of the country. Asiatic Lions, like Tigers, are listed in Appendix I of CITES, and trade in specimens of these species is only permitted in exceptional circumstances. African Lions are listed in Appendix II – i.e. a species that is not necessarily threatened with extinction, but trade must be controlled in order to avoid utilization that is incompatible with their survival (http://www.cites.org, retrieved June 2013). In terms of the regulations, export/re-export permits are mandatory for African Lions, but import permits are not needed unless a country requires one as part of their stricter domestic measures.

CITES permits issued in South Africa for exports of live Lions and their derived parts and products are "TOPS integrated permits" and resemble the sample document in Figure 8. The permits are issued by the Management/Issuing Authority of the country (generally by the provincial permit issuing official) and consist of four duplicate pages. The Issuing Authority of the province keeps a copy of Page four of the permit. The quantity recorded on the permit (Item 11 in Figure 8) indicates the quantity that the exporter intends to export to the importing country. Item 14 on the permit ("export endorsement"), however, is to be completed by the official who inspects the shipment at the time of export/re-export. The quantities actually exported/re-exported are to be entered here – and thus verify the quantities listed when the permits were issued. The official who inspects the shipment is meant to return the third page of the permit to the Issuing Authority, which should thereby enable the total quantity of Lion parts and products exported annually to be compiled. However, one person interviewed for this study said that the third page of the permit is not always returned to the Issuing Authority and therefore a complete tally of exports is rarely compiled (Anon., pers. comm., July 2013). Thus, information on exports of CITES-listed species is based on the quantities obtained from the permits issued and not the quantities actually exported.

3. Provincial acts and ordinances

A tier of complexity is added to the management and trade of Lions (and Tigers, see later in the report) by the individual provincial acts and ordinances. Each of the nine provinces have regulations that require compliance in addition to NEMBA, TOPS and CITES. Some provinces use the same ordinances that pre-date 1994 when provincial boundaries were changed and the number of provinces increased from four to nine (e.g. Eastern, Western and Northern Cape use the old *Cape Nature Conservation Ordinance No. 19 of 1974*) (Table 3). The North West Province, which straddles parts of what were the old Transvaal and Cape Provinces, uses a combination of three old ordinances (Table 3) – and this presents opportunities for transgressions and non-compliance if the Acts have contrary provisions with regards to certain activities. Only Limpopo and Mpumalanga Provinces have promulgated new nature conservation/environmental management Acts since 1994. According to a summary by the CITES Scientific Authority (2013) on Lions:

"Lion is also protected under various provincial ordinances/acts, and provincial conservation authorities often require ecological management plans when lion is introduced to a property. Utilisation and keeping of lion in the wild is closely managed in the province of Gauteng due to the dense human population in the province. In the Northern Cape, lion populations are well contained with electrical fencing. Provincial legislation in Mpumalanga regulates the killing of damage causing lions. In all provinces, most lion hunts are attended and monitored by conservation officials.

The Northern Cape Department of Environment and Nature Conservation has adopted a policy for large predators that ensures Lions (and other large predators) are introduced to areas that are sufficiently large enough to support self-

sustaining prey populations and a viable group of the predator concerned. Although Lions may still be hunted in these areas, the animals are free roaming on the property and can interact with other sex and age classes."

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA

EXPORT
RE-EXPORT
IMPORT
OTHER

2. Valid until

3. Importer (name and address)

4. Exporter / Re- exporter (name and address and country)

3a. Country of import

5. Special conditions

For live animals, this permit or certificate is only valid if the transport conditions conform to the Guidelines for Transport of Live Animals or, in the case of air transport, to the IATA Live Animals Regulations Permit / certificate valid for one consignment only

5a. Purpose of the transaction (see reverse)

5b. Security stamp no

6. Name, address, national seal / stamp and country of Management Authority

Department of Environmental Affairs
Private Bag X 447
PRETORIA
0001
SOUTH AFRICA

	7,8 SCIENTIFIC NAME (genus and species) AND COMMON NAME OF ANIMAL OR PLANT	9. Description of Specimens, including identifying marks or numbers (age/sex) if live	10. Appendix No. and source (see reverse)	11. Quantity (including unit)	11a. Total exported / quota
A	7.8	9.	10.	11.	11.a
	12. Country of origin / Permit No / Date / 12a. County of least re-export / Certificate No / Date / 12b. No of the operation ** or date of Acquisition***				
B	7.8	9.	10.	11.	11.a
	12. Country of origin* / Permit No / Date / 12a. County of least Re-export / Certificate No / Date / 12b. No of the operation ** or date of acquisition***				
C	7.8	9.	10.	11.	11.a
	12. Country of origin* / Permit No / Date / 12a. County of least re-export / Certificate No / Date / 12b. No of the operation ** or date of Acquisition***				
D	7.8	9.	10.	11.	11.a
	12. Country of origin* / Permit No / Date / 12a. County of least re-export / Certificate No / Date / 12b. No of the operation ** or date of Acquisition***				

* Country which the specimens were taken from the wild, bred in captivity propagated (only in case of re-export)
** Only for specimens of Appendix 1 species bred in captivity or artificially propagated for commercial purposes
*** For Pre-Convention specimens

13. THIS PERMIT / CERTIFICATE ISSUES BY:

Place / Date / Security stamp, signature and official seal

14. EXPORT ENDORSEMENT

15. Bill of Lading/Air Waybill Number

Block / Quantity
A
B
C
D

Port of Export / Date / Signature / Official stamp and title

Figure 8 Sample CITES permit issued in South Africa when persons apply to export live Lions, body parts and derivatives. The Management Authority is required to compile an annual report on the CITES permits issued by the provinces, and then submit this trade report to the CITES Secretariat. The CITES trade database, managed by UNEP-WCMC, holds all the national records of trade of CITES-listed species. The annual national reports compiled by DEA for South Africa from 2006–2011, and the data from the UNEP-WCMC CITES trade database from 1975–2011, were used in this report to analyse all trade in Lion products from South Africa

Table 3 Provincial comparisons concerning the conditions to which a landowner must adhere *apropos* keeping and hunting large predators. TOPS integrated permits are required in addition to the provincial ordinance permits

Province	Release period before date of hunt	Minimum area of hunting camp and no. Lions per camp	Waiting period for permit	Ordinance used, in conjunction with NEMBA	Notes from interviews and legislation:
NW	4 days	Not stipulated, however a respondent said it is >400 ha (Anon., pers. comm., May 2013)	≈10 days	1) *Transvaal Nature Conservation Ordinance 12 of 1983* 2) *Bophuthatswana Nature Conservation Act 3 of 1973* 3) *Cape Nature Conservation Ordinance 19 of 1974*	1) TOPS integrated permits apply 2) Hunter requires written consent from the landowner 3) Records of up to 6 Lions hunted a day on the same farm 4) No published policies on activities regarding Lions by landowners and trophy hunters in the NW; this policy is being developed by SAPBA
FS	≥30 days	≥1000 ha; ≤10 Lions allowed to be released per 1000 ha at a time; ≤10 Lions allowed in a 1000 ha camp	?	*Free State Nature Conservation Ordinance 8 of 1969*	1) TOPS integrated permits apply 2) Lions must be micro-chipped or else no permits are issued 3) Officials must be present during the hunt 4) Permits only issued by a permit evaluation committee 5) Permits require several signatures 6) Lion may not be released in an area adjacent to a holding facility for other Lions 7) Lions released into a hunting camp may be fed domestic animals 8) Fences of hunting camps must meet approved specifications 7) *Landowner or owner of the Lion skeleton must acquire a permit to keep, sell, transport or export the skeleton*
EC	6 months	2000 ha per Lion; adult Lions only	≈30 days	*Cape Nature Conservation Ordinance 19 of 1974*	1) TOPS integrated permit 2) Hunter requires written consent from the landowner 3) Regulations for fence height and size of property to release Lions determined "later" 4) Lions are micro-chipped 5) Applications for permits received in any of the 6 regional offices have to go to Head Office to be checked and signed before the permit is issued
NC	Unofficial source says up to one year	?	?		1) TOPS integrated permit
WC	?	?	?		1) Not implementing TOPS
LP	24 months	?	≈30 days	*Limpopo Environmental Management Act 7 of 2003*	1) TOPS integrated permits apply 2) Lions may not be hunted within 24 months after introduction onto the property
MP	?	?	?	*Mpumalanga Nature Conservation Act 10 of 1998*	Not implementing TOPS
KZN	?	?	?	*KwaZulu Nature Conservation Act 29 of 1992*	TOPS integrated permit
GT	Currently not applicable, but trophy hunting may be allowed once new populations are established (CITES Scientific Authority, 2013)				

* For captive breeding, the Free State requires a minimum of one ha per two Lions. One person interviewed *"thinks"* that NW keeps up to 20 or 30 Lions per hectare (Anon., pers. comm., May 2013)

Some of the differences in the South African provincial ordinances and Acts as they apply to Lion hunting are summarized in Table 3. One of the biggest differences is the release period prior to hunting. In the North West, trophy hunters are allowed to hunt Lions four days after being released, whereas in the Eastern Cape the release period is six months (Table 3). The minimum area of the hunting camp also varies between provinces with North West having no

stipulated area, but the Eastern Cape requiring there to be 2000 hectares (ha) per Lion. The strength of the provincial hunting legislation, and the rigour with which it is enforced, has contributed to the extent to which Lion hunting occurs within the provinces. In recent years, for example, the Free State has implemented and enforced regulations that have discouraged Lion hunting. Not only have the number of Lion breeding facilities dropped in the province, but also the number of Lions hunted has declined (W. Boing, pers. comm., May 2013).

4. National Environmental Management: Protected Areas Act 57 of 2003

Under Section 17 of the Act, three of the 12 purposes for declaring an area as protected are: (1) to protect representatives of all species naturally occurring in South Africa; (2) to protect South Africa's threatened or rare species; and (3) to provide for the sustainable use of natural and biological resources (including animals that are living or dead or derivatives thereof). In terms of the Act, however, an "indigenous species" within a specific protected area means a species that occurs, or historically occurred, in a naturally free state within the protected area, but excludes a species introduced in that area as a result of human activity. Since the meaning of "human activity" is not defined in the Act, it is unclear whether the provisions of the Act apply to Lions that are introduced into a protected area that was not part of its historical range. With regards to commercial activities within protected areas, the Act allows for the Management Authority of a park to carry out or allow commercial activities aimed at raising revenue (Section 50). Since Lion hunting is a commercial activity that raises revenue, the management authorities may authorize hunting from time to time but subject to the management plan of the protected area concerned.

5. The Convention on Biological Diversity (CBD)

The CBD is an international legally binding treaty with three main objectives that requires the signatories to develop national strategies for the conservation and sustainable use of biological diversity (http://www.cbd.int, retrieved June 2013). The implementation of CBD provisions and Decisions of the Conferences of the Parties to the CBD is up to (and varies between) the individual CBD Parties. All Parties, including South Africa were thus obliged to prepare a NBSAP (National Biodiversity Strategy and Action Plan) to implement the objectives and targets the CBD (NBSAP, 2005). South Africa's NBSAP was completed in 2005 and its stated goal is to conserve and manage terrestrial and aquatic biodiversity to ensure sustainable and equitable benefits to the people of South Africa, now and in the future. The NBSAP not only satisfies South Africa's obligations with respect to the CBD but also NEMBA (National Environmental Management and Biodiversity Act), since Chapter 3 of the latter required a National Biodiversity Framework to be developed – and the NBSAP was the first stage in the process of developing this Framework (NBSAP, 2005). Thus, while the CBD does not provide specific protection for Lions (Funston and Miller, 2013), the national legislation does regulate for the management and trade of the species and therefore complies with the terms of the Convention in order to diminish biodiversity loss. For those animals used for medicinal purposes[7], the recently agreed CBD Decision XI/25 on "Sustainable use of biodiversity"[8] provides a framework to evaluate the role of animals and their products used for medicine in national and local economies and cultures as well as the ecological services provided by harvested species. In the appended Recommendations, the Decision guides towards the monitoring of harvest, use and trade in an essential step towards conserving, managing and sustainably using wildlife resources.

6. The SADC Protocol on Wildlife Conservation and Law Enforcement

The *1999 Southern African Development Community (SADC) Protocol on Wildlife Conservation and Law Enforcement* applies to the conservation and sustainable use of wildlife resources, excluding forestry and fisheries. Eleven African Lion range States have signed the Protocol including South Africa and its neighbouring countries (Funston and Miller, 2013). The objectives of the Treaty, as summarized by Funston and Miller (2013) are:

"a) To promote the sustainable use of wildlife; b) harmonise legal instruments governing wildlife use and conservation; c) enforce wildlife laws within, between and among state parties; d) facilitate the exchange of information concerning wildlife management, utilisation and enforcement of wildlife laws; e) assist in the building of national and regional capacity for wildlife management, conservation and enforcement of wildlife laws; f) promote the conservation of shared wildlife resources through the establishment of transfrontier conservation areas; and g) facilitate community-based natural resource management practices for management of wildlife resources."

[7] Note that the CBD's Liaison Group on Bushmeat defines bushmeat (or wild meat) hunting as the *"…harvesting of wild animals…for food and for non-food purposes, including for medicinal use"* (UNEP/CBD/LG-Bushmeat/2/4) (UNEP/CBD, 2011).
[8] https://www.cbd.int/decision/cop/default.shtml?id=13186

The establishment of Transfrontier Parks as a means to promote the conservation of shared wildlife is especially relevant to Lions. The Great Limpopo Transfrontier Park is in the process of being formed and will eventually include the Kruger National Park and parks within Mozambique and Zimbabwe, but the management of a shared Lion population in this region is not currently an issue. The Kgalagadi Transfrontier Park straddling South Africa and Botswana has up to 600 Lions (the bulk of which are on the Botswana side) that can roam across the political boundary line without the population being artificially fragmented by a fence. Reports of illegal translocations of Lion cubs from the Botswana side of the Kgalagadi in to the North West province is a conservation concern for the Transfrontier Park, and are briefly mentioned in the section of this report on the illegal trade.

Other legislation

Regulations by DAFF (specifically those involving the government veterinary service) pertaining to the export of felids and their parts/derivatives were not thoroughly investigated due to time constraints. Most animals and products of animal origin leave South Africa under the cover of a veterinary certificate issued by the provincial State veterinarian and/or national State veterinarians at the ports of exit (Department of Agriculture, 2008). These regulations thus apply to: quarantine periods for live animals; export certification for live animals; and, export certification to verify the preparation of products such as trophies and bones for export. One of the relevant regulations is the *Animal Diseases Act (No. 35 of 1984)*.

Another piece of legislation, also not investigated here, is the *Customs Excise Act No. 91 of 1964*, the provisions of which address the storage, clearance, export and transit of goods through ports and airports. In terms of the Act, an officer (a person employed on any duty relating to Customs and excise) may stop, detain and examine any goods they deem to be suspect to determine whether the provisions of the Customs Act, or any other law, have been complied with.

Enforcement and compliance concerns

Various people raised numerous concerns about law enforcement and compliance during the interviews. The concerns ranged from compliance with the acts and ordinances pertaining to the breeding and keeping of Lions, to Lion hunting, and ultimately the paper trail starting with the issuing of permits down to the final shipments of Lion bones destined for East–Southeast Asia. These issues have not all been investigated and addressed in this report, but certain matters have been included for general awareness and discussion.

In one interview, the following concerns were voiced: *"If the enforcement and the compliance was better, they would have a better idea of who should have what and how many at what time…if you look at Limpopo, they only have four compliance officers, three of which are on suspension. So you know what hope does he have? Even a simple thing like scanning the microchips at the airport or scanning the microchips on a lion farm is virtually impossible for someone who doesn't have a microchip reader and who is not allowed to get anywhere close to the lions…So right from the beginning, from the very ground level, it's so difficult to enforce and to control and to see who's doing what and when and with what lions. And now lions are a dime a dozen"* (Anon., pers. comm., May 2013). The matter of micro-chipping Lions is addressed later.

The role of DAFF in enforcement and compliance has also not been fully investigated, and the concerns presented here are from brief anecdotes mentioned during the interviews. Furthermore, no officials from DAFF were interviewed to discuss the matters raised during the interviews by people concerned about the trade in Lion bones. Evidently, *"DAFF officials"* working at the airport are required to check and verify export permits before shipments are released, but several people alleged that permits are not being adequately checked and suspect cargo with questionable permits are sometimes being released for export (Anon., pers. comm., May 2013). Furthermore, concerns have been expressed over the occurrence of fraudulent re-used permits (W. Willson, pers. comm., May 2013). It was also alleged that the main focus of the new Customs system is to *"facilitate trade"* and to *"get goods shipped out of the country"* – and that this approach might work in favour of those who are deliberately non-compliant with the legislation.

DAFF recognizes that the veterinary certificates are sometimes forged (not specifically in connection with Lion bone exports, but this is probably a widespread problem with all animal products). The problem statement of *The South African Policy on Export Certification for Animals and Animal Products (No. 1325, 12 December 2008)* acknowledges that: *"Presently, South African veterinarians are issuing health certificates for export purposes. Occasionally, some consignments are rejected, detained or destroyed in the importing countries because of non-conformance. In some instances, certificates are forged and negotiated clauses are deleted…"*. This matter of forged certificates and permits should be investigated further.

Another person commented in an interview that: *"People involved in organized crime are very aware of the loopholes in the legislation and will even pay people to help them find the loopholes; people not involved in organized crime are*

more likely to make mistakes and get caught for non-compliance" (Anon., pers. comm., May 2013). The prevailing opinion of most people interviewed, however, is that Lion bone exports are likely to be legal – but since the illegal trade is difficult to identify, and bones from captive Lions are indistinguishable from wild Lions, the extent and frequency of the illicit trade is largely unknown. As a result, while the regulatory framework exists to ensure the legal trade and export of Lion bones, there are flaws in the system – starting with Lion breeding – that creates multiple cumulative opportunities for the exploitation of weaknesses in the legislation. Moreover, there is questionable provincial capacity to monitor all aspects of the Lion trade and still contend with the monitoring of other TOPS listed species that are more threatened, including rhinos and cycads.

LION HUNTING IN SOUTH AFRICA

"CANNED" HUNTING, CAPTIVE LIONS & CONTROVERSIES

Following on from the legislation is the matter of Lion hunting in South Africa, which has been the subject of extensive judicial scrutiny – specifically with regards to "put and take animals"[9]. In May 2007, applicants from the South African Predator Breeders Association took the Environment Minister to court over certain TOPS regulations that were to be implemented from February 2008. They challenged the Minister on the inclusion of Lion on TOPS as a "listed large predator" and specifically the regulation that captive bred animals could only be hunted after a 24-month release period (National Assembly, 2009c). The applicants sought to overturn the decision to prohibit activities listed in Section 24 of TOPS involving listed large predators applying to Lions on the grounds that this self-sustaining period would put an end to the hunting industry and make it financially unviable for them. An initial judgement in June 2009 found that the 24-month self-sustaining period was not unreasonable and could be practically implemented and that it would not necessarily result in an end to the hunting industry (National Assembly, 2009c). While the court case was pending, Lions were temporarily deleted from the definition of a "listed large predator" but they were not removed from the list of threatened or protected species – hence all permits issued in terms of NEMBA (including exports) still applied to Lions, and only the 24-month release period was not applicable (National Assembly, 2010a).

One goal of DEA on implementing these measures was to clean up the hunting industry and to get rid of "canned"[10] Lion hunting. However, the appellants launched a successful appeal against the June 2009 ruling, and in November 2010 the Bloemfontein Court ruled that the hunting of captive bred Lions shortly after their release into the wild be allowed to resume and that the definition of Lions as a "listed large predator" was *"invalid in so far as it applies to a 'put and take' animal that is a lion"*[11]. Hence, the 24-month release period was no longer applicable to Lions and provinces would have to apply regulations as per their provincial ordinances or guidelines, including for hunting.

One of the earliest references to "canned" hunting is in Time Magazine in 1991 (Mitchell, 1991), but the expression was probably in prior use. The article describes how well-to-do hunters in the United States were paying thousands of dollars to shoot exotic animals at point-blank range. In May 1997 the Cook Report "Making a Killing" was broadcast on television in South Africa and exposed the emerging practice of canned Lion hunting in Limpopo province (Lion Aid, 2014; Mail & Guardian, 1997). By August 1997 at least 129 cases of canned hunting were being specially investigated by the then Endangered Species Protection Unit (Beresford, 1997). These investigations exposed the growing demand for Lion trophies by affluent hunters, mainly from the United States, where hunters were prepared to pay up to USD17 500 for *"good heavy maned lions, preferably black mane"* (Beresford, 1997).

Not all hunting of captive Lions is considered "canned" and it would be fair to say that there are landowners and hunters who disapprove of the practice and do not consider it "hunting" *per se* (McLaren, 2009, refers to the practice as "canned shooting"). A rationale used to justify trophy hunting is that it creates incentives to conserve Lion habitat, which under canned hunting scenarios is a redundant argument. However, a rationale used to justify the hunting of captive Lions in South Africa is based on the argument that the sizeable demand for Lion trophies by foreign hunters, and the accessibility of the large stock of farmed captive Lions, obviates the necessity to shoot wild or naturally free-roaming animals and thereby reduces the pressure on wild populations. This argument is called "substitutability" and is considered to be flawed (Macdonald and Willis, 2013). Has Lion farming for the hunting industry really taken the pressure off wild Lions? It would currently appear so in South Africa, but it is hard to know how the industry would

[9] Defined in terms of the 2007 TOPS regulations, "put and take" animals are live specimens that are released on a property, irrespective of the size, for the purposes of hunting – i.e. animals are "put" into a hunting area for the hunting clients to "take" (shoot)

[10] "Canned hunting" of predators is considered to be any form of hunting where (i) a large predator is tranquilized, artificially lured etc., or (ii) a captive large predator is hunted (Draft norms and standards for the sustainable use of large predators in terms of section 9(1) of NEMBA). McLaren (2009) refers to it as "canned shooting" since the act of killing an animal that is *"impaired in its natural inclination to flea from a pursuer either by means of drugs or by restraints such as small fenced enclosures"* etc. is not "hunting" *per se*. [NEMBA]

[11] For more information on the case, see "SA Predator Breeders Association and Others v Minister of Environmental Affairs and Tourism (72/10) [2010] ZASCA 151". http://us-cdn.creamermedia.co.za/assets/articles/attachments/30996_151.pdf

change if captive facilities were closed down. In the past, Lion breeders threatened to euthanize all captive stock (Anon., 2009d).

Officially, wild Lions accounted for 5% of the total successful Lion hunts in South Africa from 2008–2010 (CITES Scientific Authority, 2013); however, Lindsey *et al.* (2012a) reported that South African hunting operators estimated the proportion of wild Lions hunted to be only 0.9% and 1.1% of the totals for 2009 and 2010. These wild Lions were reportedly hunted in reserves bordering the Kruger National Park or in the Kgalagadi Transfrontier Park (Lindsey *et al*., 2012a). Damm (2005) also confirms the low numbers of wild Lions hunted and estimates it to be up to 10 per year.

Heedful of the number of Lions hunted, there are concerns about the welfare and treatment of captive Lions that service the trophy hunting industry – especially their living conditions and the manner by which they are killed. Numerous reports in the media over the years have alerted people to the sub-standard conditions under which some (not all) breeders keep their animals. Despite calls to ban trophy hunting, "canned" hunting and captive breeding, it seems improbable that all these well-established industries will be shut down in the near future.

Arguments that have been advanced for maintaining the captive-origin Lion hunting industry include: (1) Lion hunting using captive animals generates millions of Rand (ZAR) for the South African economy (Figure 9); (2) it creates job opportunities at breeding and hunting facilities; (3) it supports such peripheral business as tourism and the rearing of animals by local businesses to feed the Lions (e.g. donkeys, often by communities adjacent to Lion farms) (Multiple interviewees, pers. comm., May 2013); (4) it generates revenues that can be used to fund conservation and protect Lion habitat from other land uses (e.g. Lindsey *et al.*, 2012b; Macdonald and Willis, 2013); (5) it offers an alternative to hunting wild Lions and thus provides a substitute source that results in negligible impacts on South Africa's wild Lion population. Some of these views are repeated by Taljaard (2009): *"In terms of economy-wide impacts…it is clear that the captive lion breeding industry contributes significantly, not only to the broader national economy of South Africa, but more specifically to the rural economy of some of the poorest provinces such as the North West, Free State and Limpopo"*. Thus, these arguments suggest that wild Lions are more likely to be protected in South Africa given the huge demand for captive Lion trophies and the revenue it generates (e.g. ZAR116.8 million in 2010, Figure 9). Accordingly, this will make it difficult to generate enough support to close the industry down. The supply of Lion bones from South Africa to markets in East–Southeast Asia is directly linked to the captive breeding and trophy hunting industries and, from the available evidence, most of the legally exported bones are a by-product of these activities.

As indicated in the Legislation chapter, there are differences in the regulations for the nine provinces with respect to the hunting of Lions and some of these differences are summarized earlier in Table 3. The less stringent regulations in the North West Province (e.g. a 96 hour release period into a camp of no specified minimum size) have likely contributed to the province being the source of ±74% of Lions hunted in South Africa from 2006 to 2010.

LIONS HUNTING STATISTICS FROM DEA

DEA collates all hunting statistics provided by the professional hunters and the provinces and compiles the national trophy hunting statistics report (see Figure 15). While data for 2011 and 2012 had yet to be compiled at the time of writing this report, data from 1 November 2003 to 31 December 2010 indicated that:

- Lion hunting generated USD76 million (ZAR576 million) – an average of USD10.9 million (ZAR82.3 million) per year (the average from 2007 to 2010 was USD15.2 million or ZAR118.2 million).
- The total number of Lions hunted was 2950 (Figure 9).
- The total number of Lions hunted annually reached a peak of at least 651 Lions in 2008
- The hunting income from Lions is 20% of the total revenue generated for the hunting of all indigenous mammals in the same time period (total mammal revenue USD386 million or ZAR2.9 billion, or an average of USD55.1 million per year).
- The highest revenue generated from Lion hunting was in 2008 at USD21.3 million (ZAR176.1 million), which thereafter dropped 54% to USD9.75 million in 2009 and has slowly risen since then (Figure 9).

The 54% drop in Lion hunting revenues in 2009 coincided with the canned hunting court case but cannot be confidently attributed to this case since total indigenous mammal hunting revenues and the number of animals hunted also dropped by 39% and 40% respectively that year. Furthermore, the global recession of 2009 could have had side effects for the industry with fewer hunting packages being purchased. Another explanation could be that the Lion hunting numbers were underreported in 2009 and 2010, and this possibility is addressed in the chapter that follows.

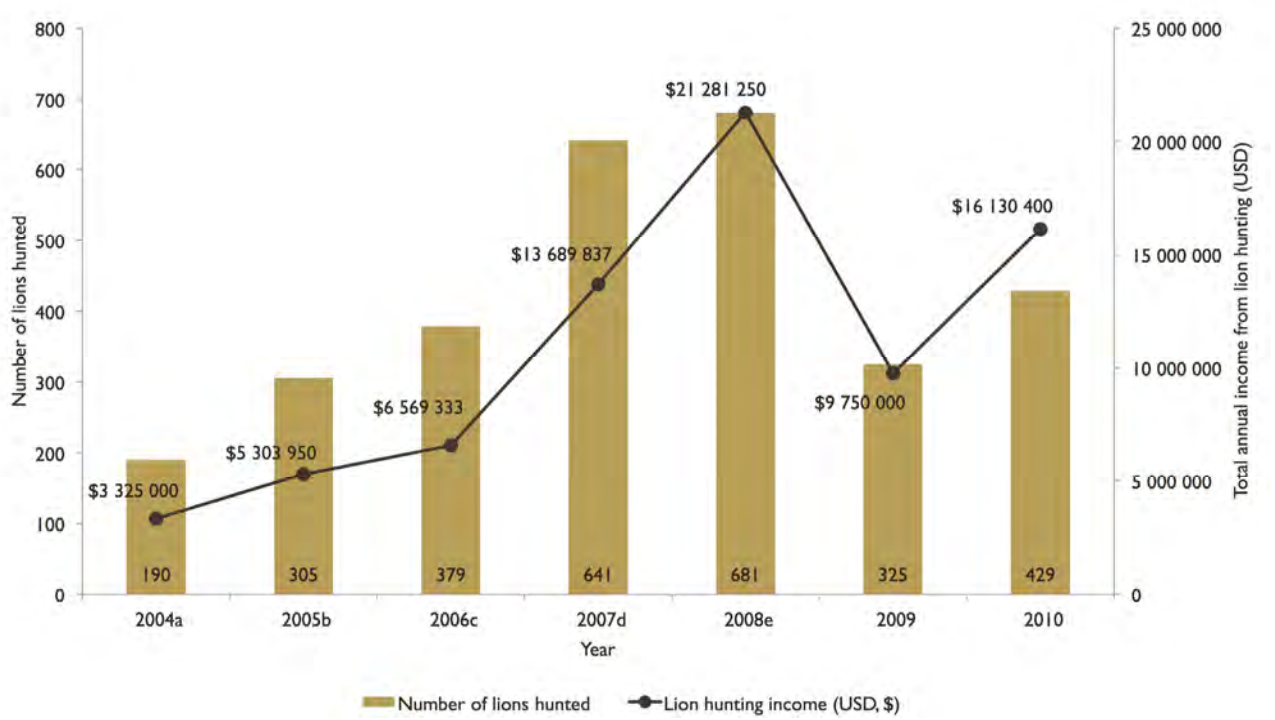


Figure 9 Statistics provided by the Department of Environmental Affairs (DEA) on the total number of Lions hunted and the income generated from the hunts. Revenues exclude the daily rates and the special fees

*[**Note 1:** letters a–e after the years in Figures 9 and 10: (a) data for 2004 are for period 1 Nov 2003 to 30 Sept 2004; (b) data for 2005 are for period 1 Oct 2004 to 30 Sept 2005; (c) data for 2006 are for period 1 Oct 2005 to 30 Sept 2006; (d) data for 2007 are for period 1 Oct 2006 to 30 Sept 2007; (e) data for 2008 are for period 1 Oct 2007 to 31 Dec. 2008. Data for 2009 and 2010 are from 1 Jan to 31 Dec]*
*[**Note 2:** The average annual exchange rates for 1USD are: 2004 = R6.30; 2005 = R6.50; 2006 = R7.27; 2007 = R7.16; 2008 = R8.28; 2009 = R8.40; 2010 = R7.24.]*

To put Lion hunting from 2004–2010 into perspective, Lions accounted for an annual average of only ±1.0% of the total number of indigenous mammals hunted but ±18% of the total corresponding income value (Figure 10). With the exception of 2009, the income generated by Lions had been increasing annually and rose from 8.3% of the total revenues in 2004 to a high of 27% in 2010. The average annual unit price of a hunted Lion rose from USD17 500 in 2004 to USD37 600 in 2010. Thus, while Lions usually rank about 18th in terms of the number of animals hunted annually (Impala *Aepyceros melampus* and Springbok *Antidorcas marsupialis* rank 1st and 2nd respectively), they consistently rank 1st in terms of the total revenues they generate annually (Kudu *Tragelaphus strepsiceros* or rhino usually rank 2nd and 3rd) (Table 4) – which is more than any other indigenous mammal (Figure 11).

Hunting in the North West province accounted for 77% of the total number of Lions hunted from 1 November 2003 to 31 December 2010 (Figure 12); these Lions were mostly captive bred. Lions hunted in the Eastern Cape accounted for 9% of the animals hunted, mostly of captive origin. Lion hunts in Limpopo declined from 27% of the total in 2004, to an average of ±4% of the total from 2008–2010; a higher proportion of these Lions are likely to be wild sourced. The proportion of Lions hunted in the Free State from 2006 rose and was ±7% of the total from 2006–2010; Free State have no free-roaming Lions and all these animals are of captive origin.

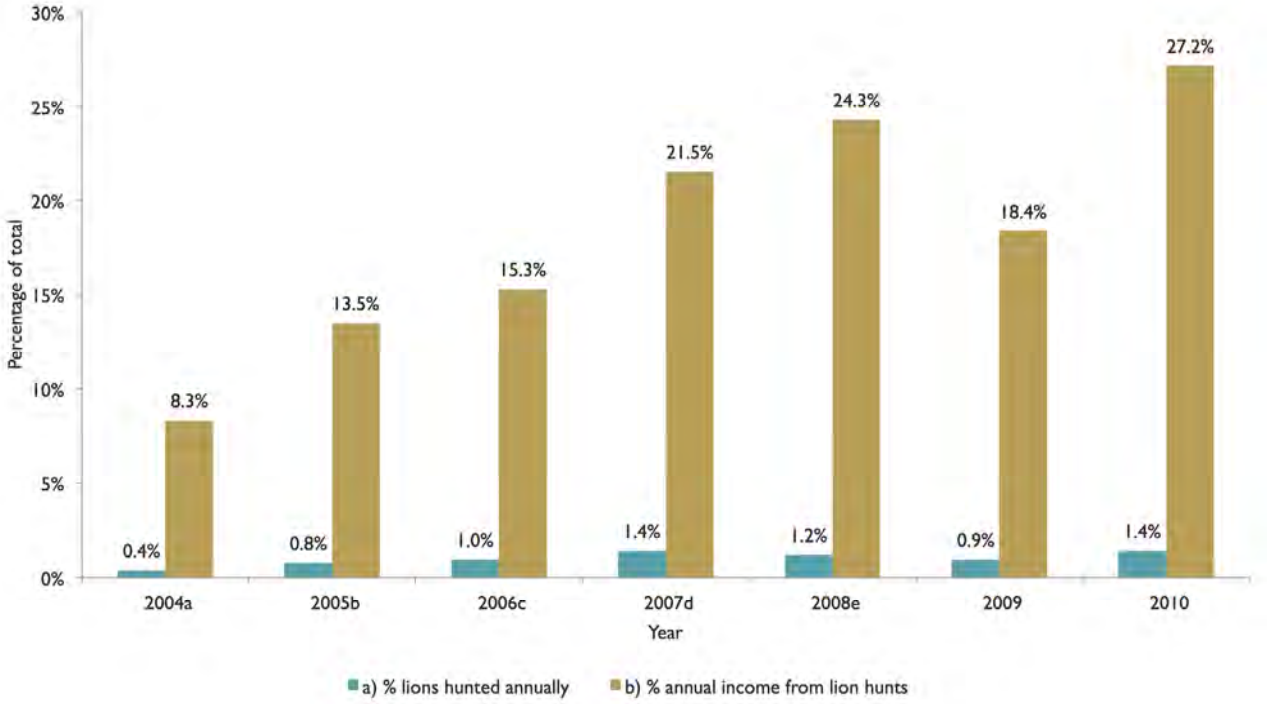


Figure 10 (a) Lions hunted annually as a proportion of the total number of indigenous mammals hunted; and **(b)** the income generated from Lion hunts as a proportion of the total income generated from indigenous mammal hunts. *[See Note 1 under Figure 9 for an explanation of letters a–e for years 2004–2008 respectively]*

Table 4 Hunting statistics 2004–2010: the average annual unit price per Lion hunted, and the rank of Lions in relation the total revenue generated from those hunts and the numbers of other indigenous mammal species hunted. (*Source*: DEA)

Year	Average unit price per Lion hunted		Total revenue from hunts		Numbers of individual mammal species hunted	
	USD	ZAR	Lion Rank	Species ranked 1st, 2nd and 3rd	Lion Rank	Species ranked 2nd, 3rd and 4th after Lions
2004	17 500	110 250	28	Im; Wh; Kd (Rh = rank 38)	3	1st Kd; Gb; Lion; Wb
2005	17 390	113 035	19	Im; Wh; Bb (Rh = 36)	1	Kd; Gb; Rh
2006	17 333	126 011	18	Im; Sb; Bb (Rh = 34)	1	Kd; Rh; Gb
2007	21 357	152 916	18	Im; Sb; Wh (Rh = 35)	1	Kd; Ny; Bf
2008	31 250	258 750	18	Im; Sb; Bb (Rh = 36)	1	Kd; Bf; Rh
2009	30 000	252 000	20	Im; Sb; Bb (Rh = 38)	1	Rh; Bf; Kd
2010	37 600	272 224	18	Im; Sb; Bb (Rh = 33)	1	Rh; Kd; Bf

Abbreviations: Bb=Common Blesbok *Damaliscus pygargus*; Bf=Buffalo *Syncerus caffer*; Gb=Gemsbok *Oryx gazella*; Im=Impala *Aepyceros melampus*; Kd=Kudu *Tragelaphus strepsiceros*; Ny=Nyala *T. angasii*; Rh=White Rhino *Ceratotherium simum*; Sb=Springbok *Antidorcas marsupialis*; Wh=Warthog *Phacochoerus africanus*; Wb=Waterbuck *Kobus ellipsiprymnus*

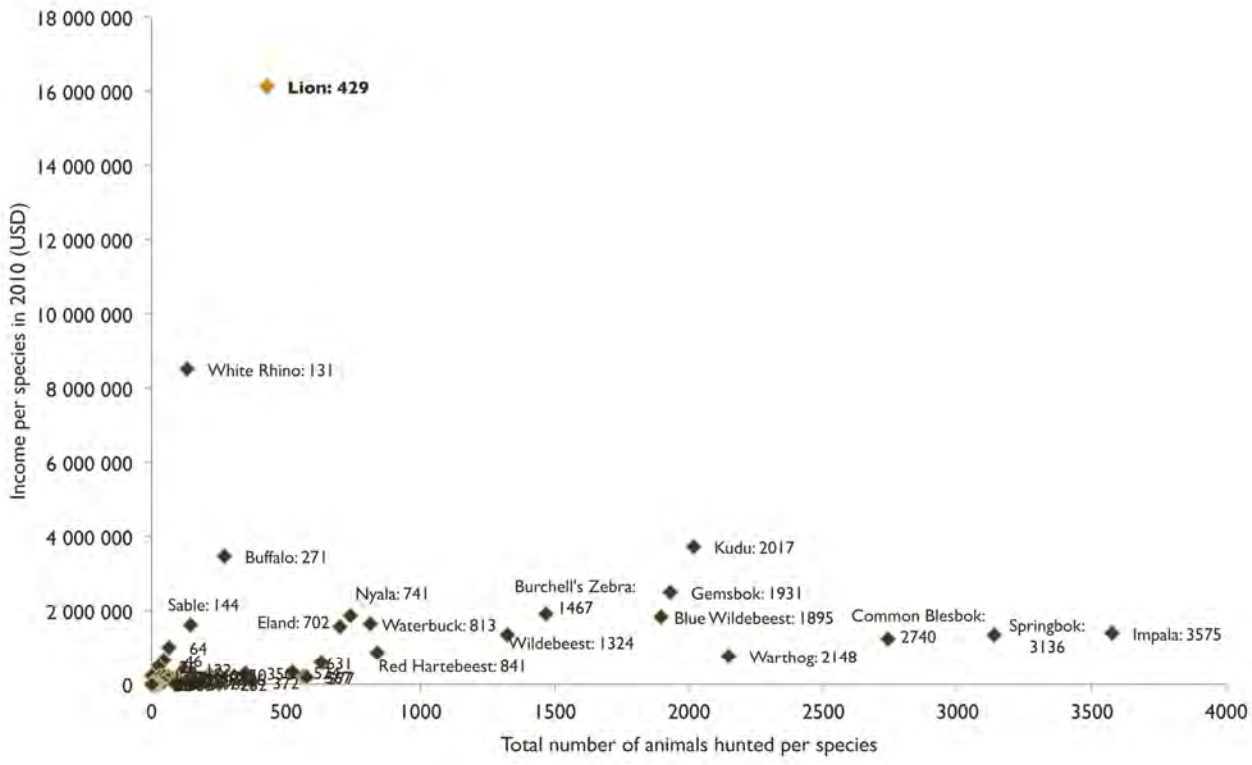
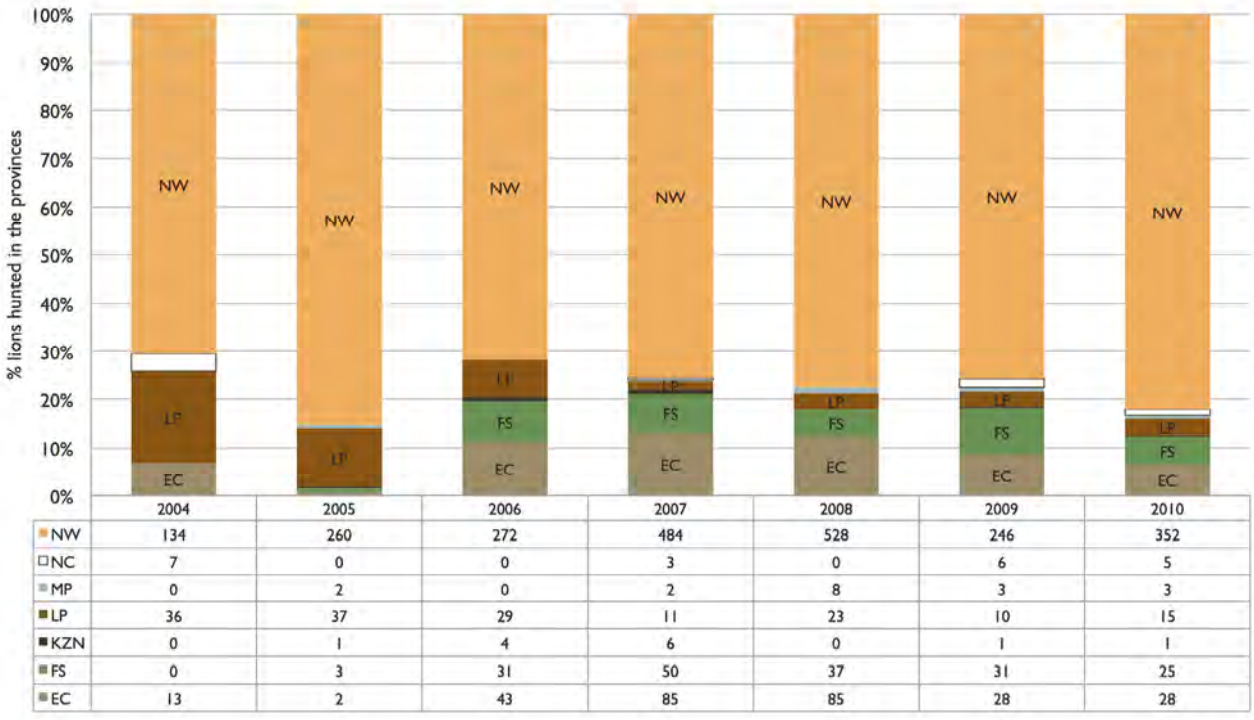


Figure 11 Total income relative to the number of animals hunted per species in 2010. Unnamed species clustered in the bottom left of the graph are hunted in smaller numbers and generate lower annual revenues. (Total indigenous mammal species hunted *n*=83)



	2004	2005	2006	2007	2008	2009	2010
NW	134	260	272	484	528	246	352
NC	7	0	0	3	0	6	5
MP	0	2	0	2	8	3	3
LP	36	37	29	11	23	10	15
KZN	0	1	4	6	0	1	1
FS	0	3	31	50	37	31	25
EC	13	2	43	85	85	28	28

Figure 12 Number and percentage of Lions hunted from each province between 2006 and 2010. No hunting occurred in WC and GP. (See Map 2 for abbreviations for the provinces)

There are discrepancies in the data on the number of Lion hunted when comparing information supplied by DEA with figures cited in other literature sources, especially for the North West Province for 2006 and 2007. How accurate the

data are from these complementary data sources is unclear, but if they are near-correct then they increase estimates of Lions hunted considerably. For example:

- In 2006: data supplied by DEA shows 379 Lions hunted, of which 272 were in the North West (Figures 9 & 10)
    - Cadman (2009) reports 423 Lions hunted in the North West (data supplied to Cadman in writing from the province);
    - If data supplied to Cadman (2009) are correct, then by replacing DEA's with Cadman's figures for the North West, the revised annual total is 530 Lions hunted in 2006.
- In 2007: data supplied by DEA show 641 Lions hunted, of which 484 were in the North West (Figures 9 & 12)
    - The National Assembly (2008) published figures of 637 Lions hunted in the North West;
    - Cadman (2009) reports 832 Lions hunted in the North West (data supplied to Cadman in writing from the province);
    - If data supplied to Cadman (2009) are correct, then by replacing DEA's with Cadman's figures for the North West, the revised annual total could have been as high as 989 Lions hunted in 2007 (or, 794 Lions using National Assembly data).
- In 2008: data supplied by DEA show 681 Lions hunted
    - Cadman (2009) quotes SAPBA (South African Predator Breeders Association) saying that 1050 Lions were hunted).

These inconsistencies noted by Cadman (2009) are noteworthy since large discrepancies were observed when comparing the number of Lions reportedly hunted with the number of permits issued to export Lion trophies. These discrepancies are discussed in the following chapter in relation to the possibility that Lion hunts are underreported in South Africa.

At the time of writing this report, data for 2011 and 2012 had yet to be compiled by DEA; however, the following provinces provided these figures (from interviews and/or documents sent subsequent to the interviews):

- Eastern Cape: 40–50 Lions hunted in 2011, which is up from 28 Lions hunted in 2010;
- Free State: no more than 20 Lions hunted in 2012, which is lower than in previous years when the province began implementing and enforcing regulations that discourage hunting.
- North West: 361 and 553 Lions hunted in 2011 and 2012 respectively. The number hunted in this province in 2012 exceeds the high of 528 Lions reported by DEA in 2008.

Based on the preliminary figures for the Eastern Cape, Free State and North West, and other anecdotal evidence collated from other interviews, the number of Lions hunted in 2011 and 2012 are on a continued upward trend from the alleged low of 2009 (Figure 13). The total number hunted in 2012 seems set to exceed the number of Lions hunted in 2008.

HUNTING REVENUES FROM LIONS

With the exception of rhinos, Lions generate the second highest individual revenue per animal hunted of any species in South Africa; however, since fewer rhinos are hunted annually, the total annual income generated is usually second to that of Lions (Figure 10). The average unit value paid by clients to trophy hunt Lions in South Africa was USD37 600 in 2010 (Table 4), which was an increase of 11.5% from the USD17 500 paid in 2004 (Table 4) (*Source*: DEA annual hunting reports). These average values are mainly for captive-sourced animals and include values for both Lions and Lionesses. Hunters pay more to hunt male Lions compared to Lionesses; for example, values cited in 2013 were ZAR160 000–ZAR170 000 (USD16 800–USD17 900) per male and ZAR30 000–R40 000 (USD3150–USD4200) per female (W. Boing, pers. comm., May 2013). Hunters also pay more to hunt wild Lions.

WEIGHING THE SEX COSTS

Once landowners deduct the costs of tranquilizing and translocating Lions from the breeding facilities to the hunting camps, the net profits generated from hunting Lionesses are considerably less than males. Females in breeding facilities that are not hunted and do not die of natural causes are more likely to be put down in a manner that incurs the fewest costs, bearing in mind that a permit is required to cull Lions and veterinarians charge about ZAR5000 (USD525) to euthanize animals (there are, however, allegedly cheaper more dubious means). Before the Lion bone trade commenced c.2008, Lionesses are alleged to have had little value to landowners besides their breeding potential (Anon., pers. comm., May 2013); accordingly, the market for bones in Asia has created a value for their skeletons that was previously absent.

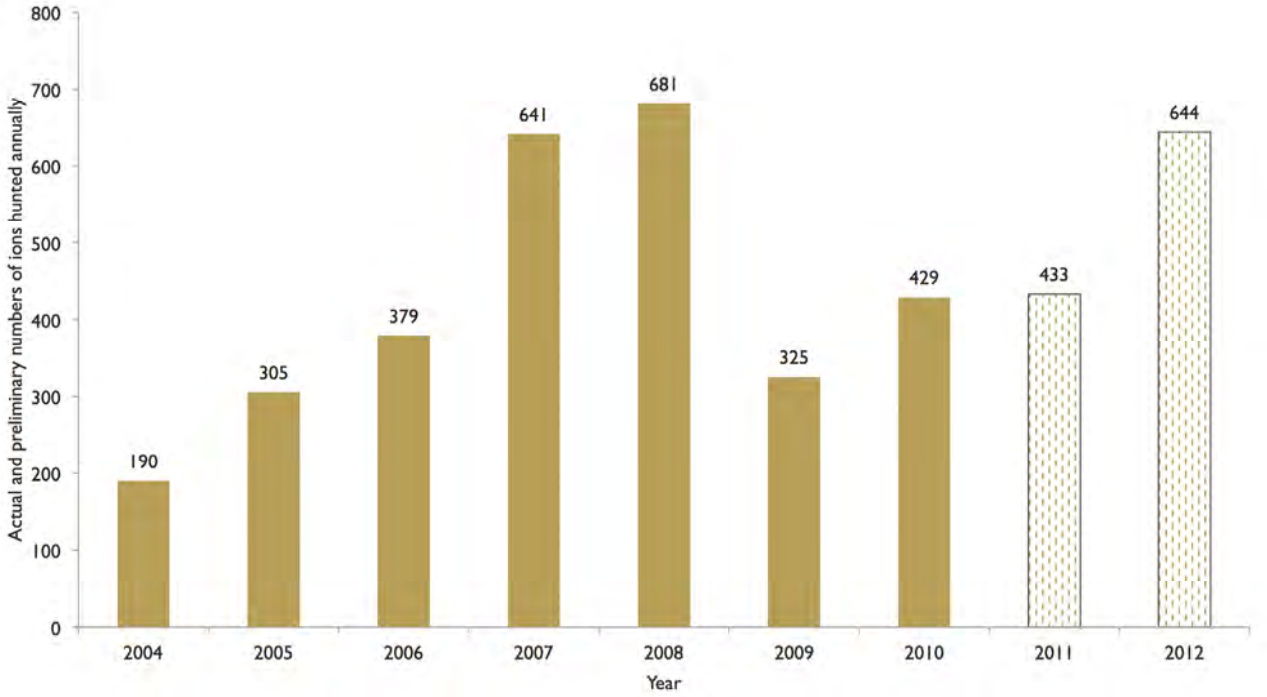


Figure 13 The number of Lions hunted in South Africa from 2004–2010 (solid bars, same as Figure 9) and preliminary and incomplete tallies for 2011 and 2012 (patterned bars) based on information provided by the provinces during interviews. The official 2011 and 2012 figures will only be released by DEA towards the end of 2013. (*Source*: DEA) *[Note: No data were provided on the numbers of Lions that were of captive or wild origin – see estimates by Lindsey* et al.*, 2012a]*

Prior to 2008 carcasses from all Lions, whether hunted or culled, would have been disposed of. Rademeyer (2012a) writes that skeletons would be left for vultures and scavengers or be buried in pits to rot in the soil. Since 2008, a value has been added to the previously discarded bones and landowners/game farmers are allegedly exhuming skeletons. Some people have stated in the media that females are now the primary source of Lion bones for the foreign market – but there is no evidence for this. According to the landowners, it makes no business sense for them to supply only Lionesses since the income would only be from the bones and not from the additional revenue generated by the trophy. And, since hunted male Lions fetch considerably higher prices, a landowner's first choice would be to obtain the income from the trophy and then make additional profits from the bones as a secondary income stream from the same Lions.

While male Lions generate the most revenue for landowners, there are different reports on the proportion of males and females hunted. Lindsey *et al.* (2012a) report that 33.5% of Lions hunted as trophies in South Africa are female. Currently in the Free State province no Lionesses are hunted, but in the past around 10% of the total were female (W. Boing, pers. comm., May 2013). Limited data obtained for this study indicated the sex of the hunted individuals: of 416 hunts, 84.1% were males and 15.9% females. The proportion of males and females hunted in a province, and thus the income generated therefrom, would depend on the number of breeding and hunting facilities per province. Since most Lion breeding occurs in the Free State and most hunting in the North West, the income generated from selling Lions to hunting operations would be higher in the Free State whereas the income from hunting male Lions would be higher in the North West. Accordingly, the proportion of skeletons available for export and derived from male Lions would be higher where most of the hunting occurs, whereas the proportion of skeletons from Lionesses is higher where most of the breeding occurs. There are anecdotal reports that >90% of the Lions culled/euthanized in the breeding facilities are female (Anon., pers. comm., May 2013) – but the actual number of individual Lions this represents is not known to have been enumerated. Accordingly, the number of skeletons exported to East–Southeast Asia that were derived from this sector of the industry is not actually known – but most reports and people interviewed have said that the skeletons were mainly obtained from trophy hunted Lions, which are primarily male (Multiple interviewees, pers. comm., May 2013).

CLIENT NATIONALITY

The nationality of foreign hunters, and their activities, in South Africa is of casual interest to this study. Big game hunters in South Africa are usually from the Americas and Europe. Until c.2006, Asian hunters, particularly from East–Southeast Asia, were a rarity with no tradition of sport hunting outside of their country of origin. While a few Lion

trophies were exported to China before 2004, hunting safari services for Chinese hunters became popular from 2004/2005. A China-based adventure travel business, for example, started offering wealthy clients the opportunity to go on hunting safaris in Africa and to *"bag a trophy and bring it home"* (Zhilong, 2012). Viet Nam does not have any recognized hunting associations (Rademeyer, 2013), yet the number of Vietnamese hunters applying for permits to "hunt" white rhino trophies increased noticeably from 2006 and especially 2007 (See Figure 14 in Milliken and Shaw, 2012). PHASA (the Professional Hunters Association of South Africa) first notified authorities in 2007/2008 that a rapidly increasing number of Asian nationals, under the guise of being sport hunters, started hunting rhino (Damm, 2008). The final purpose of the "hunters" was not the trophy but the commercialisation of the rhino horn and derivatives – which, despite the hunts being legal, was in contravention of CITES protocols (Damm, 2008).

National records from the professional hunting register for all hunted indigenous and non-indigenous vertebrates show that the number of hunters from Viet Nam increased exponentially from 3 in 2004 to 87 in 2010 (Table 5); the number of hunters from China remains low, and no hunters from Lao PDR and Myanmar were reported. In contrast, the number of hunters from the USA is normally >2600 per year and these clients usually represent more than 50% of the total number of hunters to South Africa (Table 5). For the years 2004–2005 and 2009–2010, Vietnamese hunters were most likely to be issued permits to hunt species in the North West and Eastern Cape provinces (Figure 14); clients from the USA were most likely to hunt animals in the Free State, North West and Limpopo. However, some provinces like the Northern Cape no longer allow people from Viet Nam or China to hunt within the province (P. van Niekerk, pers. comm., May 2013). The chapters that follow unravel the trade and export of Lion trophies and skeletons from South Africa to East–Southeast Asia and explores the potential linkages to Tiger and rhino exploitation.

Table 5 Number of foreign hunting clients per selected country reported in the South African hunting registers from 2004 to 2010 (for all species, including Lions).

Selected countries	2004	2005	2006 – 2008	2009	2010
Hunters from selected East–Southeast Asian countries					
Cambodia*	-	-	No data supplied	-	9
China	4	13		1	9
Lao PDR	-	-		-	-
Myanmar	-	-		-	-
Thailand	1	-		-	1
Viet Nam	3	6	See Fig. 14 in Milliken and Shaw (2012)	61	87
Top three countries with the most hunters visiting South Africa					
Denmark	291	394	No data supplied	588	401
Spain	476	628		413	389
USA	3741	3955		3061	2673
Total number of hunters (*n*>84 countries)	**6673**	**7342**		**6292**	**5673**

* Cambodian hunters were recorded for the first time in South Africa in 2010. Hunting took place in the North West province. The only reported legal trade between South African and Cambodia is in live birds and Nile Crocodiles skins between 2001 and 2011 (*Source*: UNEP-WCMC CITES trade database), hence the species that were trophy hunted cannot be deduced from the available records

(*Source*: DEA annual hunting statistics)

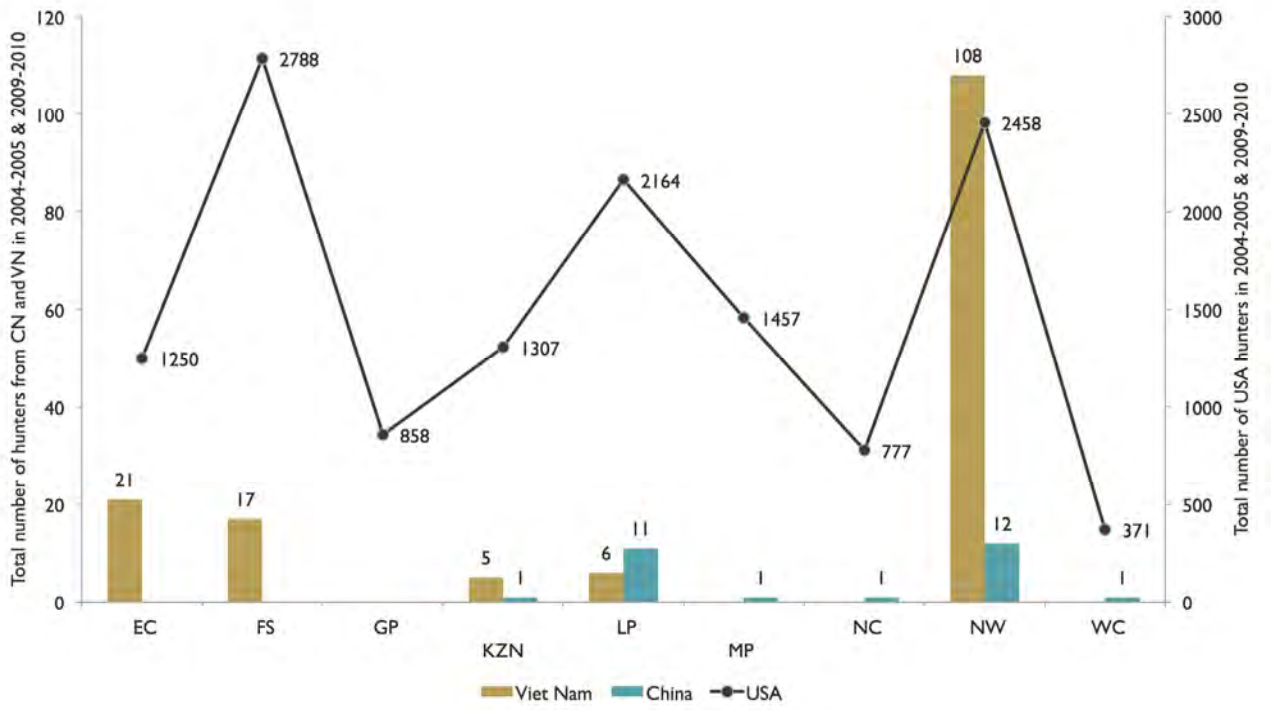


Figure 14 The total number of clients per province from Viet Nam, China and the USA in 2004–2005 and 2009–2010 that hunted indigenous and non-indigenous vertebrates. (*Source*: DEA annual hunting statistics)

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LION TROPHY EXPORTS & THE SIZE OF THE SKELETON RESOURCE BASE

INTRODUCTION

Permits to hunt Lions in South Africa are issued through the provinces and professional hunters are obliged to record all completed hunts in a professional hunting register (Figure 15). Since African Lion is listed in Appendix II of CITES, clients must have permits to export the trophies and the provincial Issuing Authority issues these permits once the hunts have been registered. Corresponding permits to import trophies are only required if a country requires one as part of their stricter domestic measures (http://www.cites.org)

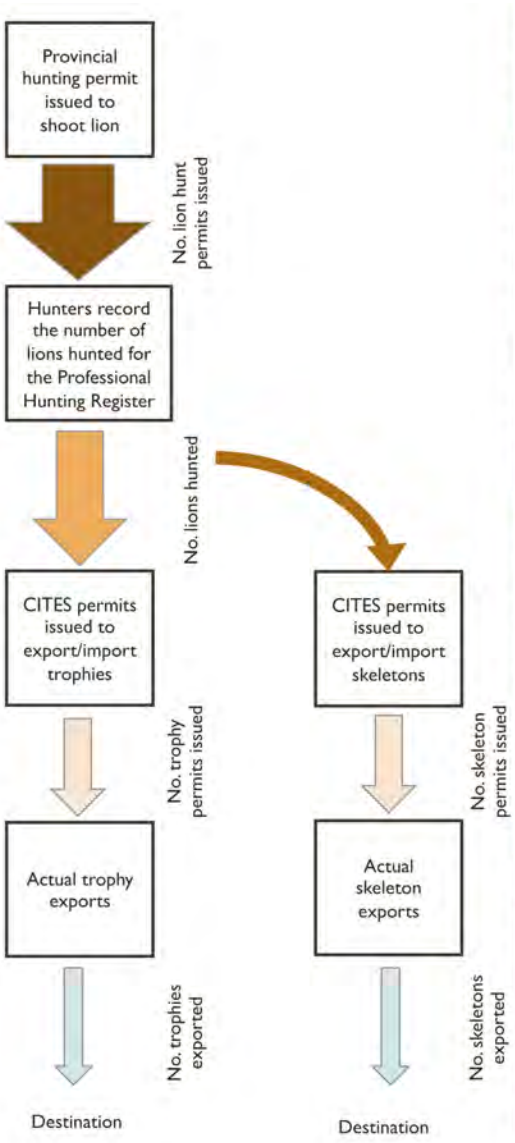
From 1977 to 2011, South Africa reportedly issued permits to export 7014 Lion trophies to 100 countries – but the number of Lion trophies imported to these countries amounted to only 5246 – a difference of 1768 trophies (Figure 16) (*Source*: UNEP-WCMC CITES trade database). Up to 2003, the annual differences in exports/imports amounted to 20–50 trophies per annum, but from 2004 the differences usually exceeded 130 trophies per annum and went up to a difference of 373 in 2009. The increase in the number of permits issued for Lion trophies, especially from 2006, illustrates the growing demand by foreign hunters (Figure 16).

It is important to be aware that the number of Lion trophies indicated in the CITES records through the permits issued do not reflect the actual number of trophies exported or imported (Figure 15). A similar principle applies to permits issued to export skeletons. Reasons why the numbers of Lions/trophies recorded on the permits do not reflect the actual exports/imports include:

1. The Lion may have been hunted and the trophy permit issued, but the permit was not used because the trophy was not exported/imported;
2. Fewer Lions were exported/imported than specified on the permit – if the application was for more than one Lion trophy on the permit;
3. A corresponding import permit was not required by the foreign client's country, or the client did not declare the import/export;
4. Professional hunters were non-compliant and did not apply for a hunting permit, yet they obtained an export and/or an import permit.
5. Incorrect and/or forged documentation and/or "re-used" permits were used. Freight forwarding and cargo handling companies and law enforcement officials have found fraudulent permits during inspections. It has been alleged that some exporters are selling re-used permits for USD100 (W. Willson, NSPCA, pers. comm., May 2013).

Another way of corroborating the quantity of legal exports would be if the duplicates of Page three of all issued CITES export permits were returned to the Issuing Authority with the endorsement by the official in charge of inspecting the cargo. However, as mentioned in previously, these duplicate pages are rarely returned or compiled (Anon., pers. comm., July 2013). Given the discrepancies and discontinuities in the paperwork along the value chain from the hunting permit to the shipment import, it is a challenge determining exactly how many Lions were hunted and how many trophies were exported and thus how many carcasses there are in stock that could potentially be exported as skeletons (Figure 15).

The number of hunting permits issued cannot be used as a proxy for the numbers of carcasses potentially in reserve/stock since fewer Lions are reportedly hunted than trophy permits issued. While the number of permits issued for trophy exports should be less than the number of Lions hunted (since the exporter must show a copy of the hunting register to obtain a permit and thus demonstrate the Lion was hunted), there are more permits issued for trophies than the number of Lions hunted (Figure 17, discussed later).



Provinces issue hunting permits to Professional Hunters to hunt lions. The **number of hunting permits** issued is more than the number of lions hunted since not all of the permits are used, or fewer lions are hunted than stated on the permit.

After each successful hunt with a foreign client the Professional Hunter has to complete a professional hunting register, recording information such as the name of the client**, the number of lions hunted**, where it was hunted, etc. The provinces use this information to compile annual reports, which they send to DEA, who in turn consolidates the provincial reports to compile the National Trophy Hunting Statistics. Completing the register is a legal obligation in terms of provincial legislation. However, the hunting statistics are an estimate and not a reflection of the actual figure – but the information is considered to be a more accurate reflection of what was hunted than what is shown to be exported from the CITES reports (M. Boshoff, pers. comm., July 2012).

CITES permits are issued to export trophies and skeletons. Export permits for **trophies** *"Wont be issued unless a copy of the register is available"* (M. Boshoff, pers. comm.). Since the hunting register is required before an export permit is issued, the **number of trophies recorded on the CITES export permits** should be less than the number of lions hunted (assuming that not all hunters export the trophies). However, the **number of lion trophies listed on CITES permits** annually is more than the number of lions hunted (Figure 17). Another discontinuity in the paperwork is that export permits for **skeletons** are not always linked to the hunting register or a permit issued to export the trophy part of the lion as a trophy, thus creating an opportunity for illicit activities.

The actual **number of lion trophies** exported is presumably less than the number indicated by the CITES permits issued. The proportion of trophies not exported is not known and would require extensive ground truthing to determine this.
The actual **number of skeletons** exported is presumably equal to (but unlikely to be less than) the number indicated by the CITES permits – since the exporters applying for permits have the skeletons and are selling them into a market for which there is a constantly large demand in Asia. The number of skeletons, and the proportion of the total market, that are exported illegally is undetermined.

Figure 15 Decreasing number of Lion "units", from the number of hunting permits issued (top of Figure) to the final number of trophies or skeletons exported (bottom of Figure)

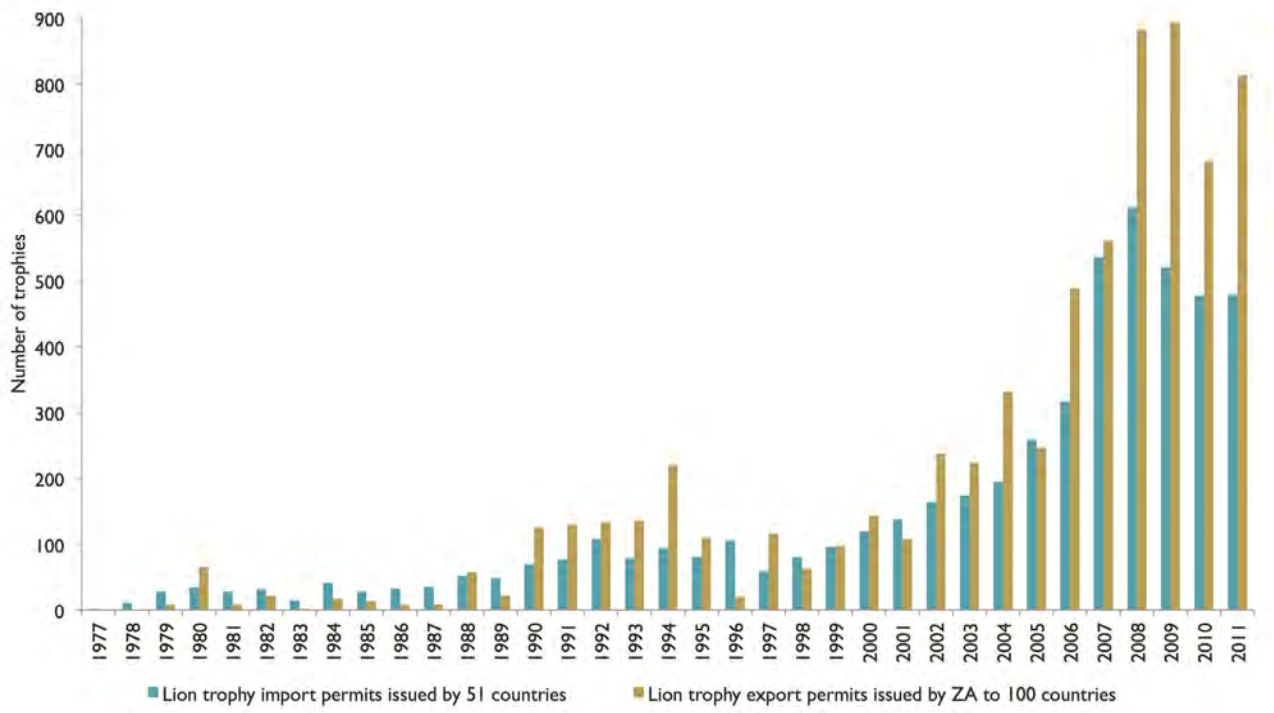


Figure 16 South Africa's reported exports of Lion trophies (based on the number of CITES permits issued to 100 countries) contrasted with the Lion trophies imported from South Africa (ZA) (based on import permits issued by 51 countries to import trophies from ZA), and illustrating the difference in the number of trophies reportedly exported/imported. (*Source*: UNEP-WCMC CITES trade database)

DEA maintain that *"although the hunting stats are just an estimate and not reflected as an absolute figure, this information is a much more accurate reflection of what was hunted, than the reflection of what was exported in the CITES report"* (M. Boshoff, DEA, *in litt.*, July 2013). One reason why the hunting statistics are "an estimate and not an absolute figure" is because it requires professional hunters to be honest in their legal obligation to complete the professional hunting register accurately. Doubts about the absolute accuracy of the information thus recorded are based on an interview wherein the informant discussed how some hunters and people in the wildlife business allegedly have a *"bad attitude towards government and don't want to have anything to do with officialdom"* which extends to refusing to comply with all permit regulations (Anon., pers. comm., June 2013). Since hunters who are not part of professional hunting organizations (and can't be forced to belong to an organization either) cannot be relied on to report all the animals hunted under their watch, the national hunting statistics are thus assumed to be a lower-bound estimate of the actual number of Lions hunted.

The years that the export permits for Lion products are issued do not necessarily indicate (1) the years the Lions were hunted, or (2) the years the trophies/skeletons were actually exported. Delays are partly based on the time needed to taxidermy the trophy or prepare the skeleton for export. A subset of n=155 permit records supplied from DEA indicated the date of the Lion hunt alongside the year the export permit was issued. From these data, it was estimated that:

- 62% of export permits were issued in the same calendar year the Lions were hunted;
- 23% of permits were issued in the subsequent calendar year;
- 4% of permits were issued in the second calendar year after the hunt;
- 5% of permits were issued in the third calendar year after the hunt;
- 3% of permits were issued four or more calendar years after the hunt.

For example, for Lions hunted in 2007: 62% of trophy export permits would have been issued in 2007, 23% issued in 2008, 4% in 2009 etc. How representative this subset of data is for the entire trophy export industry is unclear because some people interviewed said that only a small proportion of trophies are exported one or more years after the Lions were shot and the trophy permits issued.

Various data were used to assess the size of the Lion hunting industry, the number of trophies and skeletons exported/imported, and the potential size of the skeleton resource base (Table 6). These figures were used throughout the rest of the report.

Table 6 Data and source of information available to this study to assess Lion hunting and export/import permits issued annually

	Provincial hunting permits	National trophy hunting statistics (from the professional hunter register) [1]	CITES trade database: imports and exports [2]	South Africa's annual CITES reports [1]	Actual exports*
Data available	Number of permits issued	Includes the number of Lions hunted annually	Number of export/import permits issued, destination of the trophy, quantity	Nearly all of the data recorded on a CITES permit except for the names and addresses of the importer and exporter	No data available
Years data available	?	2004 – 2010	1975 – 2011	2006 – 2011	
Information accessed for this study	No	Yes	Yes	Yes	

Sources: [1] DEA; [2] UNEP-WCMC CITES trade database

* Information on actual imports is only available: (1) through getting export records from exporters and freight forwarding companies at airports and harbours; (2) if nature conservation departments recorded the actual number of specimens being exported at the port of exit on the CITES permit (there is a field at the bottom of each permit available for this purpose but it is rarely used); or (3) the third duplicate page of the CITES permit is return to the Issuing Authority by the official in charge of inspecting the shipment.

COMPARISON OF LION HUNTING REGISTER AND TROPHY EXPORT STATISTICS

There are large discrepancies between the total number of Lions hunted and the total number of Lion trophies recorded on CITES export permits for South Africa in a calendar year (Figure 17). Since hunters are required to show their hunting registers to the Issuing Authorities before permits are issued to export trophies, there should be more Lions hunted than trophies recorded on export permits. Between 2004 and 2010, 2950 Lions were registered as having been successfully hunted – yet CITES export permits indicate 4088 trophies for the same period, a difference of 1138 more trophies than Lions hunted and an average annual discrepancy of 162.6 ± 218.2 more trophies than Lions. The biggest deficit is 569 in 2009 – which is notable since Lion hunting numbers had been increasing annually until they apparently dropped in 2009, and yet permits issued to export trophies were higher than previous years (Figure 17). The only years in which no deficits were recorded are 2005 and 2007 when 58 and 80 more Lions were hunted than reportedly exported in those years respectively (Figure 17).

Several reasons have been proposed to explain the discrepancies, but it is questionable as to whether these reasons cumulatively explain the big differences. These reasons include:

1. If permits expire before the trophies are exported, then new permits are reissued in the same or subsequent calendar years;
2. Some exports are incorrectly declared as being trophies instead of a different category, and thus the number of trophies are over-reported;
3. Lions are not always hunted in the same year as the permits are issued, hence comparing the two statistics can be slightly misleading since the total number of export permits issued in a year could also include permits for Lions hunted up to five years previously.

Even if the annual export statistics are adjusted to create more of a relatable comparative platform – i.e. a theoretical scenario that estimates the number of trophies in a year by assuming the permits were issued the same year the Lions were hunted (i.e. creating a graph similar to Figure 17 using the 62%:23%:4%:5%:3% proportions of trophy permits issued 0-1-2-3-4-5 years after Lions are hunted) – the large annual deficits between hunting and trophies still exist (data not shown). If the deficits can't be entirely explained by the delays in trophy exports, then alternative reasons need to be considered.

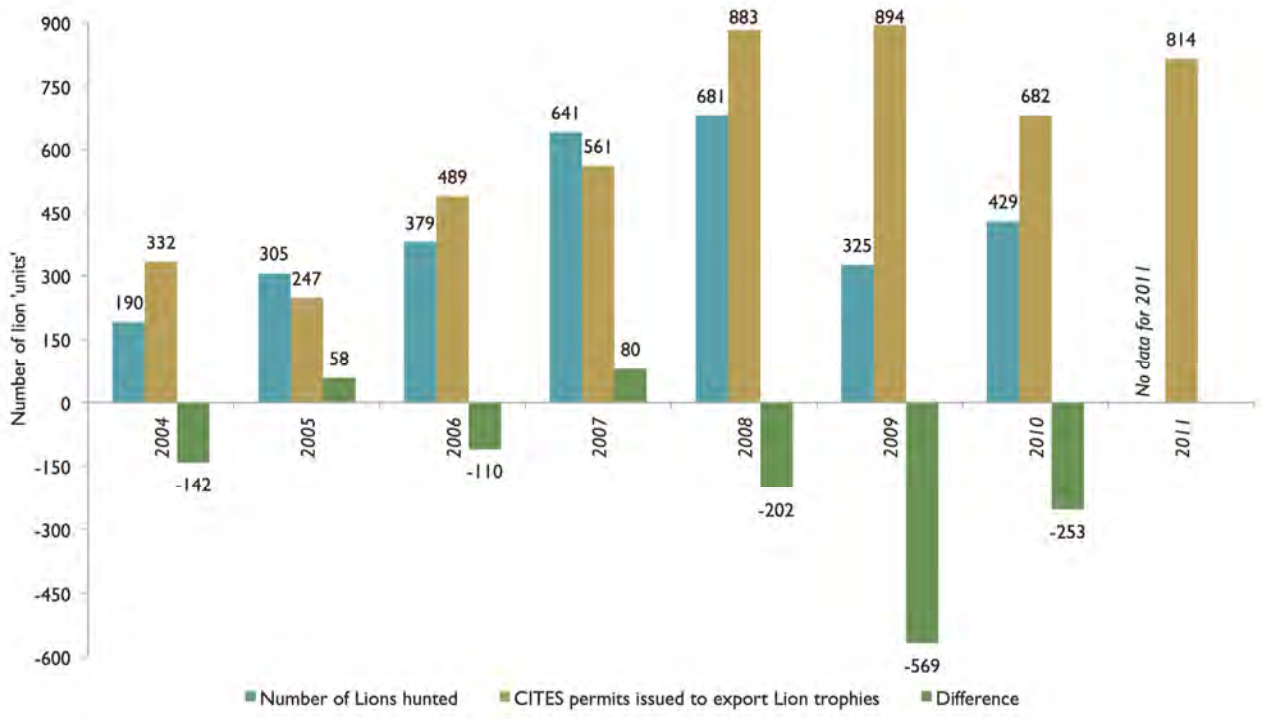


Figure 17 Comparative difference between the number of Lions hunted in South Africa and the number of Lion trophies declared on the CITES export permits issued in South Africa. (Years in italics)

Regarding allegations that some Lion skeleton exports are incorrectly declared as "trophies" and thus the number of trophy exports are erroneously inflated (Bullet 2 above), Milliken and Shaw (2012) established that early exports of rhino horns to Viet Nam were being falsely declared as rhino "trophies", thereby erroneously inflating the number of permits issued for "trophies". Despite the trade in Lion bones being legal, questions have been raised as to whether this was a tactic used in the early days of Lion bone exports and whether this practice continues, either deliberately or in error.

If annual trophy figures were being erroneously inflated by falsely listing "trophies" instead of "skeletons" on the export permits, then "hunters" from East–Southeast Asia might have more motives to pursue this misdeclaration. However, the only nationals from East–Southeast Asia legally exporting trophies from 1999 to 2007 were Chinese hunters at an average of 3.4 ± 3.1 trophies per year (see Figure 22). This average has a negligible influence on the annual deficits apparent in Figure 17. Vietnamese clients were only issued permits to export Lion trophies in 2008 and 2009 (Figure 21) – although their apparent lack of activity with respect to Lion hunting prior to 2008 is debateable given their involvement in rhino hunting and their business relationships with Lion breeders that were widely reported in the media. Nevertheless, the permits issued to export Lion trophies to China and Viet Nam in 2008 and 2009 cumulatively amount to only 27 and 38 trophies respectively and also do not reduce the annual differences in Figure 17 by any notable amount. Hence, potentially false declarations of "skeletons" instead of "trophies" on CITES export permits do not satisfactorily resolve the deficits observed in Figure 17.

On balance, it would seem that reissued export permits, false permit declarations, and readjustments of the number of permits that could have been issued the year a Lion was hunted cannot account for all of the large deficits between the numbers of Lions hunted and the trophies exported. Hence, the discrepancy could lie with other factors, e.g. the number of Lions hunted and the accuracy of the professional hunting registers. There are a number of questions that should be addressed in this regard including:

- Is there more hunting occurring than is being declared?
- Are all professional hunters declaring all Lion hunts and being honest with their record keeping?
- Despite the legal requirement, are there professional hunters who are not keeping hunting registers and thus not contributing to the national statistics on the number of Lions hunted?
- Are conservation officials attending all hunts and ensuring that they occur for the Lions specified on the permit (so that permits aren't reused illegally for different Lions)?
- Is information being accurately submitted and compiled along the chain of accountability from hunter to DEA?
- Are some trophy export permits being issued without a copy of the hunting register being seen? (Some national nature conservation departments have vigorously denied this contention)
- Are trophies originating from outside South Africa exported via the South African system?

- Are the cumulative discrepancies for 2004–2010 partly a proxy for the number of hunted Lions that have not been declared by the professional hunters?
- Are the provinces accurately compiling their annual hunting reports?
- Alternatively, are non-hunted animals (such as euthanized Lions) being declared as trophies and thereby falsely inflating the figures on the number of export permits issued?

The merits of these and other questions regarding the sources of the discrepancies should be seriously considered. It is unlikely that any one factor/variable can be attributed to the deficits, but each variable was mentioned during the interviews as an area where the reporting of hunting and export statistics should be improved to limit the irregularities. There is also room for improving the monitoring and reporting of other areas of the Lion trade directly concerning the Asian bone trade starting, for example, with the birth of Lion cubs in breeding facilities. One conservation official pointed out the size of the captive Lion population versus the number of Lions hunted and said that there *"must be a lot of extra lions that are in the way of somebody"* (Anon., pers. comm., May 2013). The inference was that some landowners are not getting the necessary permits and permission to carry out restricted activities, and that Lion skeletons may enter the system without the necessary paper work that can trace it back to its original source.

ESTIMATING THE SIZE OF THE RESOURCE BASE: THE NUMBER OF SKELETONS THAT COULD BE EXPORTED

There are several potential sources of skeletons for the Lion bone trade: (1) natural mortalities; (2) animals that were put down for a variety of reasons (e.g. euthanized; culled to manage Lion numbers); (3) problem-Lion hunts; (4) carcasses that were buried/discarded after events in the past (e.g. hunting, natural deaths, etc.) and could possibly be exhumed for the trade; (5) poaching; and (6) trophy hunts. Information is limited on the number of Lions available from the first four sources and the size of this resource base is unknown but presumed to be cumulatively large considering the number of captive animals and the amount of hunting that took place in the past. Small reserves with Lions may also cull animals to manage their numbers and prevent over-population – thus, it may arise that the bones are sold to recoup costs (P. Lindsey, *in litt.*, September 2013); however, there were no data available on whether this occurs and the size of this resource base. Incidents of Lion poaching in national and private reserves are rare and not believed to be a notable contributor of bones to the trade (see chapter on the illegal trade in Lions).

The best source of data on the minimum size of the carcass resource base is the number of Lions hunted annually [*Note*: the number of permits issued for trophy exports has to be used as a proxy for Lions hunted before 2004 since the national hunting statistics provided began in 2004]. Trophy hunted Lions appear to be the main source of skeletons for the Lion bone trade in South Africa. Since most of the Lions hunted in South Africa are from captive stock (>95% according to several sources), most of the exported bones are reportedly derived from captive, and not wild, Lions accordingly. Bones from wild Lions hunted in national parks are not sold to buyers. Thus, if bones from wild specimens are sold into the trade, then the most likely sources would be from wild stock that have been illegally introduced into a captive population, or wild Lions poached from neighbouring countries.

Thus, excluding bone sources 1–6 above (because the data are highly deficient), and taking into account Lion hunts conducted from 1977 to 2010, the size of the skeleton resource base from the trophy hunting industry is roughly estimated to be at least 5000 to 6200 units and growing (Table 7). There is no real information available on the extent to which carcasses discarded before 2008 are being located and exhumed and whether these decomposed bones are acceptable to buyers. If one assumes that landowners/game farmers/taxidermists are only selling skeletons from hunts conducted after 2008, then the potential exportable resource base was 1400 to 2500 units for the period 2008–2010 (Table 7). Skeletons available from euthanized animals and those that died naturally would further increase the estimates for the potential size of the resource base from hunted and non-hunted Lions.

Table 7 Estimated size of the Lion skeleton resource base available from trophy hunting, assuming older remains are accessible. Prior to 2008, most skeletons would have been discarded

Years	Size of the skeleton resource base from trophy hunting
1977 – 2010	5000 to 6200
2000 – 2010	3600 to 4900
2004 – 2010	2900* to 4100
2008 – 2010	1400* to 2500

* Lower estimates calculated from national trophy hunting statistics compiled annually by DEA. Higher estimates based on the CITES trophy export permits issued. Estimates *exclude* skeletons that might be available from natural mortalities, euthanized animals, problem-Lion hunts and poaching.

TRADE IN LION BONES & OTHER BODY PARTS FROM SOUTH AFRICA

INTRODUCTION

Lion hunting and the subsequent exports of trophies are notable contributors to the income generated by the hunting industry. Besides Lion trophies, South Africa has exported 19 other categories of Lion products since 1977 ranging from hair to handbags, feet, leather items and tails (*Source*: UNEP-WCMC CITES trade database). Of interest, and the focus of this report, are the body parts and derivatives exported to East–Southeast Asia that are part of the extensive global large felid trade and feed into the "tiger" bone industry as substitutes. Since 1998, but especially after 2007, China, Viet Nam, Lao PDR, Myanmar and Thailand have imported increasing amounts of live Lions, Lion bodies and bones from South Africa (Table 11; Figure 24).

Bag of Lion bones in South Africa.

Note: As stated earlier, no distinction in the analyses is made between Lion products that were "wild" or "captive" sourced. This is because some provincial permit issuing authorities were, for a period of time, erroneously recording some captive sourced animals as "wild sourced" on CITES export permits. This practice has since been amended.

EXPORTS OF LIVE LIONS FROM SOUTH AFRICA

The number of animals recorded on permits issued to export live Lions from South Africa reached a peak of >280 animals in 2010 (Figure 18), and the dominant importing country varied annually. Countries besides those in East–Southeast Asia that have been issued permits to import more than 50 live Lions each in the period 1990–2011 are: Botswana, Spain, the United Arab Emirates, the USA, Zambia and Zimbabwe.

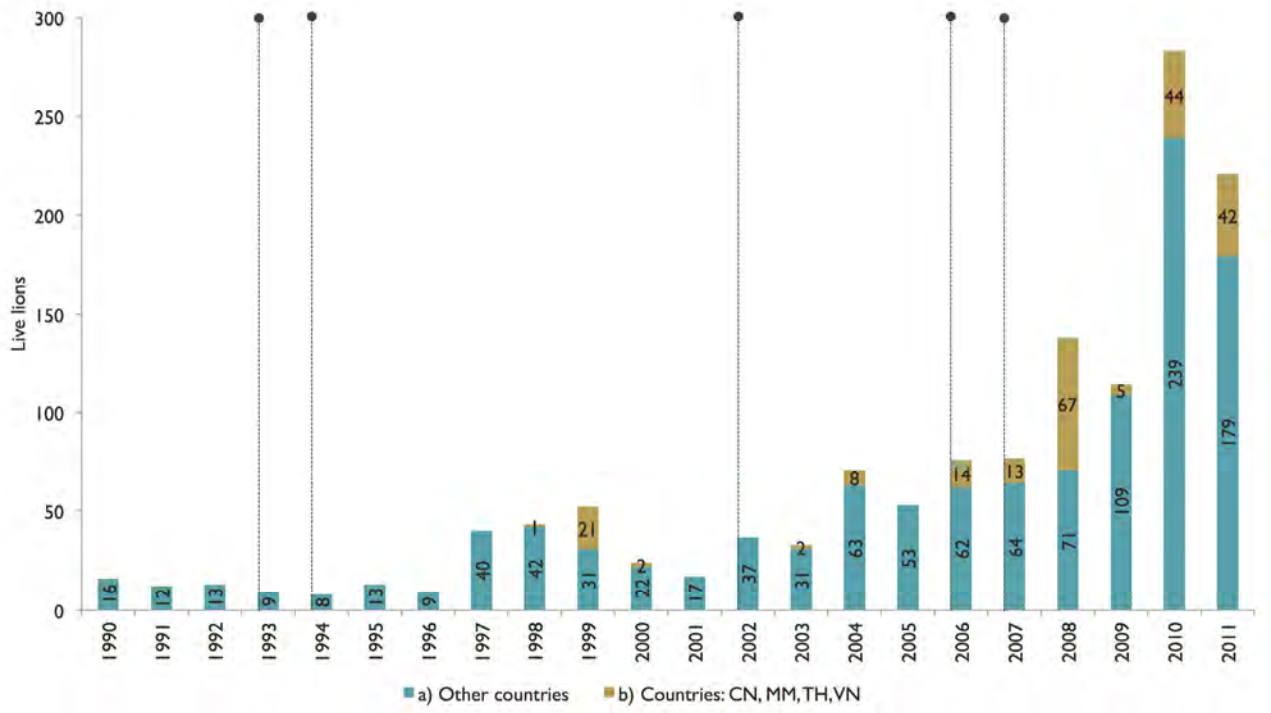


Figure 18 The number of live Lions recorded on export permits issued by South Africa to (a) "other" countries, and (b) China (CN), Myanmar (MM), Thailand (TH) and Viet Nam (VN) combined. Vertical lines indicate years that measures were adopted to protect Tigers and Asian big cats. Exports to countries prior to 1990 are not shown. Figure excludes import records for a country when there was no corresponding export record from South Africa (*Source*: UNEP-WCMC CITES trade database)

Permits to import live Lions to East–Southeast Asia from South Africa were first reported in 1992; two Lions were imported into Thailand (*Source*: UNEP-WCMC CITES trade database) – however, no corresponding export permits issued in South Africa were reported on the CITES database (hence the record is not reflected in Figure 18 because this graph only shows the number of live Lions recorded on export permits issued by South Africa). The first permits issued by South Africa to export live Lions to East–Southeast Asia were issued to China in 1998 for one live Lion, followed by permits in 1999 to export 6 and 15 Lions to China and Thailand respectively (Figure 18). Exports of live Lions to East–Southeast Asia were irregular until 2006; thereafter, export permits were issued to Thailand every year from 2006–2011 (total 115 Lions, average 19 ± 24 per year). In the same period, permits issued to China, Myanmar and Viet Nam totalled 20, 28 and 22 live Lions respectively.

From 1993 to 2011, 59% of the live Lions destined for East–Southeast Asia went to Thailand, 18% to China, 13% to Myanmar, and 10% to Viet Nam. In Oswell's report on the big cat trade in Thailand and Myanmar conducted between 2001 and 2010, no mention is made of the presence of live African Lions in the markets (Oswell, 2010). Since there are few CITES records of legal cross-border trade in live Lions in East–Southeast Asia, it is impossible to ascertain the purpose of these imports. In other words, are the Lions retained in the possession of the importers or are they subsequently traded and trafficked illegally throughout the region? Moreover, what is Thailand's role in the live Lion trade?

Ostensibly, the Lions remain in Thailand since permits to export live Lions from Thailand to elsewhere in East–Southeast Asia amount to no more than nine individuals from 1996 to 2003 (and permits to export other Lion products amount to one specimen and seven claws) (*Source*: UNEP-WCMC CITES trade database). However, Thailand serves a transit country, conduit and retail centre for buyers of wildlife throughout the region (legal and illegal trade) (Nooren and Claridge, 2001; UNODC, 2010; various sources from http://www.traffic.org). It was alleged by one interviewee that there are two big *"quarantine stations that bounce a lot of things through from Thailand into China because some*

things aren't allowed from South Africa into China" (W. Willson, pers. comm., May 2013). Is it thus feasible that Lions are disposed of in the extensive illegal wildlife trade nexus that exists in the region?

Within South Africa, the provinces that issued permits to export live Lions from 2006–2010 are: North West (40% of Lions recorded on the permits), Free State (29%), Gauteng (15%), Limpopo (8%), KwaZulu-Natal (7%) and the Eastern Cape (1%). Of these, only the North West, Free State, Gauteng and the Eastern Cape exported live Lions to East–Southeast Asia (China, Thailand, Myanmar and Viet Nam). Sixty-seven per cent of these Lions were reported on permits issued in the North West, 17% from Gauteng, 12% from Free State and 4% from the Eastern Cape. All of these Lions were captive bred.

EXPORTS OF LION BODIES FROM SOUTH AFRICA

There has been an irregular trade in Lion bodies[12] since 1984, but exports increased more than 12-fold in 2010 from the average of seven bodies per year from 1990–2009 (Figure 19). In 2010, 50% of the bodies were destined for the USA, the reported purpose being "hunting trophy". All the permits issued to export Lion bodies to East–Southeast Asia from 2005 to 2011 were for China; the purposes of 88% of the exports were reported as "educational" and 12% as "personal".

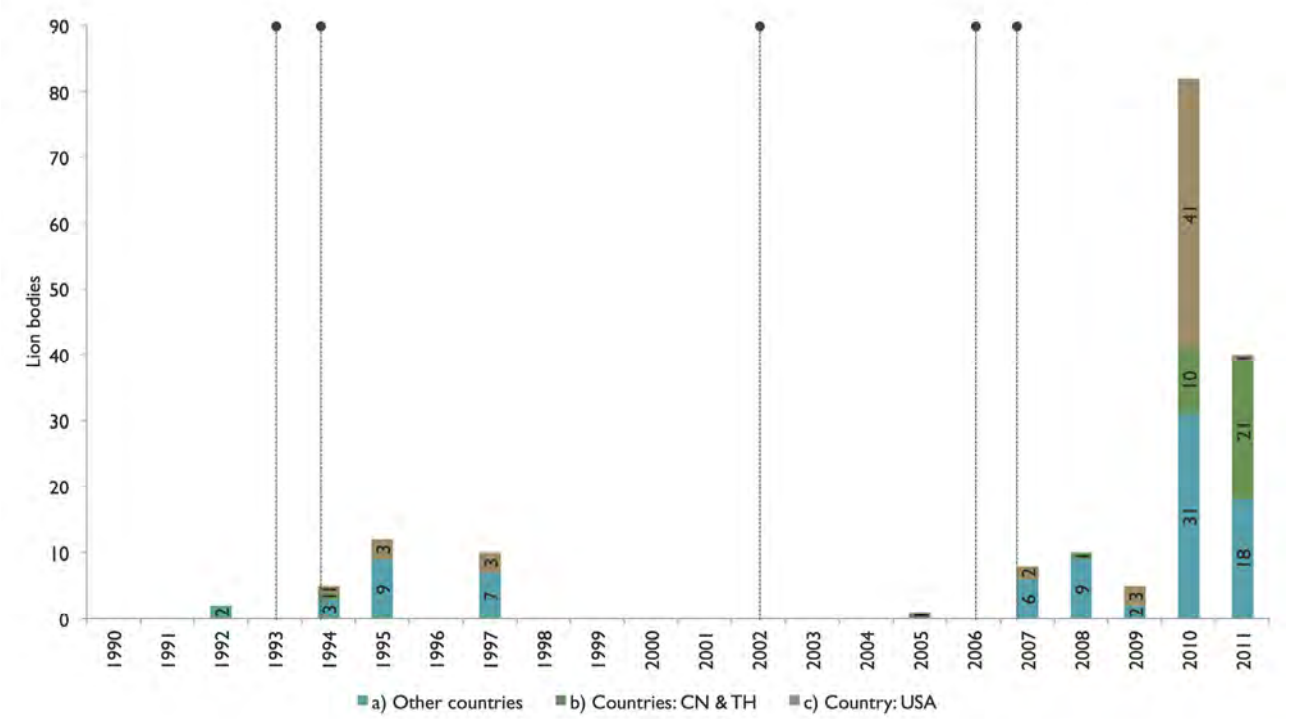


Figure 19 The number of Lion bodies recorded on export permits issued by South Africa to (a) other countries, (b) China (CN) and Thailand (TH) combined, and (c) the USA. Vertical lines indicate years that measures were adopted to protect Tigers and Asian big cats. Exports to other countries prior to 1990 not shown

The UNEP-WCMC CITES trade database records that permits were issued to export 80 "bodies" from South Africa to Lao PDR in 2009. However, on examination of the annual CITES reports supplied to this study by DEA it was established that these were actually "skeletons"[13] that had been incorrectly reported as "bodies". Hence, these 80 "bodies" are not included in the above analysis of bodies (Figure 19), but are included in the analysis of skeletons in Figure 20.

[12] The definition of a "**body**" (BOD) according to CITES (2010c) guidelines is *"substantially whole dead animals, including fresh or processed fish, stuffed turtles, preserved butterflies, reptiles in alcohol, whole stuffed hunting trophies, etc."* The preferred unit of measurement is the number of bodies, but alternatively the mass can be recorded.

[13] The definition of a "**skeleton**" (SKE) according to CITES (2010c) guidelines is a "substantially whole skeleton". The unit of measurement is the number of skeletons. "Carcass" is not a term defined by CITES.

EXPORTS OF LION BONES FROM SOUTH AFRICA

The CITES category "bones"[14] is different to "skeletons". Whereas "bones" exported to East–Southeast Asia are usually whole skeletons, in this section of the report "bones" refers to a few individual bones (e.g. patella, floating bones) and/or a quantity of a specific mass where the equivalent number of skeletons has not been reported.

The annual CITES reports supplied by DEA for 2006–2011 contain most of the information on CITES export permits, except for the names and addresses of the exporters/importers. It was thus possible to scrutinize the raw data and amend/reclassify the information if necessary. Some errors in the reporting of "bone" exports were detected, usually that "bones" were whole skeletons. Ten permit records were subsequently reclassified with the assistance of the relevant provincial Issuing Authorities following requests to clarify information that appeared inaccurate (Table 8). Hence, the data presented here for bones differ considerably from the information on the UNEP-WCMC CITES trade database.

Table 8 Reanalysed and corrected data (last column) for permits issued by South Africa to export bones (BON) and skeletons (SKE) to China (CN), Lao PDR (LA) and Viet Nam (VN)

Year	Description on original CITES permit (from DEA annual reports)	Incorrect record		Corrected record
		DEA CITES report	Recorded on UNEP-WCMC CITES trade database	Data used in this report
2008	1) 35 skull/bones to VN	1) 35 BON to VN	1) 35 BON to VN	1) 35 SKE to LA
	2) Bones of 15 Lions to VN	2) 15 BON to VN	2) 15 BON to VN	2) 15 SKE to LA
2009	3) 250 kg to LA	Correct report	Correct report	3) 250 kg BON to LA (=26 SKE, Appendix 5)
	4) 2 (sets of bones)	4) 2 BON to LA	4) 2 BON to LA	4) 2 SKE to LA
	5) no record	5) no record	5) 48 BON to CN*	5) 48 BON to CN*
2010	6) Details of numerous individuals bones to LA	6) 232 BON to LA	6) no record	6) 3 SKE to LA
	7) Details of numerous individual bones to LA	7) 583 BON to LA	8) 586 BON to LA	7) 27 SKE to LA
	8) 13 + 13 bones to VN	8) 26 BON to VN	8) 26 BON to VN	8) 26 SKE to VN
2011	9) 1573 (107.5 kg) bones to LA	9) 1573 BON to LA	9) 1573 BON to LA	9) 107.5 kg BON to LA (=11 SKE)
	10) 32 carcasses to VN	10) 32 BON to VN	10) 32 BON to VN	10) 32 SKE to VN
Totals for incorrect and corrected records		**BONES=2498 bones and 250 kg**	**BONES=2314 bones and 250 kg**	**BONES=48 bones to CN SKELETONS=177 (119 to LA & 58 to VN)**

(*Source*: DEA annual CITES reports, and UNEP-WCMC CITES trade database; Anon., Issuing Authority, *in litt.*, 2013)

* There is no equivalent record in the DEA report of a permit being issued to export 48 bones to China; this record appears only on the UNEP-WCMC CITES trade database. "48 bones" is an unusual number of Lion bones to export (Table A14 in Appendix 4), and it is suspected that this record is for 48 skeletons, however no raw data were available to justify changing the category from BON to SKE

Up to 2007 permits were usually issued to export 2–4 bones per customer and these were probably the floating bones from trophy animals. From 1990 to 2007 an average of five bones per year were exported, usually to the USA or Denmark (also the most frequent hunting clients, along with Spain, to South Africa). In 2008 the first permits to export bones to East–Southeast Asia from South Africa were issued and are reported as "35 & 15 bones to Viet Nam" on the permits (records 1 and 2 respectively in Table 8). The quantities of 35 and 15 bones were actually the "bones of" 35 and 15 Lions (hence skeletons, not individual bones). Furthermore, as previously mentioned in the Introduction chapter,

[14] "**Bones**" (BON) according to CITES (2010c) guidelines are "bones, including jaws". The unit of measurement is the number bones or the mass in kilogrammes thereof.

while the permits record "Viet Nam"[15] as the importing country, "Lao PDR" is also recorded on the same permits. It was thus presumed that Lao PDR was to be the final destination of the shipment and the records were amended accordingly in this report to reflect "35 and 15 skeletons to Lao PDR" (Table 8).

Record 9 in Table 8 is for the export of 1573 bones weighing 107.5 kg (from North West province in 2009). By using the regression in Figure A4 (Appendix 4) and Appendix 5, the shipment quantity of 107.5 kg was converted to an equivalent of 11 skeletons. Similarly, the consignment of 250 kg of bone (from Free State in 2008) in Record 3 equates to about 26 skeletons. In total, DEA and CITES records mistakenly reported that permits to export up to 2498 individual bones and 250 kg of bones were issued. The corrected records reveal that up to 48 bones (not skeletons, but likely so – footnote in Table 8) and 177 skeletons were exported to Lao PDR, Viet Nam and China from 2008 to 2011 instead. The 177 skeletons are thus included in the analysis of the trade in skeletons.

EXPORTS OF LION SKELETONS FROM SOUTH AFRICA

Prior to 2008 the only record of South Africa having issued CITES permits to export skeletons was for three to Denmark in 2001 (*Source*: UNEP-WCMC CITES trade database). Furthermore, the worldwide exports of Lion skeletons from 1982–2000 only totalled nine and these were mainly to Europe.

In July 2008 South Africa issued its first permit to export Lion skeletons obtained from captive bred animals to Southeast Asia; the destination of the cargo was mistakenly recorded as Viet Nam instead of Lao PDR and the quantity recorded as 35 Lion "bones" instead of the "bones of 35 Lions" (i.e. 35 "skeletons") (Table 8) (Anon., Issuing Authority, *in litt.*, 2013). A second permit was issued later in 2008, and the export destination and quantity were also incorrectly captured – this time as "15 bones" to Viet Nam instead of "15 skeletons" to Lao PDR (Anon., Issuing Authority, *in litt.*, 2013). Thus by the end of 2008, permits to export 50 skeletons to Lao PDR had been issued – which is a year earlier than the public were made aware of. The importer of both shipments was reportedly from the Bolikhamxay Province, Lao PDR (Anon., Issuing Authority, *in litt.*, 2013). Five months prior to the permit for 35 skeletons being issued however, a permit had also been issued to an importer in Bolikhamxay Province to receive "10 skulls/skins" and "20 floating bones" (clavicles) – an amount that would have been derived from 10 Lions. Given the date of this permit in early 2008, the Lao-based importer was in all likelihood making enquires about Lion bones in South Africa in 2007 or earlier, but whether illegal exports of bones actually occurred then is a matter of speculation. However, some illegal trade in Lion bones is presumed to have occurred before 2009 when Nguyen van Hai was arrested for being in possession of Lion parts without permits, and also given the presence of Xaysavang Company representatives in South Africa from at least 2008 (see Introduction for details).

From 2008 to 2011 CITES permits issued to export Lion bones totalled 1160 skeletons (Table 9) (including ± 177 skeletons from Table 8). Lao PDR was the primary recipient of the bones (85%), followed by Viet Nam (13%). Permits issued to Thailand and China were only reported in 2011. If the mean mass of a Lion skeleton is ± 9.28 kg (Box 4 in Appendix 4), then the exports are equivalent to 10 765 kg – over **10.8 tonnes in four years**.

Table 9 Annual quantities of skeletons reported on CITES export permits issued by South Africa to East–Southeast Asia.

Year	Lao PDR	Viet Nam	Thailand	China	Total
2008	50				50
2009	197	2			199
2010	221	117			338
2011	519	32	20	2	573
Total	**987 (85.1%)**	**151 (13.0%)**	**20 (1.7%)**	**2 (0.2%)**	**1160**

(*Source*: DEA annual CITES reports and the UNEP-WCMC CITES trade database)

At the time of writing this report, the 2012 annual CITES reports compiled by DEA had not been completed. In the interim, data collected on skeleton exports during the course of this investigation were added to Figure 20 to present the

[15] The capital of Lao PDR is "Vientiane", which sounds similar to "Viet Nam". Several people interviewed for this study made mention of "Vientiane" but either (1) assumed it was a town in Viet Nam, (2) assumed Vietnam had been spelled incorrectly, or (3) said "that place Vientiane/Vietnam" as if they were the same places. Lack of familiarity with Lao PDR undoubtedly resulted in some of the initial permit applications incorrectly listing the import country as Viet Nam instead of Lao PDR.

information known so far. These figures are incomplete, but show that at least 365 skeletons with a combined mass of 2768 kg were exported to Viet Nam and Lao PDR in 2012 and 2013 (the official final numbers will be higher).

The only provinces issuing permits to export Lion bones to East–Southeast Asia are the Free State, North West and Eastern Cape (24%, 67% and 7% of the skeletons recorded on the export permits respectively) (Table 10). These provinces dominate the captive breeding/hunting industries (Figure 5) and all the skeletons are from captive bred animals. It is important to note, however, that Lion skeletons exported from a particular province do not necessarily originate there. "Bone agents" usually buy skeletons from willing landowners/sources in more than one province (Figure 28); the agents apply for permits from a province to export multiple sets of bones, irrespective of where the Lion was hunted. Furthermore, some of the skeletons may not be from trophy hunted Lions and may be derived from Lions that were put down or died from natural causes. Based on this, a recommendation from one interviewee is that export permits are only issued for carcasses with a complete set of supporting documentation in the province of its mortality (see *Recommendations*).

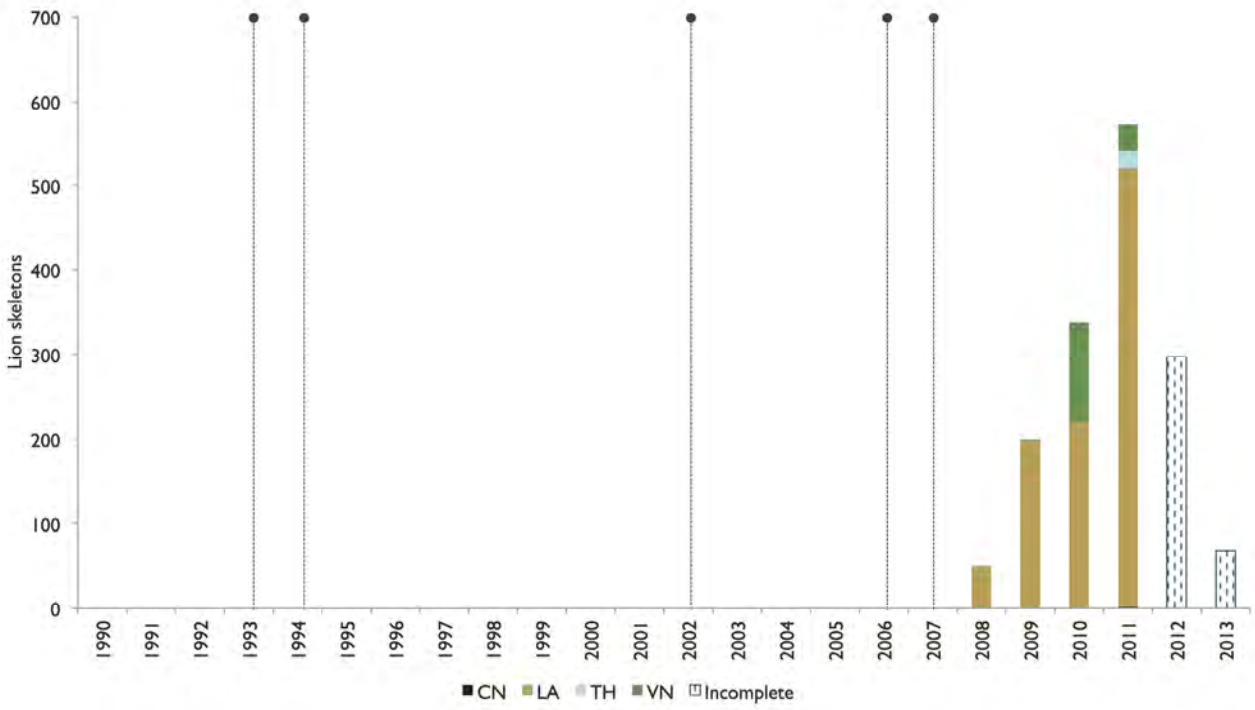


Figure 20 The number of Lion skeletons recorded on export permits issued by South Africa to China (CN), Lao PDR (LA), Thailand (TH) and Viet Nam (VN) from 2008 to 2011. The 2012 annual CITES report from DEA had not been released at the time of writing this report, hence the incomplete data for 2012 and 2013 were assembled from information accumulated from multiple other sources. Vertical lines indicate years that measures were adopted to protect Tigers and Asian big cats

Table 10 Number of skeletons recorded on the permits issued by three South African provinces to export Lion skeletons to East–Southeast Asia.

Year	Free State	North West	Eastern Cape	Total
2008	50			50
2009	41	132	26	199
2010	97	214	27	338
2011	105	436	32	573
Total	**293 (25.3%)**	**782 (67.4%)**	**85 (7.3%)**	**1160**

(*Source:* DEA annual CITES reports)

EXPORTS OF LION TROPHIES TO EAST AND SOUTHEAST ASIA

In parallel with the increase in the rhino horn trade, there has been an increase in hunting by Asian clients in the last decade (Milliken and Shaw, 2012). However, unlike rhinos where the main clients were Vietnamese "hunters", the main importers of Lion trophies[16] were Chinese customers beginning in 1999 (Figure 21). Even though the number of Vietnamese hunters reached new highs in 2010 (Table 5), the only reports of permits being issued to export Lion trophies to Viet Nam occurred in 2008/2009 (Figure 21). However, permits issued to export Lion "trophies" to Lao PDR have dominated trophy exports to East–Southeast Asia since 2010 despite there being no records of clients from Lao PDR having hunted in South Africa in 2009/2010[17]. Vietnamese and Thailand nationals were convicted in South Africa of illegally possessing Lion body parts and admitted to sourcing wildlife products for importers such as the Xaysavang Company (see Introduction), hence the following question arises: was the purpose of some of the Lion hunts by Vietnamese clients for legitimate personal reasons, or were they to supply Lao PDR's established wildlife trade with Lion body parts derived from seemingly legal hunts? If so, this latter scenario is similar to the rhino trade.

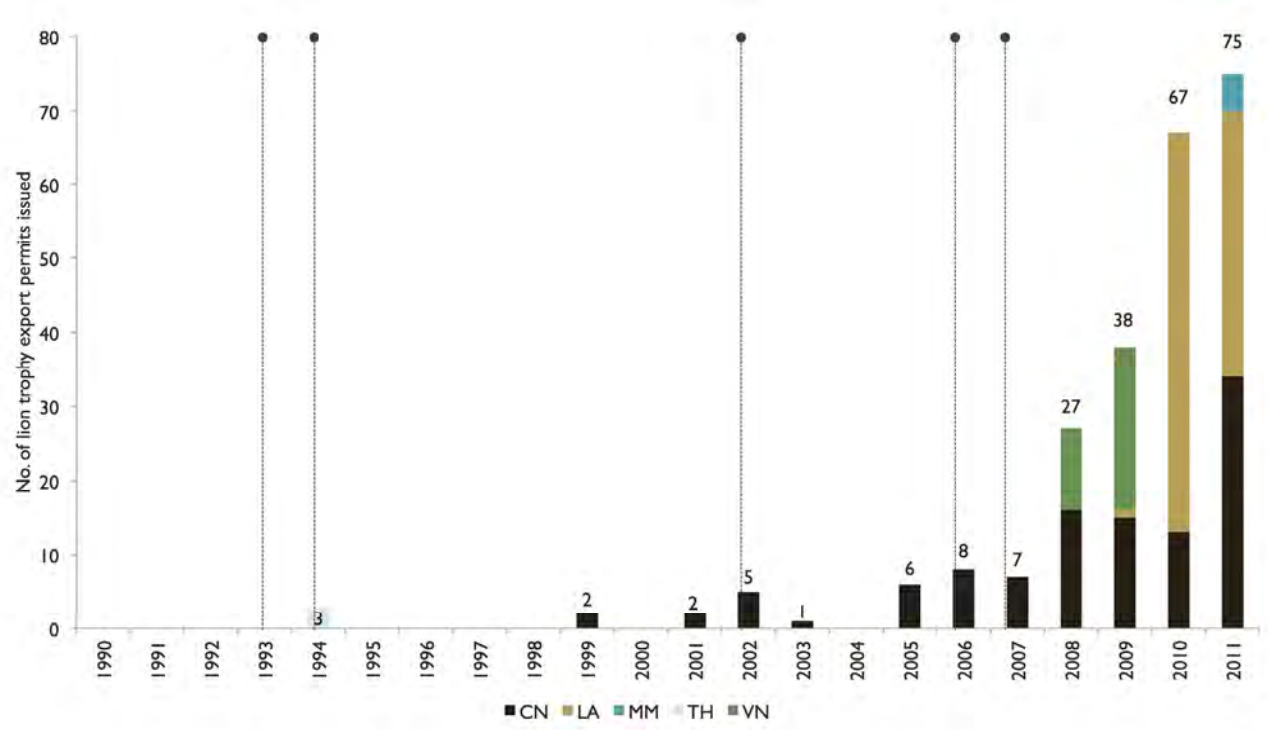


Figure 21 The number of Lion trophies recorded on export permits issued by South Africa to China (CN), Lao PDR (LA), Myanmar (MM), Viet Nam (VN), and Thailand (TH). Vertical lines indicate years that measures were adopted to protect Tigers and Asian big cats. For a complete enumeration of trophy exports to all countries, see Figure 16.

Of the 241 reported Lion trophies destined for East–Southeast Asia from 1994 to 2010, 45% were for China, 38% for Lao PDR, 14% for Viet Nam, 2% for Myanmar and 1% for Thailand. There are no records of hunters from Myanmar on the official hunting registers of 2009/2010. Thus, questions arise as to the motives for five trophies being exported there in 2011 (Figure 21). Interestingly, exports of Lion trophies to East–Southeast Asia increased markedly after the 2006–2007 measures to protect Tigers and Asian big cats were adopted and the motives for these exports are also in question (Figure 21). However, not all hunting from Asian clients is to be regarded with suspicion since economic growth in Asia is leading to increased levels of private wealth and thus more people can legitimately afford to hunt abroad for recreational purposes (Zhilong, 2012).

[16] A "**trophy**" (TRO) according to CITES (2010c) guidelines is: all the trophy parts of one animal if they are exported together: e.g. horns (two), skull, cape, back skin, tail and feet (i.e. total ten specimens) constitute one trophy. But if, for example, the skull and horns are the only specimens of an animal that are exported, then these items together should be recorded as one trophy. Otherwise the items should be recorded separately. A whole stuffed body is recorded under "BOD". A skin is recorded under "SKI".

[17] The nationality of foreign hunting clients are recorded on a professional hunting register after a hunt, and these data are compiled and sent to DEA annually. Data were only available for 2004/2005 and 2009/2010.

The North West province is the source of most Lion trophies exported to China, Viet Nam and/or Lao PDR. From 2006 to 2011, 52% of the trophies reported on permits were issued by the North West, 24% from Mpumalanga, and 15% from the Free State (Figure 22). However, since Lion hunting is a rare event in Mpumalanga and is not permitted in Gauteng, the Lions must have been hunted in different provinces. Permits issued for trophies do not necessarily reflect the provinces the Lions were hunted in because trophies are routinely sent to taxidermists in a different province to where the hunts occurred.

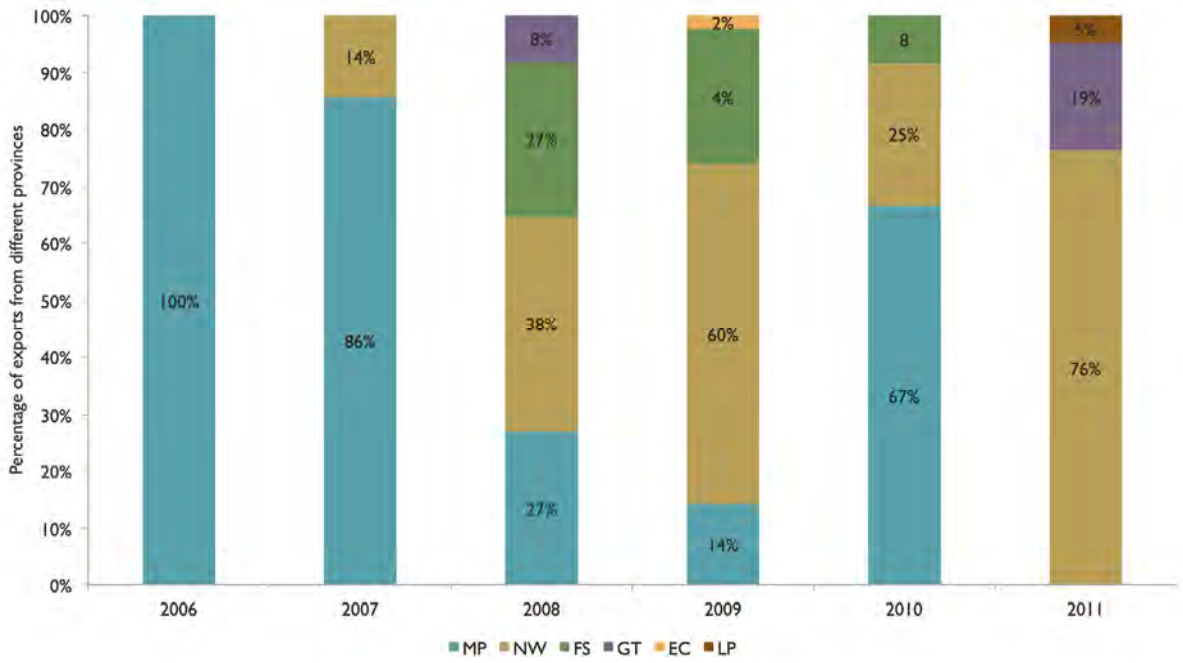


Figure 22 The proportion of trophies that China, Lao PDR and Viet Nam imported that were exported from the various provinces. The provinces from which trophies are exported do not necessarily indicate where the Lions were hunted if the landowners and the taxidermists processing the trophies are in different provinces. (See Map 2 for abbreviations for the provinces)

COMBINED EXPORTS OF LION BODY PARTS TO EAST AND SOUTHEAST ASIA

Exports of Lion products to East–Southeast Asia commenced in 1994 when Thailand was issued a permit to import one Lion body (Figures 18, 23a, 24; Table 11). From 1993 to 1998 there was sporadic trade in live Lions, bodies and trophies to China and Thailand (Table 11; Figure 24). The first noteworthy exports occurred in 1999 when permits to export 6 and 15 live Lions to China and Thailand respectively were issued. The trade in Lion parts to East–Southeast Asia maintained a steady flow from 2003 to 2005, after which exports increased to their second highest recorded level in 2006.

The quantities recorded on export permits for Lion body parts to East–Southeast Asia in 2007 were marginally higher than in 2006 (Figures 24). But in 2008 exports increased almost 6-fold from the year before. Not only did the number of live Lion imports reach record levels, but also the first permits to export skeletons were issued. Similar to rhinos, exports of Lion products grew exponentially from 2007 (Figures 23 & 24) – the same year that CITES approved Decision 14.69 (CITES, 2007b) and the year after China implemented further regulations to protect Tigers and Asian big cats (see Introduction; Tables 1 and 2). There thus appears to be a correlation with the rise in Lion product exports (especially skeletons) and the years that these protective measures were adopted (Figures 23 & 24). The upward trends in quantities of all Lion products increased sharply after 2006, especially exports to Lao PDR.

Each of the four selected Asian countries has a different import pattern for African Lions and their body parts (Figure 23). Lao PDR is clearly the dominant destination for Lion bones (Figure 23b) and 85% of all skeletons recorded on export permits from 2008–2011 were destined there. The quantities of skeletons destined for Lao PDR is also 10 times more than the combined quantities of skeletons destined for China, Thailand and Viet Nam. The next biggest importer of skeletons is Viet Nam with 13% of the total imports. China tends to import more Lion trophies and small quantities of bones and bodies (Figure 23a), whereas Thailand tends to import live Lions and sporadically the bodies and trophies (Figure 23c). Viet Nam, like Lao PDR, only started importing Lion parts in 2008 and the total quantity of exports are second to Lao PDR.

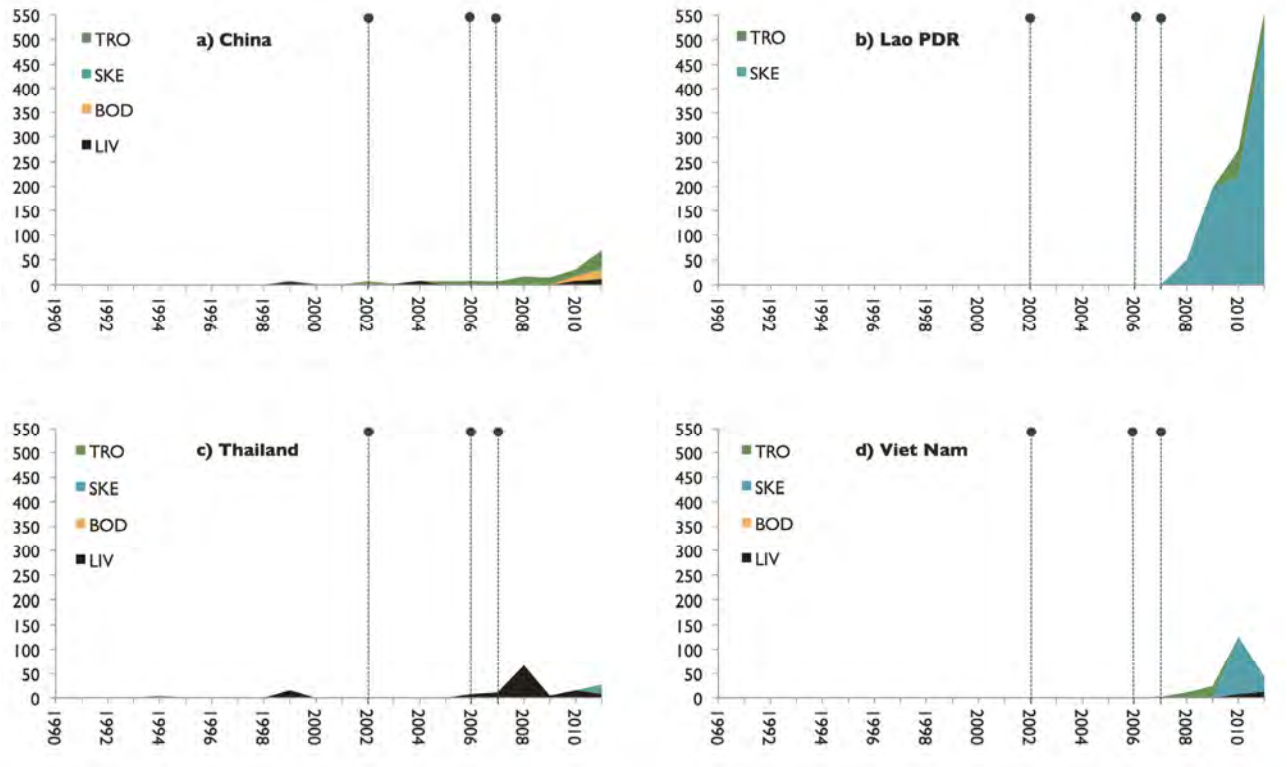


Figure 23 Selected country comparisons of the quantities of live Lions (LIV) and Lion products (trophies, TRO; skeletons, SKE; bodies, BOD) recorded on CITES export permits using the same y-axis as Lao PDR. Vertical lines indicate years that measures were adopted to protect Tigers and Asian big cats

Table 11 Combined total number of quantities recorded on permits issued by South Africa to export Lion commodities to China, Lao PDR, Viet Nam, Myanmar and Thailand from 1990

Year	Live	Bodies	Skeletons	Trophies	Total
1990					-
1991					-
1992					-
1993*					-
1994*		1		3	4
1995					-
1996					-
1997					-
1998	1				1
1999	21			2	23
2000	2				2
2001				2	2
2002*		2		5	7
2003	2			1	3
2004	8				8
2005		1		6	7
2006*	14			8	22
2007*	13			7	30
2008	67	1	50	27	145
2009	5		199	38	242
2010	44	10	338	67	459
2011	42	21	573	75	711
TOTAL	**219**	**36**	**1160**	**241**	**1656**

* Years correspond with the measures adopted to protect Tigers and Asian big cats

Despite the large quantities of Lion bones exported to Lao PDR, there are no records on the UNEP-WCMC CITES trade database of Lion products being exported from Lao PDR to neighbouring countries. Similarly, there are only one or two records each of Lions being exported from China, Viet Nam and Thailand. This suggests that the products are either consumed within the country or they are processed and channelled into the extensive regional wildlife trade and moved across country borders illegally without CITES permits.

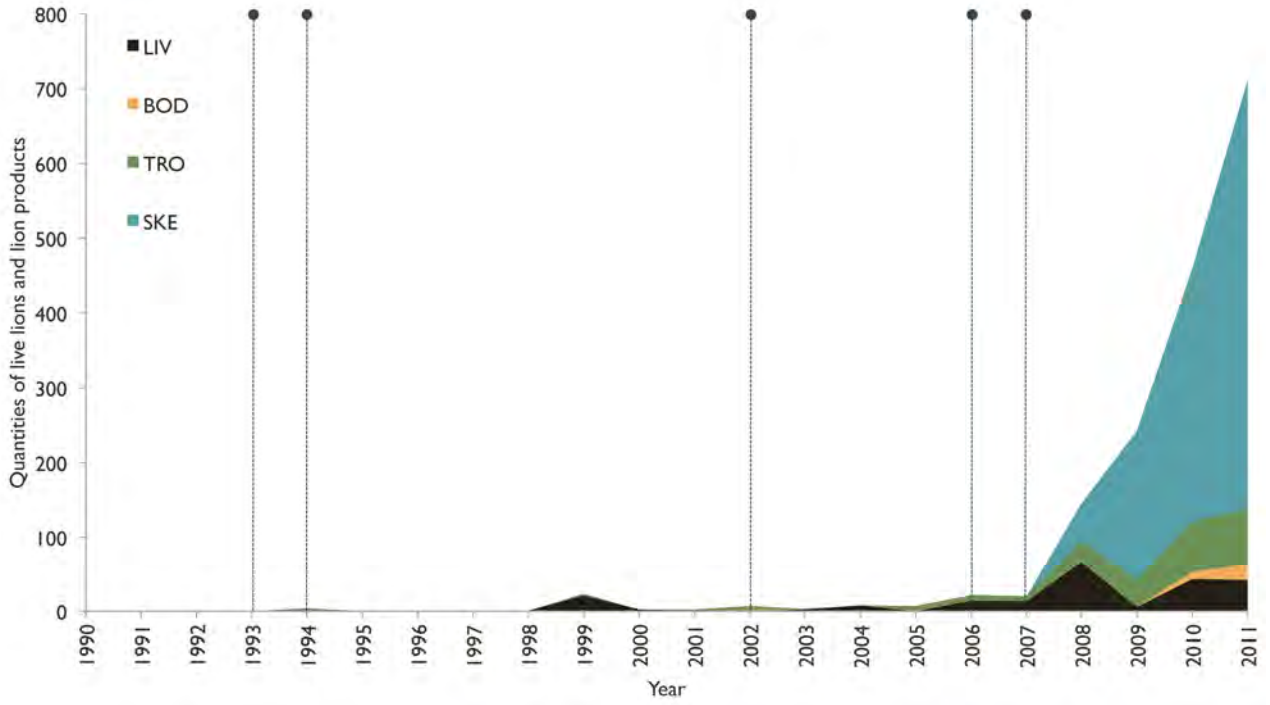


Figure 24 Combined quantity of live Lions and Lion products recorded on permits issued by South Africa to export the products to China, Lao PDR, Thailand and Viet Nam (raw data in Table 11). Vertical lines indicate years that measures were adopted to protect Tigers and Asian big cats

ESTIMATING THE RESERVES IN THE SKELETON RESOURCE BASE

The size of the resource base available from Lion trophy hunts from 1977–2010 was estimated to be 5000–6200 skeletons (Table 7). Before the Lion bone trade started in 2008, game farmers and/or taxidermists would have disposed of the Lion carcasses once the trophy component was removed from the body. If the skeletons were buried then they would need to be exhumed to retrieve the bones, but it is doubtful whether landowners know the whereabouts of most old carcasses obtained from hunting activities in the past. A component of the disposed skeletal reserves are therefore irretrievable and probably unusable. Since the numbers of Lions being hunted are increasing annually, and more than twice as many Lions were hunted in 2010 compared to 2004 (Figure 9), the numbers of skeletons available from hunted Lions are increasing at a similar rate and creating a cumulatively larger annual reserve. Skeletons from some non-hunted Lions are also potentially available, but the size of this resource is unknown.

Estimates for the skeleton reserves presented in this section are for 2004 to 2010 and/or 2011, but the number of skeletons estimated to have been buried or disposed of resulting from Lion hunting prior to 2004 exceeds 2100 carcasses (derived from Table 7).

1. Based on the number of Lions hunted: 2004–2010

The size of the skeleton resource base from 2004–2010 and the number skeletons not yet exported was estimated using: (1) figures for the number of Lions hunted until 2010 (obtained from national hunting register), and (2) the number of Lion skeletons reported on export permits issued to countries in East–Southeast Asia (*Source*: DEA and CITES trade statistics). The following results were obtained:

- The number of Lions hunted from 2004–2010 totals 2950 Lions; the number of skeletons recorded on export permits from 2008–2010 is 587 – hence a difference of **2363 Lion skeletons in reserve** that have not all been exported (Figure 25, numbers below the axis from 2004 to 2010). Skeleton stocks disposed of before 2007 would need to be located and/or exhumed if required.
- Assuming game farmers and breeders are only using the stock generated since the Lion bone trade commenced in 2008, and at least 1435 Lions were hunted from 2008–2010, then there is difference of 848 Lion skeletons in reserve that have probably not all been exported and would not necessarily require locating before being exported (Figure 25, numbers below the axis from 2008 to 2010).

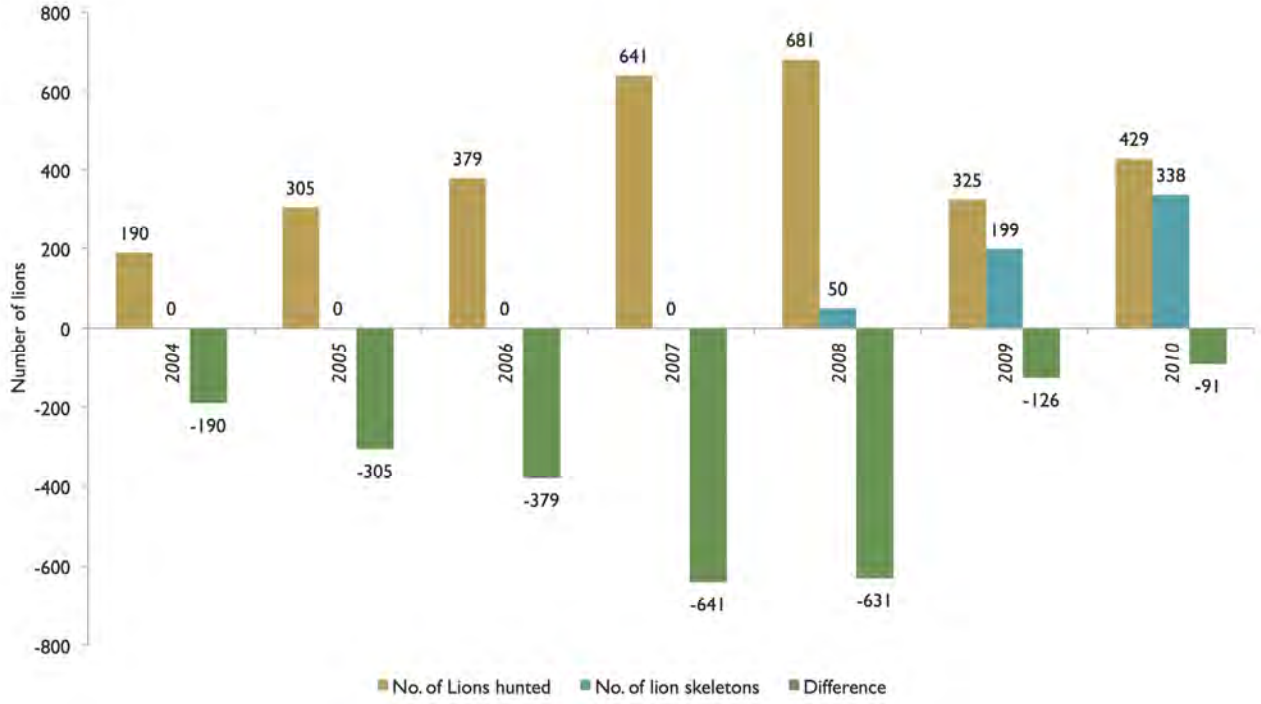


Figure 25 The difference between the number of Lions hunted and the number of Lion skeletons reported on export permits for 2004–2010. The annual differences below the axis indicate the number of skeletons that have not been exported and are in reserve. (Years in italics) (*Source*: see text)

Not all skeletons recorded on the permits are exported and not all farmers sell the bones. Furthermore, there are also skeletons from non-hunted Lions that contribute to the national reserve. Therefore, the number of skeletons in reserve that have not been exported is larger than the estimates presented here. Hence, the exports are currently less than what can be supplied and there is still a large surplus of Lion skeletons in South Africa. Since these animals are mostly captive bred, there is inferred to be little impact on wild Lion populations in South Africa. In other African countries, however, hunting is reportedly of wild Lions and the potential impacts of the Lion bone trade on wild populations outside of South Africa are likely greater if wild Lions are hunted to supply bones to Asian markets in addition to being hunted for trophies.

2. Based on the number of trophies exported: 2004–2010

Figure 25 above represents a conservative scenario for the size of the skeleton resource base. In the previous chapter the discrepancies between the number of animals hunted and the number of trophies recorded on export permits indicated that more Lions were being hunted than were being declared on the hunting registers. If true, then the discrepancies also indicate that the number of skeletons in reserve is even larger than that inferred from Figure 25.

By comparing (1) the number of trophies recorded on export permits from South Africa until 2011 (to get an upper-bound estimate of the number of Lions hunted), with (2) the number of Lion skeletons reported on export permits issued to countries in East–Southeast Asia (obtained from DEA and CITES trade statistics), the following results were obtained:

- The number of Lion trophies from 2004–2011 totals 4951; the number of skeletons recorded on export permits from 2008–2011 is 1160 – hence a difference of **3791 Lion skeletons in reserve** that have probably not all been exported (Figure 26, numbers below the axis from 2004 to 2011).
- Assuming that farmers are only using the stock generated since the Lion bone trade commenced in 2008, and there are 3322 Lion trophies from 2008–2011, then there is a difference of 2162 Lion skeletons that have probably not been exported and would not necessarily require locating before being exported (Figure 26, numbers below the axis from 2008 to 2011).

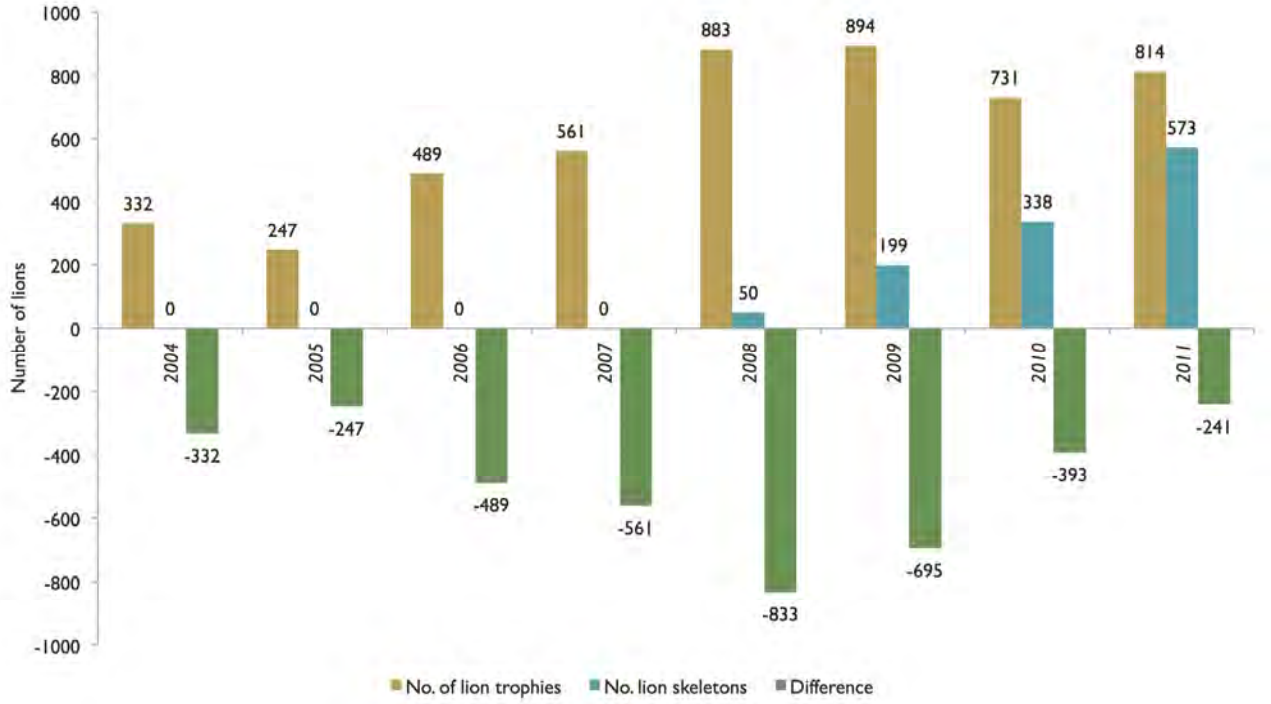


Figure 26 The difference between the number of Lion trophies and the number of Lion skeletons reported on export permits for 2004–2011. The annual differences below the axis indicate the number of skeletons that have not been exported and are in reserve. (Years in italics) (*Source*: see text)

As the number of skeletons exported to East–Southeast Asia increased from 2008, the size of the annual skeleton reserve in a calendar year decreased correspondingly ("difference" in Figures 25 & 26). At a national level, the cumulative size of the skeleton surplus appears large enough to continue to supply the market for skeletons. However not all farmers sell their Lion skeletons, whether they are derived from hunted or non-hunted Lions or not. Thus an unknown proportion of the skeleton surplus is not for sale. Furthermore, if there are preferences in Asian markets for "fresher" bones with more bone marrow and soft tissue then importers will be more partial to purchasing bones from newer bone stocks and bones derived from hunting activities in previous years are less likely to be sold. But since there are reports of farmers exhuming old bones, it is unclear how much one should disregard the value of old stock.

At the landowner level, stocks of Lion skeletons will continue to grow annually on properties where farmers don't sell bones, but the size of the surpluses might decline on properties that regularly supply the trade. If the demand in East–Southeast Asia continues to increase, then a scenario might arise whereby fresh skeletons are in short supply despite the national surplus. Various concerned people have been quoted in the media as saying that farmers would probably meet the demand for Lion bones by resorting to culling healthy Lions. Alternatively, that they (farmers) would increase reproductive rates in their breeding stock to grow the necessary numbers of Lions as is the practice in Tiger farms. However, some landowners have denounced these allegations by saying that the bone trade is an opportunistic business venture whereby more profits are made from selling the Lions twice. Their primary income is made from selling a Lion to a hunter, and a secondary income is generated from selling bones that would have otherwise been disposed of. Under this scenario, operators might increase the marketing of Lion hunts to foreign hunters to generate an additional supply of trophy animals and thus carcasses. But, captive females that aren't hunted are allegedly at risk of being culled. Where previously there was no value in the skeleton, a consumptive and thus monetary value now exists (see later chapter on the value of the trade).

Another concern raised is that landowner *"Diversification into a lion bone industry…carries the risk of not only creating but fuelling demand for lion bones in Africa. This in turn creates the obvious risk that merchants may well choose to buy wild lion bones from poachers for much lower prices than their captive breeder rivals are charging"* (Hargreaves, 2010). While there are reports that these risks exist in several African Lion range countries, in South Africa, however, there is presently no evidence of increased levels of Lion poaching, and especially not at a rate that could supply the current export market maintained by the captive breeding and trophy industries. Furthermore, it seems as if the prices paid in South Africa are not an incentive to poachers (see later chapter on the value of the trade). From all the discussions held with conservation officials it also appears that the least likely scenario at present is that Lion poaching in South Africa would increase – this is partly because bone stocks from captive animals are ample, and old

stocks would be located and/or exhumed if necessary. However, this situation seems to be specific to South Africa currently and future trends have not been extrapolated.

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EXPORTERS, IMPORTERS & TRADE FLOWS

The authors have not clearly established what happens to Lion bones once they reach East–Southeast Asia. The Asian-based networks and syndicates that trade in Lion products are worthy of further investigation and are presumably similar to those for other Asian wildlife, especially big cats (Figure 27). Since wildlife trade often makes use of established networks and supply lines, the Lion bone trade may have piggy-backed on existing wildlife routes in Lao PDR, Viet Nam, China, Thailand and Myanmar. A description of the trade chain in the flow of Tiger parts and derivatives from source to consumer is illustrated in a report by TRAFFIC (2008, Figure 21, pg 39–41), and the Lion products exported to East–Southeast Asia are likely to end up in parts of that chain. On the South African side, a simplified representation of one aspect of the trade chain from the landowner/breeder to the airline is depicted in Figure 28 and the text that follows. The routes followed by South African traders appear to be relatively more transparent and there is presumed to be more legal than illegal trade.

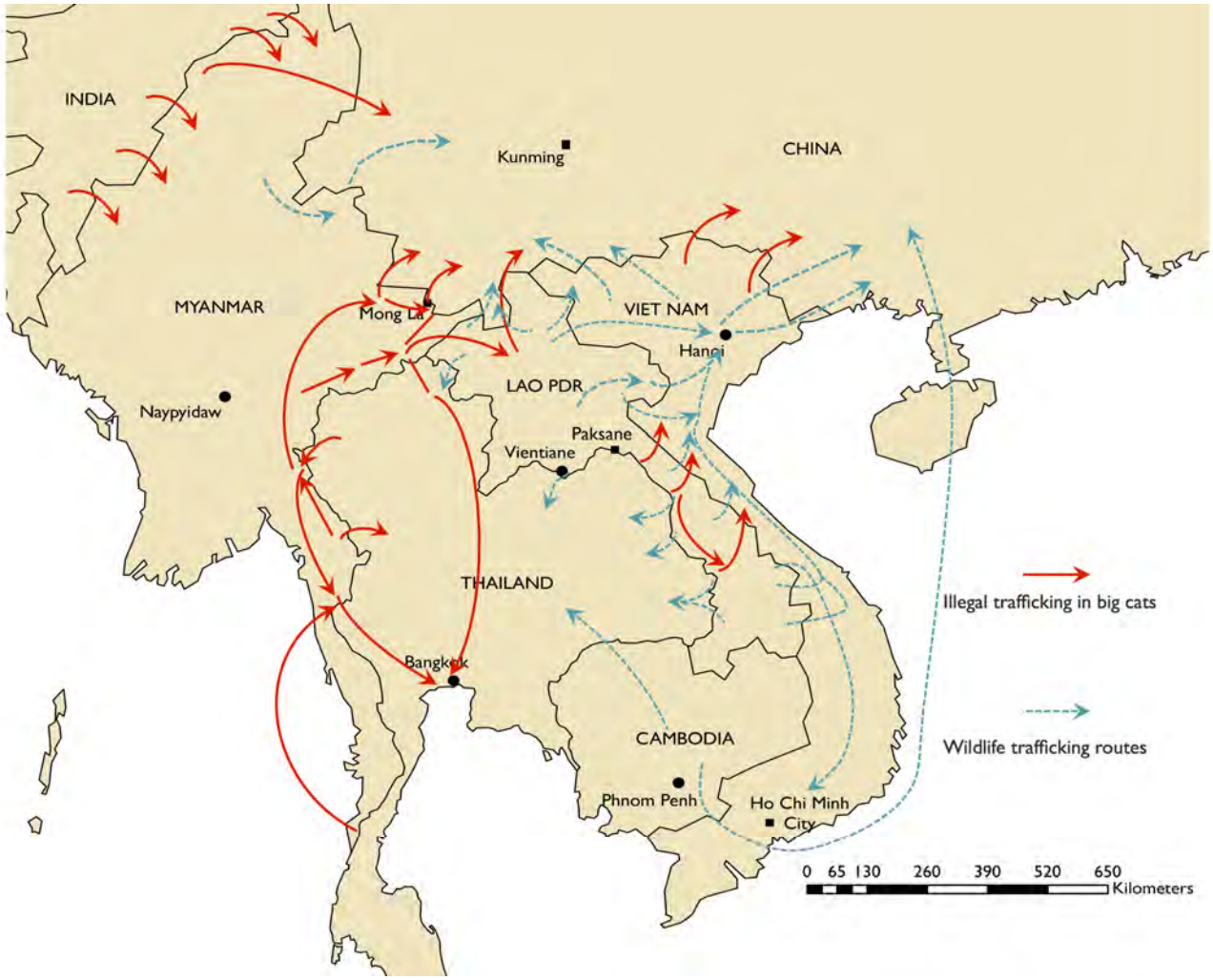


Figure 27 Regional trade flows and trafficking routes for Asian big cats and other wildlife. Lion bone shipments could follow similar established routes after the cargo is flown to airports in Vientiane, Hanoi, Ho Chi Minh City and Bangkok. Map derived from Nooren and Claridge (2001) and UNODC (2010, 2013)

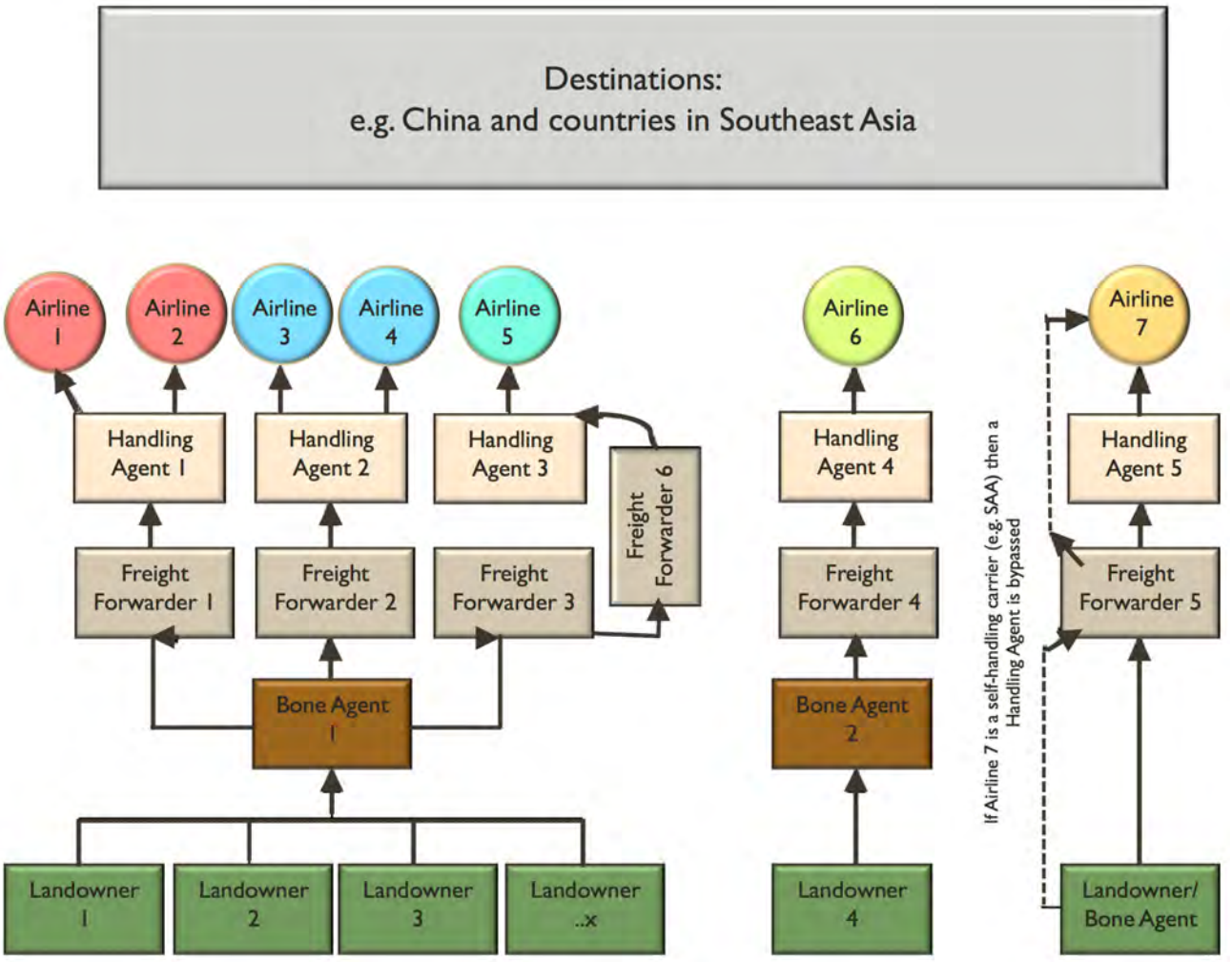


Figure 28 Several simplified scenarios of trade flows for Lion bones from the landowner/game farmer/breeder to destinations in the East–Southeast Asia. Airlines are used as an example of a cargo carrier through a gateway such as OR Tambo International Airport (ORTA), but shipping companies at seaports such as Port Elizabeth could also be (and are known to be) used as exit points. One interviewee estimated than 99% of Lion skeletons exit South Africa via ORTA (Anon., pers. comm., July 2013). These scenarios were derived from interviews with people in the freight forwarding industry

Trade flows and terminology within the airfreight business are relatively complex. The main actors and their roles within the bone trade are simplified and summarized as follows:

Landowner: the owner of the facility that breeds and/or allows Lion hunting on the property and thus has bones for sale. Not all landowners with Lions will sell the bones, and there is anecdotal evidence that some farmers destroy carcasses after the Lions have been hunted. Landowners are sometimes, but not always, listed as the exporters on the CITES permits.

"Bone agent": an enterprise or individual who sells the bones to a customer in East–Southeast Asia and who is usually listed as the "*exporter*" on the CITES permit and the "*consignor*" on a waybill. "Bone agents" mostly buy skeletons from farmers and then prepare them for export[18]. The agents must submit all the necessary paperwork to the freight forwarders before the export can proceed including the CITES permits, a taxidermy certificate (usually indicating that the consignment consists of "partially processed trophies") and a certificate from the

[18] Mouton (2013) reported that one taxidermy studio north of Pretoria exports around 200 skeletons annually to Viet Nam, which they mostly buy from farmers. The Vietnamese, the bone agent said, *"want us to bake the bones, rather than boil them to get the meat off…They want the cartilage between the ribs that disappears when you boil it"*.

State Veterinarian. The "bone agent" doesn't necessarily own land and Lions, but they may act as their own agent for skeletons from their own property. In terms of TOPS regulations, they could also be called *"wildlife products traders"* since they engage in the business of acquiring and sourcing dead specimens of listed threatened or protected species with the express intention to trade the specimens for commercial purposes. Taxidermists may act as bone agents.

Customer/buyer at a destination in East–Southeast Asia: the customer/buyer to whom the bone agent and/or landowner sells the bones is listed on the CITES permit as the "***importer***", and on the airline waybill as the "***consignee***". The importer most frequently reported by the Department of Environmental Affairs for 2009 and 2010 (National Assembly, 2011d) is the Xaysavang Company from Paksane, Lao PDR.

Freight forwarder: also known as *forwarding and shipping agents*, the forwarder is a person or company who organizes the transport and shipment of the bone consignment on behalf of the bone agent so that the cargo reaches the customer in the East–Southeast Asia. Forwarders contract with a particular carrier (e.g. an airline or shipping company) through a ground handling agent (GHA) to transport the consignment to the destination. First, however, the forwarder contacts the GSA (General Sales Agent) of the airline and buys cargo space for the consignment. The forwarders also prepare and process the necessary documentation including generating the air waybill (AWB). Thereafter, the forwarder takes the cargo to a GHA. In some cases, a forwarder may take the bones to a second forwarder first (e.g. bones exporter using Airline 5 in Figure 28)

Ground handling agent (GHA): GHAs are responsible for handling cargo on behalf of a specific airline. An airline will only be the client of one GHA at a time. Some airlines such as South African Airlines and Lufthansa, however, are "self handling agents" – i.e. they do not require the services of a private GHA, and the freight forwarder can take the cargo directly to them (Airline 7 in Figure 28). Thus, the GHA takes the consignment of bones delivered to them by the forwarder, keeps it in a warehouse, and then takes the cargo to the aircraft once the necessary documentation has been generated, checked and the cargo inspected. If the GHA has been directed by the South African Revenue Service (SARS) to notify them of certain types of cargo, then a Customs representative from SARS will check the consignment. The GHA will also notify the relevant authorities if they notice anything suspect or if they do not understand the documentation.

In a simple linear trade flow (e.g. Landowner 4 to Airline 6), the landowner/breeder sells the bones to a bone agent. The bone agent has probably already arranged for the sale of the bones to an Asian buyer. The agent or the landowner will apply for a CITES export permit from the Issuing Authority of the relevant province. The permits usually name the bone agents as the exporter and the Asian customer as the importer. Thereafter, the agent takes the cargo to a freight forwarder, who chooses a GHA. If the GHA only has one airline as a client (which they generally don't – e.g. Freight Forwarder 2 in Figure 28), then the GHA will generate the necessary documentation (including the air waybill) and implement the necessary cargo checks, and then load the cargo on to the airline.

In a less linear trade flow the landowner could sell to more than one bone agent on different occasions. Furthermore, there is anecdotal evidence that the bone agents do not routinely choose the same freight forwarding company – possibly so as not to draw attention to their potentially controversial activities (which freight forwarders speculate happens), but also to go with the carrier that has the cheaper rates. Consequently, consignments of Lion bones could leave South Africa via different gateways and carriers at different times depending on the freight forwarder that the bone agent chooses. This scenario is not unlike wildlife traders in East Asia, for example, who are reported to change routes opportunistically to take advantage of new infrastructure, to reduce transaction costs or avoid detection by authorities (UNODC, 2013).

It was reported during interviews that some bone agents consolidate skeletons purchased from different landowners and ship them as one consignment. One example described by an interviewee is depicted in Figure 29; the diagram shows how Lion bones that were part of a consignment shipped to "Asia" were obtained by a bone agent from three landowners in two provinces and were reportedly sent to two different importers at the same address (Anon., pers. comm., April 2013). And, while the landowner's names appeared on the permits, there was no link to a hunting permit or the cause of Lion mortality. Several people expressed concerns that it is sometimes not feasible to trace consignments of Lion bones back to their original source, nor to determine the cause of Lion mortality, when permits restricting various activities with respect to Lions are missing and/or not required before exports can proceed. In order to improve transparency within the bone trade, it was recommended by one interviewee that a system be put in place that enables the identification of individual Lions from birth to death and to link this to any activity involving those

specific Lions so that all exported skeletons and trophies can be traced back to the original source and mode of mortality. In the context of the current regulatory and compliance monitoring frameworks, the feasibility of such a system should be critically assessed.

In summary, the trade in Lion bones is mainly conducted through middlemen or "bone agents". Skeletons are typically sold to bone agents by landowners, breeders and other facilities, and then freighted to East–Southeast Asia. The number of landowners selling bones and the size of the supply base is unknown. Of the bone agents, there are only 12 known South African exporters: DEA published six of the 12 names in 2011 (National Assembly, 2011d), five names were mentioned in confidence during the interviews with various conservation and law enforcement officials, and one company was mentioned in a 2013 online newspaper article (Mouton, 2013). People who exported bones in the past are not necessarily active at present. Apart from the Lao-based Xaysavang Export-Import Company (EIA, 2014b; National Assembly, 2011d; Rademeyer, 2012a; court judgements in Chunchom and Lemtonghtai's trials) not much is known about Lion bone buyers in Viet Nam, Thailand and China. This is largely because the information is confidential. From the discussions, however, it seems that most of the consignments exported to Lao PDR go to the same addresses, but the name of the importer is allegedly not always the same.

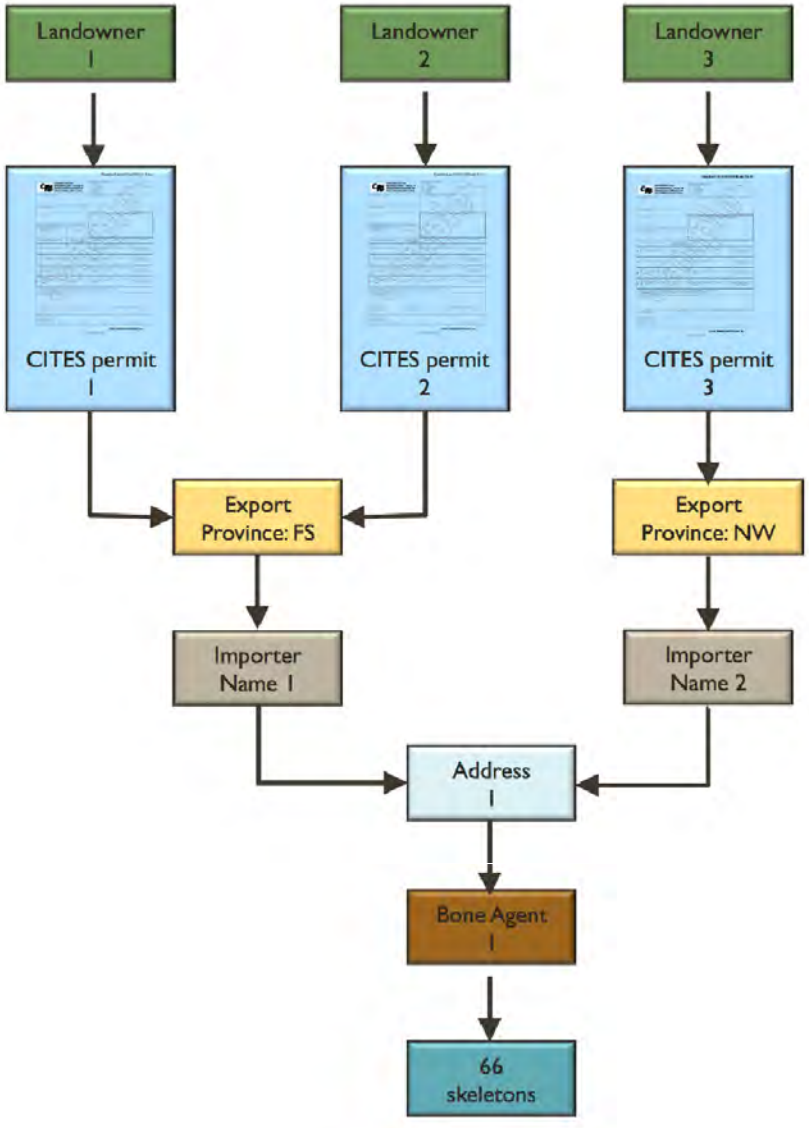


Figure 29 Example of a consignment of 66 Lion bones exported to an Asian country in 2012 that demonstrates how the "bone agent" consolidated the consignment (Anon., pers. comm., April 2013)

Finally, the Xaysavang Network, believed to be led by Vixay Keosavang, is an international wildlife trafficking syndicate that facilitates the killing of endangered animals for products such as ivory and rhino horn (U.S. Department of State, 2013). Given Xaysavang's well established links to the Lion bone trade in South Africa, it is unlikely that

other Laotian-based companies are procuring the bones. Accordingly, it would appear that some South African bone agents are dealing directly with this company – which, given the mostly legal trade in South Africa using CITES permits, is an unusual juxtaposition of interests. What is more, some conservation and law enforcement officials believe that there is some overlap in the landowner supply base trading in rhino horns and Lion bones, in the wildlife products traders/agents acting as middlemen, and the Asian importers of rhino and Lion products (Interviews conducted from May–July, 2013). The Xaysavang company, however, is not the only importer of Lion bones and there are, as yet, unnamed importers purchasing unknown quantities of bones in Viet Nam, Thailand and China.

VALUE OF THE LION BONE TRADE

There are at least two tiers to the South African Lion bone trade chain to consider when determining the value of the bones: (1) the prices paid to landowners for skeletons by the bone agents, and (2) the prices paid to the bone agents/wildlife-traders/intermediaries by the Asian importers. One must be cautious, however, when evaluating the South African side of the chain not to erroneously use the same US dollar prices that are allegedly paid for parts and products once they enter the markets in East–Southeast Asia. Once skeletons reach the Asian market, the values of the bones and derivatives increases incrementally along the sale and resale supply chain from importer → wholesaler and/or trader and/or manufacturer → middlemen and/or retailer → consumer, but there are no consistent and credible benchmark values by which to estimate the gross worth of the trade in Asia at the various levels of the chain.

In South Africa, the value of a Lion skeleton is also determined by the completeness of a "set" – i.e. whether the skull and/or bones from the limbs are included. Bones from Tiger limbs (especially kneecaps) and the skull are highly valued in TAM and a premium is paid to sellers accordingly if these bones are present in a set. The 2013 price paid to South African farmers/landowners by the bone agents was ZAR12 000–ZAR15 000 (USD1260 to USD1560) per set without skulls, and up to ZAR18 000–ZAR20 000 (USD1890 to USD2100) per set with skulls (depending on the size of the skeleton) (Anon. quoting a South African bone agent, pers. comm., July 2013) (Table 12). Thereafter, the bone agents charge the importers a fee of about ZAR3000 (USD315) per set, not all of which is profit since the agent has to organize for the export of the consignment.

Table 12 Various prices reportedly paid to South African landowners, breeders and/or bone agents for sets of Lion bones

Year	Reported value	Notes	Source
2013	i) Excluding skulls: ZAR12 000 to ZAR15 000 (USD1260–USD1560) per set (depending on size and completeness) ii) Including skulls: up to ZAR18 000 to ZAR20 000 (USD1890–USD2100)	The going rate paid to the landowner per set. Bone agents add a mark-up of ±ZAR3000 (USD315). Once the skeletons reach the "Far East" they will fetch upwards of USD10 000	Anon. (pers. comm. July 2013) (quote from a South African bone agent)
2012??	i) Excluding skull and feet: ZAR1000/kg (USD130/kg) for bones (equates to ZAR9300 per set*). ii) Including skull and feet: an extra ZAR5000 (USD650) added to the purchase price	A Free State farmer was paid ZAR60 000 (USD7800) for 12 sets of bones (ZAR5000/set), but the bones were small and some were missing	Rademeyer (2012a)
2009 – 2010	i) Excluding skull and feet: ZAR10 000/set (USD1300) of bones. ii) Including skull and feet: extra ZAR5000 (USD650) added	Information contained in affidavits leading to the arrest of Punpitak Chunchom and Chumlong Lemtongthai	Macleod (2012b)

* Assuming a mean skeleton mass of 9.28 kg per skeleton (for lions of mixed age, sex and completeness) (see Box 4 in Appendix 4)

The prices paid for South African Lion bones were first alleged by the media to be ZAR600–R800/kg (USD72–USD96/kg) in 2009 (Smith, 2009). In affidavits leading to the arrest of Punpitak Chunchom and Chumlong Lemtongthai for organizing illegal rhino poaching expeditions, they stated they were buying Lion bone sets for about ZAR10 000 (USD1300) each from game farms in the Free State and North West, and paid an extra ZAR5000 (USD650) if the skull and bones from the feet were present c.2009–2010 (Macleod, 2012b) (Table 12). Rademeyer (2012a) cites a similar figure, but also reports that the going rate was ZAR1000/kg (USD130/kg) plus an extra ZAR5000 (USD650) if the skull and feet were intact (Table 12). However, a Free State farmer was paid ZAR60 000 for 12 incomplete sets of bones (about ZAR5000 each) by the same buyers (Rademeyer, 2012a). The Chairman of the South African Predator Breeders Association (SAPBA) said that of the ±800 Lions hunted on the farms he was aware of, the total annual value of bone sales to the farmers was ±ZAR20 million (which translates to ZAR25 000/skeleton) (USD2.45 million total, or USD3060/skeleton) (P. Potgieter, pers. comm., June 2013) [*Note*: no time period was given for these sales]. This latter total value probably included the fees paid to the bone agents and may be the combined value for landowners and bone agents.

The alleged value of Lion bones once they reach the Asian supply chain is mostly anecdotal and unconfirmed. A set of Tiger bones was quoted to be worth as much as USD7000 each c.2011 (Graham-Rowe, 2011). Given that Lion bones are sold into Asian markets as Tiger bone fakes, the resale values along each tier of the supply chain equates to a potentially high-value business. Lion Aid (2012a,b,c) reported on the following values for Lion bones in 2010, 2012 and 2013:

- 2010: USD300/kg or USD4000 per skeleton *"in the Asian countries"* (Lion Aid, 2012a);
- 2012: USD10 000 (ZAR84 000) per skeleton in Asian countries (Lion Aid, 2012a)
- 2012: A minimum value of USD15 000 per skeleton earned by wildlife traffickers in Lao PDR (Lion Aid, 2012b);
- 2013: USD400–USD500/kg for captive bred Lion bones, and a skeleton is worth USD15 000 to TCM practitioners (Lion Aid, 2012c).

The value of a set of Lion bones in South Africa is substantially less than USD10 000 to USD15 000 per set that is frequently alleged to be paid. Ascribing such erroneously high values on the South African side of the supply chain would make it seem plausible that poaching wild Lions would be a cheaper alternative to sourcing the bones from hunted captive animals and thereby incentivize illegal hunting – which appears not to be the case in South Africa. However, the relatively low prices paid for South African Lion bones could potentially promote a sustained demand to supply an allegedly lucrative Asian market with Tiger bone fakes that are sold at high prices in black markets.

The value of bones generated as a secondary by-product of the trophy hunting industry has allegedly motivated farmers to dig up previously discarded carcasses originating from trophy hunts and captive mortalities. Whereas female Lions formerly had little or no value to breeders from a trophy hunter's perspective, the emergence of a market for bones has generated a previously overlooked value for females. There are concerns, however, that the breeding cycle of the females will be abused to generate additional income for the farmer. From discussions with the various provinces, these concerns are supported by anecdotal evidence – but these practices appear to be in the minority for the time being.

Further concerns about the breeding of Lions specifically for the income generated from the bone trade have been raised. What the representatives from the various provinces and the Department of Environmental Affairs are clear on is this: there is no economic incentive to farm Lions solely for the bones, especially given the costs involved in raising Lions and the current prices paid for skeletons. The bones alone are worth, at most, ZAR20 000 for a complete skeleton, whereas a trophy hunted male Lion of at least six years old will generate ZAR160 000 to ZAR170 000 (USD16 800–USD17 900). That the farmer can sell the bones is of secondary benefit to their operation, but it makes no business sense for them to put down a male and thus forfeit about ZAR142 000 (USD14 900) in the process. Females are, however, at risk of this practice since a farmer will only get ZAR30 000 to ZAR40 000 (USD3150–USD4200) for her from a trophy hunter. Also at risk are juvenile Lions where cumulative expenditure on their rearing is still relatively low. However, current data suggest that it is the skeletons from adult Lions that are mainly being exported (see Table A16 in Appendix 4 for average mass of exported skeletons). Hence, monitoring of Lion breeding facilities is a recommended step to restrict opportunities for abuse of the system for financial gain.

The global illicit wildlife trade (excluding timber and fish) was estimated to be worth one-third of the legal trade, which put it in the range of USD7.8–USD10 billion (Haken, 2011). By contrast, Nguyen (2008, cited in Drury, 2009) estimated that revenues from Viet Nam's illegal wildlife trade are 12 times greater than revenues from the legal trade. The Lion bone trade in South Africa is regarded as mostly legal; some predator breeders have reportedly said that they do not release Lion bones unless they come from legally hunted Lions (Liou, 2012). Therefore revenues generated from the legal trade in bones in South Africa will probably be larger than those generated by the existing illegal trade, but these values have not been determined as yet.

ILLEGAL TRADE IN LIONS

INTRODUCTION

Transnational wildlife crime syndicates often establish and maintain vast trade networks, usually in developing countries where they can evade trade tariffs and environmental regulations by exploiting regional weaknesses in law enforcement, border and Customs control and the corruptibility of people within the public and private sector (Haken, 2011; Hübschle, 2013). The Lion bone trade in South Africa is juxtaposed within such a network of dealers that operate both illegally and legally. The illegal trade in Lions in South Africa usually involves restricted activities for which offenders are not in possession of permits to breed, keep, hunt, catch, sell, convey or export live animals or parts thereof. Cases involving illegal trade are detected, frequently at airports, when persons found in possession of Lion parts do not have the necessary CITES permits. Incidents of confiscations, seizures and/or prosecutions from illegal international trade and possession of wildlife are reported annually on the CITES UNEP-WCMC trade database and by TRAFFIC (TRAFFIC, 2013b).

The number of confiscations/seizures of African Lions (live and parts thereof) reported to CITES totalled 199 incidents worldwide from 1982 to 2011 (Figure 30) (*Source:* UNEP-WCMC CITES trade database). Lion trophies, skins, live animals and claws were the most frequently seized products. None of these incidents involved countries in East–Southeast Asia as the importer, but China and Thailand were the exporters in five cases. The USA was reported as the importer in 57% of the total seizures, and South Africa was the exporter in 43 (22%) seizures (Figure 30). The commonly seized products originating from South Africa were trophies, skins and claws. These results, however, must be viewed in the context of the sources for this information: many countries do not include records of confiscations on their annual reports to CITES, and the USA has a long history of providing this information to CITES (Nowell and Pervushina, 2014). Therefore, while CITES seizure records are a useful measure of illegal trade and are suggestive of enforcement effort (Nowell and Pervushina, 2014), more incidences of confiscations occur than are captured on the CITES trade database.

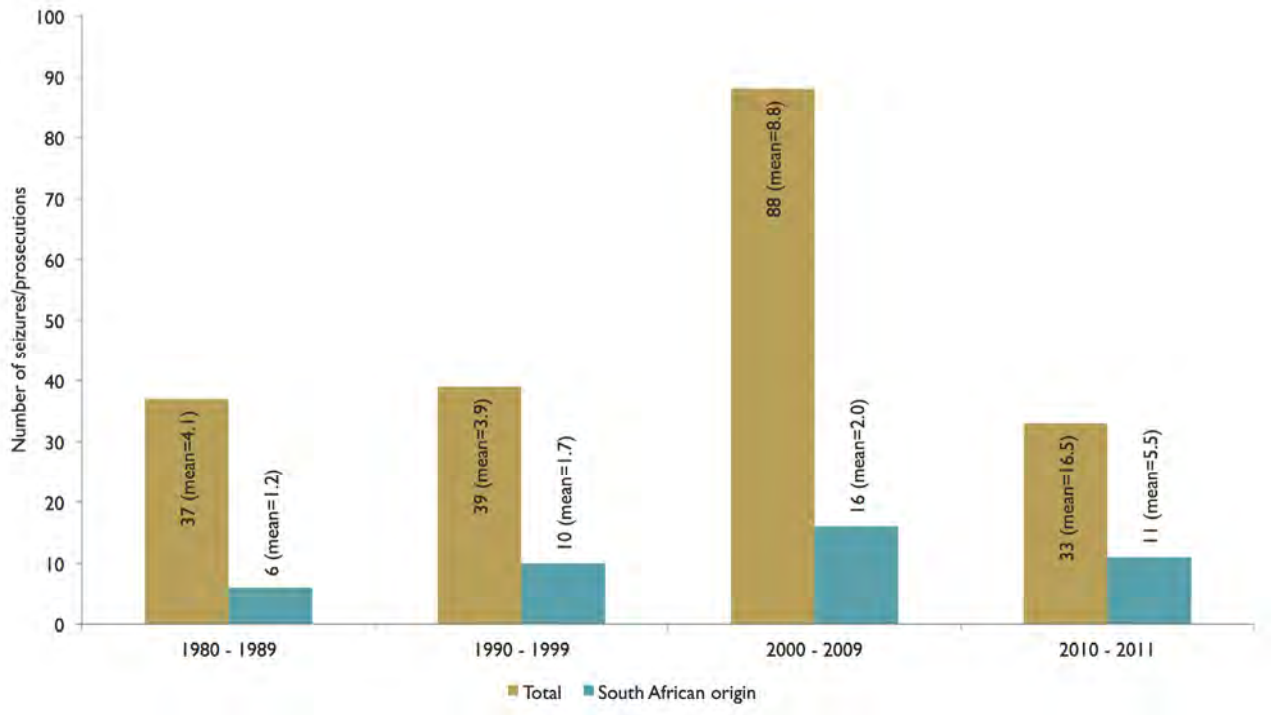


Figure 30 Number of African Lion confiscations/seisures (live and body parts) recorded over three decades across the world (Total) and where South Africa is identified as the exporter. The mean annual number of confiscations per decade is in brackets. (*Source*: UNEP-WCMC CITES trade database) *Note: many countries do not include confiscations in their annual reports to CITES (Nowell and Pervushina, 2014), hence these data are a subset of the total unquantified number of seizures worldwide*

Trends in confiscations indicate an increase in the average annual number of incidences reported worldwide to CITES in the last 13 years (Figure 30). This trend is indicative of both the increase in illegal trade and the detection thereof. The number of seizures of Lion parts in the forthcoming decade looks set to be greater than the number reported from 2000–2009.

Selected cases of seizures and prosecutions that took place from 1997 are compiled and published by TRAFFIC annually. Incidents involving African Lions that were detected outside South Africa from 1998 to 2013 are listed in Table 13, for example in 2001 an Asian national was detained at Hong Kong International Airport for being in possession of Lion body parts originating in South Africa. In 2009 Chinese nationals were arrested in Tanzania and Kenya in possession Lion claws and/or teeth.

Table 13 Cases of seizures and prosecutions outside South Africa relating to Lion products

Type	Year of incident	Place of arrest	Description
Live	1996	Mozambique	6 Lions from a circus. Allegedly transported wildlife in contravention of CITES.
Skull	1998	Belgium	1 skull; origin and source unknown
Body and bones	2001	Hong Kong	Customs officers at the airport discovered the stuffed head of a male adult Lion with its skin, four limbs and tail still attached in a box carried by a businessman arriving from Johannesburg. The man claimed the specimen, which weighed 11.9 kg and measured 3.32 m from head to tail, was for decoration in his home. An export permit had been issued by South Africa but the traveller was unable to produce an import permit.
Body	2003	UK	After examination of a hunting trophy shipment in transit from Zimbabwe to the USA, an adult stuffed Lion was seized owing to the absence of CITES permits.
Live	2004	Indonesia	Lions seized at an animal rehabilitation centre. Owner didn't have licence.
Trophy	2008	France	2 stuffed Lions were seized from a taxidermist's premises. The taxidermist was unable to produce the requisite CITES permits.
Claws and teeth	2009	Tanzania	4 people were arrested in Dar-es-Salaam airport on suspicion of trying to smuggle ivory to China. The suitcase contained 60 Lion claws and teeth.
Teeth	2009	Kenya	Three Chinese men destined for China charged with illegal possession of teeth.
Skin	2010	Gabon	Raids conducted by government officials yielded a portion of Lion skin.
Skin and head	2010	Swaziland	Two siSwati ladies were arrested and later prosecuted for being in possession of Lion skin (for local use for traditional medicine).
Skull	2010	UK	The skull of 1 cub smuggled from South Africa.
Skeletons	2011	Viet Nam	Searches at properties in Ho Chi Minh City turned up large amounts of wildlife bones and processed animals. DNA tests concluded that items included the skeletons of 6 Lions
Body	2012	Indonesia	1 stuffed Lion seized from the premises of a taxidermist
Not specified	2013	Republic of Guinea	A man prosecuted for the illegal trade in Lions (and other species) over the past decade

(Source: TRAFFIC, 2013b)

Published incidences of illegal trade in Lions and their parts that were detected in South Africa were obtained from TRAFFIC (2013b), government documents and media reports (Table 14). The first arrest (and subsequent prosecution) of an Asian national in South Africa was the Vietnamese man (Nguyen van Hai) in 2009 (Table 14). Other undetected and/or unreported incidences involving restricted activities occurring without permits are known to have occurred from anecdotal reports and personal observations. Examining the cases listed in Tables 13 and 14, it appears that incidences of Asian nationals trying to smuggle African Lion body parts (especially bones) into their respective countries were reported with increasing frequency from c.2009. While undetected illegal trade in Lion bones to South-East Asia is likely to have occurred before 2009, the year this trade was initiated is unknown.

Table 14 Published incidences of illegal activities pertaining to Lions reported in South Africa. This list excludes incidences reported during interviews with provincial law enforcement and conservation officials

Type	Year of incident	Place of incident	Description	Reference
Poaching	2004	Kruger NP	1 Lion poached that year in the park. No indication of whether arrests were made.	National Assembly (2008)
Poaching	2006	Kruger NP	3 Lions poached that year in the park. No indication of whether arrests were made.	National Assembly (2008)
Poaching	2008	Kruger NP	3 Lions poached that year in the park. No indication of whether arrests were made.	National Assembly (2009d)
Translocation	c.2008	Free State	7 illegally translocated Lions seized while in transit to the North West province	Abader (2009)
Traditional medicine	2008	KwaZulu-Natal	A Pietermaritzburg *Sangoma* (traditional healer) sentenced to community service for being in possession of Lion and leopard skins	Anon (2008)
Traditional medicine	c.2008	KwaZulu-Natal	Uncovered poisons used to kill Lions for skins, teeth, claws, fat and tails	Abader (2009)
Carcass parts and bones	2009 – first reported case	Gauteng	Vietnamese man (N. van Hai) arrested in Pretoria after allegedly *"slaughtering"* several Lions on residential premises. There were 13 Lion heads and several Lion teeth. He was arrested on five charges of contravening NEMBA by being in possession of *"threatened/protected species without permits"* and deported	Miller (2009) Otto (2009b)
Carcass parts	2010	Gauteng	A range of animal parts, including Lion, was confiscated from Asian and traditional healers during a police operation that involved INTERPOL and nature conservation groups	TRAFFIC (2013b)
Carcass parts and bones	2011	Gauteng	Two Thai men (P. Chunchom and P. Thongphai) arrested in Edenvale (near Johannesburg) with 59 Lion bones without a permit. The bones were mostly claws and paws parts. They admitted to police in an affidavit that the Lao-based Xaysavang Company employed them and received fines of ZAR10 000 and deported. Chunchom was subsequently wanted by INTERPOL	Du Plessis (2011a,b) South African Revenue Service (2011) http://www.interpol.int
Translocation	2012	Northern Cape and Botswana	Report of SA farmers smuggling adult wild Lions and cubs from Botswana in to the Northern Cape via cattle-rustling routes. The article alleges that smuggling was occurring *"to supply a growing demand for lion bone potions in the Far East"*. The article further alleges that smuggling frequency increased from c.2007, and that Lions supply captive breeding facilities.	Macleod (2012a)
Traditional medicine / poaching	2014	KwaZulu-Natal	Male Lion in Tembe Elephant Park caught in snares and the head cut off for suspected traditional medicine ("*muthi*") purposes. A Lioness was also caught in the snares but was not decapitated.	Mngoma (2014)
Hunting	General	South Africa	See Box 3	CITES Scientific Authority (2013)
Poaching	General	South Africa	See Box 3	CITES Scientific Authority (2013)
Poaching	General	South Africa	Poaching is a problem in some provinces. Snares at border fences are removed on a routine basis during patrols.	CITES Scientific Authority (2013)
Muthi	General	South Africa	See Box 3	CITES Scientific Authority (2013)
Trade	General	South Africa	See Box 3	CITES Scientific Authority (2013)
Translocation	General	South Africa	See Box 3	CITES Scientific Authority (2013)

REPORTS OF ILLEGAL ACTIVITIES AND TRADE WITHIN SOUTH AFRICA

1. Interviews with provincial nature conservation and law enforcement officials

Several incidences of illegal activities and trade were reported during more than 15 hours of interviews with various provincial conservation and law enforcement agencies. Some of the salient points that emerged from these interviews were also mentioned in a report by the CITES Scientific Authority (2013), hence a section of the Scientific Authority's report is quoted in Box 3. One of the most revealing statements made during the interviews by a law enforcement officer with respect to "canned" hunting and the Lion bone and rhino horn trades was: *"…everyone is too afraid of this industry. This industry is like the mafia. If you're on the right side, you're alone. If you're on the wrong side, there's lots of people with you…"* (Anon., pers. comm., May 2013).

2. Interviews with the NSPCA

The discussion with the NSPCA[19] was lengthy. Some of the points raised during the discussion did not arise during the interviews with other research participants, including:

- Some exporters are allegedly selling re-used permits for about USD100
- Poaching and illegal translocation: a case in South Africa in 2012 when a Lioness in Kgalagadi (on the Botswana side) was killed and two cubs taken and illegally smuggled to an unknown farm in the Free State. The breeder wanted the wild genes to strengthen the genetic diversity of his stock.
- There are very few instances of poaching of wild Lions in South Africa, and hence there is little threat to wild populations with respect to the bone trade. Wild Lions are safer than captive Lions, but concerns about animal rights and the welfare of Lions in captivity have been raised. The legislation allows farmers to breed Lions, but some regulations in some provinces do not allow for the humane treatment of the animals. For example: cubs are taken away from the Lioness too early to force them into frequent oestrus; females are bred repeatedly and end up in poor physical condition; inbreeding depression causes deformations etc. When it comes to the Lion bone trade, these weaker individuals are dispensable and likely to be put down.
- There is a need to investigate the Lion trade in Namibia, Botswana and probably Mozambique because poached Tanzanian Lions transit through Mozambique.

3. Interviews with various people who requested anonymity

There are a diversity of people at the coalface of the legal trade and illegal trafficking of wildlife as participants, witnesses or stewards. For a variety of reasons they requested anonymity. Sometimes the incidents reported here are primary or secondary accounts, and sometimes the incidents were mentioned by more than one source. The illicit activities reported include:

- Attempts at smuggling rhino horns by wrapping them in Lion skins from trophy hunts;
- Tiger cubs falsely declared as dogs to avoid having to acquire a CITES permit;
- Lion cubs declared as dogs in a container of live birds;
- A large consignment of Lion skeletons of mixed sex destined for East–Southeast Asia that was falsely declared as *"samples and documents"*;
- Falsely declared quantities on the CITES permit;
- Incorrect and/or forged documentation, re-used permits, and exporters offering to courier missing documentation;
- Exports not accompanied by the original documentation and CITES permits.

Some freight and cargo companies are less concerned about the cargo they ship out compared to other companies. As businesses, their mandate is mainly to export cargo on behalf of a client and to search for explosives, weapons and drugs. But, *"rhino horns don't explode"* and are therefore not a physical threat to airport and passenger security. At the very least they might scan the documentation for irregularities, and if none are blatantly obvious then they are obliged to release the cargo. Other companies, however, are more vigilant and scrutinize the CITES permits and other

[19] The NSPCA has the mandate to support the South African Police Service in enforcing the Animals Protection Act of 1962 and other legislation related to the protection of animals.

documentation more closely. Given this gradient of conscientiousness, there is a tendency for "less truthful" exporters to seek out freight companies with weak spots that they can exploit, or to find a company prepared to turn a blind eye to compliance irregularities so that they can export products in a manner that is not entirely legal.

Freight forwarding is a colossal industry with tonnes of goods being exported hourly to hundreds of global destinations – hence it is not practically feasible for companies to scrutinize every shipment looking for signs of illegal trade specifically concerning Lions and thus some illegal exports will go undetected. The prevailing opinion among the interviewees is that there are probably fewer unlawful exports of Lion compared to other wildlife such as rhinos and reptiles (few Customs officials are prepared to open a box of live snakes to verify their contents, for example). Moreover, some interviewees said that they would like to see the trade in Lion bones stopped if they had the capacity.

BOX 3: Excerpts from a report by the CITES Scientific Authority (2013) that reviews incidences and allegations of illegal lion trade in South Africa

- *"Although there are no specific figures on illegal trade of lions in South Africa, provincial conservation authorities indicate that illegal use or trade is generally limited to negligible.*
- *There is no recorded/known illegal trade in lion in Gauteng, KwaZulu-Natal or the Eastern Cape and illegal utilisation of lions within South Africa's national parks is negligible.*
- *Illegal trade in captive bred lions within the North West province is suspected to take place, as this industry is large and a challenge to regulate.*
- *There are no reported records of illegal hunting of lions in the Northern Cape.*
- *Illegal hunting or trade in lions is likely to occur only along the border between Northern Cape and Botswana.*
- *In the past it was alleged that free roaming lions from Botswana were shot illegally and brought over the border into the North West province for trophy mounting – these reports, however, remain unconfirmed.*
- *The IUCN/SSC African Lion working group believes that there is illegal trade in lions between south africa and Botswana, Zambia, Zimbabwe and Mozambique and alleges that lionesses with small cubs are shot in Botswana's southern region in order to supply cubs to predator keepers/breeders in South Africa. As there is an excess of captive bred lions available in South Africa, this claim would certainly require further investigation and supporting evidence.*
- *Lions are targeted for traditional medicine and poaching in Mpumalanga along the western boundary of the Kruger National Park is increasing due to the expansion of human settlements."*

LION PARTS IN SOUTH AFRICAN TRADITIONAL MEDICINE

OVERVIEW

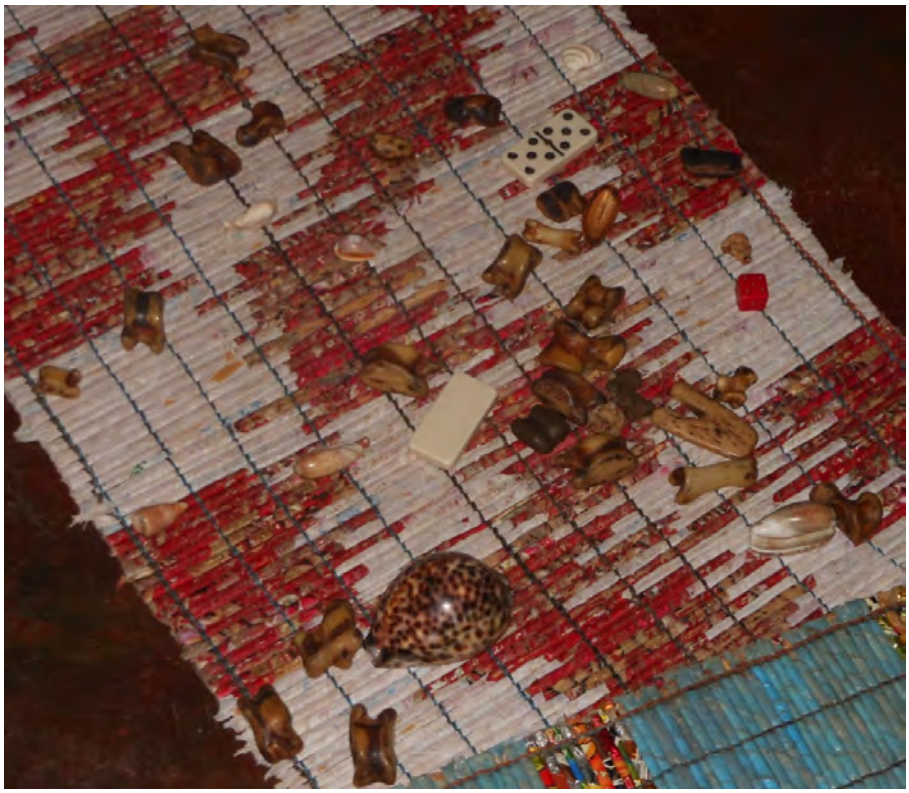
Called *iBhubese* in Zulu and *iNgwenyama* in Xhosa, Lion body parts and derivatives are used in African traditional medicine ("*muthi*") preparations and have routinely been recorded in South African *muthi* market surveys since the 1980s (Cunningham and Zondi, 1991; Mander *et al*., 1997 cited in Marshall, 1998; Ngwenya, 2001; Simelane, 1996; Simelane and Kerley, 1998; Whiting *et al*., 2011). Lion "fat" (most of it imitation) is most prevalent in the markets compared to the skin and bones. There are two large informal, urban, open-air markets for traditional medicine in South Africa: the Warwick Street Market in Durban, KwaZulu-Natal, and the Faraday Street Market in Johannesburg, Gauteng. There are over 300 traders in both markets, but fewer than 20% of the traders sell animal parts and the throughput is relatively low; parts of some species remain at stalls for years with only small pieces being sold at irregular intervals. Given the small quantities of Lion parts in the markets, the impact of the traditional medicine trade on Lion populations in South Africa is believed to be negligible (especially in comparison to the trade in bones in markets in Asia). White *et al*. (2004) allege that species such as Lions are often smuggled into South Africa from Zimbabwe or Mozambique, and that the body parts and derivatives are sold through markets in Swaziland and then traded through Faraday and Warwick before reaching small towns along this trading route.

A large Felid skull in the Faraday traditional medicine market, Johannesburg, c.2002

There is believed to be a limited demand for Lion parts by traditional healers outside of urban markets in the rural areas. Healers routinely use pairs of bones (usually the phalanges) as instruments of divination, but citations of their use in this manner are uncommon. This demand by rural healers has not been formally documented and the frequency of acquisitions is not fully known. Incidences of seizures of Lion parts from healers are infrequent and the quantities they have been found with amount to no more than a small part of one Lion at a time.

The expansion of human settlements on the western boundary of the Kruger National Park in Mpumalanga has been cited as a reason for the recent increase in Lion poaching for African traditional medicine (CITES Scientific Authority, 2013). There is also anecdotal evidence that healers in areas adjacent to Kruger purchase animal parts from traditional healers working for SANParks and other reserves (T. Mashua, pers. comm., July 2013). When dead animals become available, employees of the parks who also happen to be healers get access to the body parts and then sell them to other healers at healer association meetings.

Four surveys of the urban trade in animal parts are known to have been conducted in three provinces in South Africa since 1987. The surveys focused on sales in traditional medicine markets, *muthi* shops and by wholesale distributers. In addition to these surveys, Mander *et al.* (1997) investigated animal species using primary data sources (*viz.* Cunningham and Zondi, 1991; Simelane, 1996) for the TRAFFIC report by Marshall (1998) on medicinal wildlife resources used in East and southern Africa. Despite Lions being reported as priority species in Malawi, Mozambique and Uganda (and being utilized in six other countries), they were not on the list of top 25 priority animals in South Africa in 1997 (Marshall, 1998).



Lion phalanges included in a set of bones used by a healer in the Bushbuckridge area (July 2013)

SURVEY OF DISTRIBUTERS IN KWAZULU-NATAL (1987)

The 1987 survey conducted by Cunningham and Zondi (1991) recorded Lions as the seventh most "popular" animal species used by 52% of the traditional healers (the Southern African Python *Python natalensis* ranked first). As a proxy of the demand, the sales made by a major national wholesaler were analysed and a slightly different picture of the demand emerged: Lions ranked second after hippopotamus in the quantity of animal fat sold per year (42 litres/y and 109 litres/y respectively). The fats, however, were almost certainly not genuine. The proportion of fake Lion fat available in urban areas was alleged to be higher than in rural areas where authentic ingredients were more easily obtained. Even though many animal fats are imitation, consumers are unaware of this and consider the products to be the real thing. The physical strength of Lions was cited as a reason for their use.

SURVEY OF TRADERS IN THE EASTERN CAPE (c.1994)

The study in the Eastern Cape province was conducted c.1994 with more than 19 traders (Simelane, 1996; Simelane and Kerley, 1998). Similar to the 1987 survey, 53% of traders "*mentioned it*" – however the study did not list the body parts used. Instead, the authors describe how Lion fat, skin and bones are usually included as an ingredient in medicines to treat kings and chiefs in the absence of parts from preferred spotted predators such as leopards, genets and cheetahs. These species are selected for their predatory behaviour since it is believed that their strength and agility in attacking prey can be conferred to community leaders and thus provide them with the necessary power to rule their people. Traditional leaders frequently wear traditional attire decorated with these skins to signify and/or manifest that power.

SURVEY OF *MUTHI* SHOPS IN KWAZULU-NATAL (2000)

The 2000 survey of animal products sold in *muthi* shops in 12 towns in KwaZulu-Natal by Ngwenya (2001) is by far the most comprehensive for South Africa. Lion parts were recorded in nine towns, especially bottles of "lion" fat (Table 15). Lion bone was the second most frequently observed part (*n*=7), followed by the skin (*n*=6) and the skull (*n*=4).

Table 15 Lion parts used, frequency of observations, and price range of the parts (from Ngwenya, 2001)

Lion part used	Frequency (*n*=9 out of 12 towns)	Price range* (all ZAR=R)
Bile	2	R10 – R25 per 5-10 ml bottle
Bones	7	R5 – R20 per piece
Claws	1	R10 – R20 each
Eye-lashes	1	R5 per piece
Fat	9	R3 – R25 per 5-10 ml bottle
Head/skull	4	R5 – R25 per piece
Heart	1	R5 per piece
Liver	1	R5 per piece
Meat	1	R5 – R20 per piece
Skin	6	R5 – R25 per piece
Toes	2	R10 – R25 each

* Average exchange rate in 2001: ZAR1 = USD0.1177

SURVEY OF THE FARADAY MUTHI MARKET, JOHANNESBURG (2005)

A survey of animal species and parts was conducted in the Faraday Market, Johannesburg, in 2005 by Whiting *et al.* (2011). The survey excluded the documentation of the animal fats, partly because the species could not be verified. Of the sample of 32 traders, three (9%) sold Lion parts and three different body parts were recorded (Table 16; Figure 31). Potentially, more parts (such as bones) were present in the market than were observed or identified. Compared to other animals present in the market, Lions are not a highly utilized species (Figure 31)

Table 16 Lion parts recorded in the Faraday market in 2005

Trader no.	Part sold	Use
1	1 x skull	Cranium *"mixed with tears to make one to be feared"*
2	1 x bone	*"For strength and instilling fear"*
3	1 x skin piece	No use recorded

(*Source*: Whiting *et al.*, 2011)

A pilot survey conducted in Faraday with 10 traders in 2001 did not record the presence of Lion parts and further indicates that the frequency and volume of sales of non-fat Lion body parts were low in the region at the time. Given that Lion parts are relatively difficult to obtain (especially from wild populations), the incidence in the markets was expected to be low. There are occasionally reports of traditional healers from the eastern side of South Africa having being arrested with Lion parts, but these instances are sporadic and the material in their possession is usually derived from no more than one Lion. Whether traditional healers from areas adjacent to nature reserves in Limpopo and Mpumalanga, and the captive breeding facilities in the provinces of the Free State and North West, have greater access to Lion parts is merely speculation at this stage.

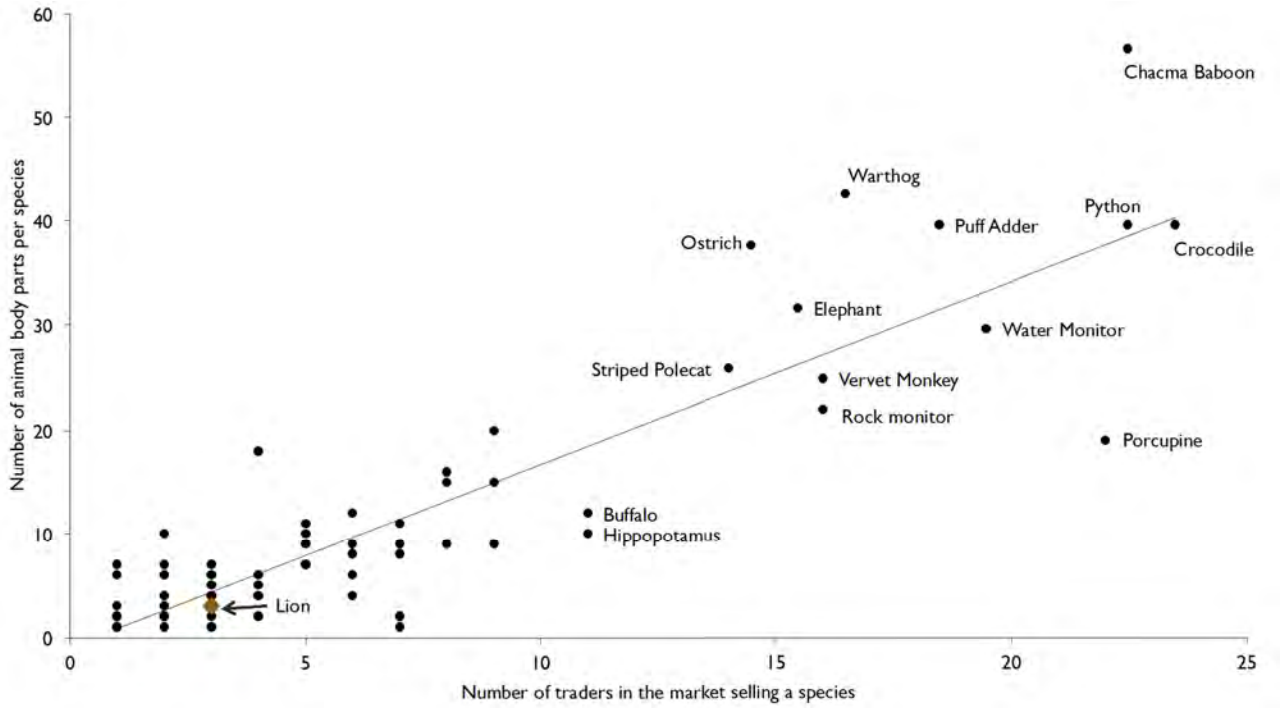


Figure 31 The trade in Lion parts in relation to other species in the Faraday market in 2005. (The total number of animal parts per species excludes feathers, quills, scales, teeth, horns and crocodile osteoderms) (Derived from Figure 5 in Whiting *et al.*, 2011)

2013 INTERVIEWS

An informal telephone interview was conducted with the Chairman of the Faraday market in June 2013, the purpose of which was to establish informally whether Asian customers visit the market and what they enquire after. A similar interview was conducted with the Chairman of the Makokoba Market in Bulawayo, Zimbabwe, in February 2013. There have been Asian visitors to both markets, but no Lion parts were requested. The visitors to Makokoba tend to look around and not purchase anything. In Faraday, the *"Chinese"* buy prepared medicines that exclude Lion parts.

The trade in Lion bones as a substitute for Tigers in Asian countries was discussed with the Faraday chairman. He said that it was not a good idea to mix Lion and Tiger bones together since it would make a person *"more violent"*. On further enquiry about the sale of Lion parts in Faraday, he said that very few healers sell Lion parts because they are difficult to obtain – mainly because *"papers"* are needed to (legally) hunt one. Furthermore, he was *"very uncomfortable with the killing of lions"* and that farmers were the only ones involved. The chairman was concerned that traders and healers would be implicated in supplying Lion carcasses to Asian traders. He stressed that they are not in the bone trade since they have limited capacity to do so.

AUTHENTICITY OF THE ANIMAL FATS

Almost all animal fats sold in 5–10 ml labelled bottles in South Africa are imitations. Synthetic fats manufactured by herbal suppliers have been "indigenized" and these products are considered highly effective in ensuring protection from evil spirits (Cocks and Dold, 2000). In 1996, one of the authors of this report visited the premises of one of the largest distributers of traditional medicines in southern Africa. In the process, the recipes for "making" animal fats were unwittingly revealed. Lion fats were Product No. 7 (Bhubhesi), and the recipe was as follows: *Take dry pork fat; cut into very small flaked strips (15 mm in length); put into a 10 ml glass bottle; cap with a 10 ml cork.* Labels with the words FAT IMIT (fat imitation) were then affixed to the bottles.

Animal fats sold at the *muthi* markets are usually in old and unlabelled 250 ml alcohol bottles filled with fetid substances of dubious identity (Figure 32). These fats are purchased from rural suppliers to the urban markets, but the provenance cannot be authenticated and the incidence of genuine Lion fat cannot be determined without DNA testing.

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Figure 32 A variety of non-manufactured animal fats in the Faraday traditional medicine market, Johannesburg

TIGER POPULATION AND TRADE IN SOUTH AFRICA

OVERVIEW

There are estimated to be more than 280 Tigers (mainly Bengal Tigers) in at least 44 facilities[20] in South Africa. The total size of the *ex situ* Tiger population in South Africa is not known and is believed to be higher than estimated here from the partial survey that was conducted. Because of inbreeding, some people view Tigers in South Africa to be of little conservation value to the global *ex situ* population; accordingly, given the demand for Tigers in East–Southeast Asia, Tigers may face some future risk of exploitation for market-driven consumptive purposes by a few breeders.

One of the most well-known private *ex situ* conservation facilities is "Tiger Canyons" in the Free State with at least 14 Tigers. The mission of the facility is to "*create a free-ranging self-sustaining population of tigers in the hands of private enterprise in and out of the Asian continent*" (http://www.jvbigcats.co.za). Another organization in the Free State with similar numbers of Tigers is "Save China's Tigers" (http://savechinastigers.org). The charity have a "re-wilding" project for the Critically Endangered South China Tiger *Panthera tigris* ssp. *amoyensis* that reportedly sends captive-bred animals to South Africa for the purposes of "rehabilitation" so that they can be reintroduced into China with the skills to hunt.

Like captive Lions, most Tigers are in the Free State and North West provinces. There have recently been unverified rumours that Tigers are being made available to trophy hunters. Information on the UNEP-WCMC CITES trade database records that permits were issued to export Tiger trophies (especially after 2006), but there are no records of hunts in the national consolidated hunting reports (however, other exotic species are listed). The current provincial legislation is variable on where and whether hunting can occur (Table 17).

Siberian Tigers *Panthera tigris* ssp. *altaica* at Johannesburg Zoo

[20] Derived from a non-exhaustive Internet search in May 2013 and from personal communications with representatives from three provinces

Table 17 Summary of South African provincial legislation as it applies to Tigers. Depending on the province, restricted activities are determined by a Tiger's definition as either (a) an "exotic animal", or (b) as an "endangered wild animal" that is listed in Appendix I of CITES. (y=yes; n=no; ?=uncertain)

Province	Ordinance or Act (abbreviation)	Defined as Exotic (Ex) or Endangered CITES Appendix 1 (A1)	Hunt/Catch		Live: convey, keep, possess, sell, buy, donate	Live: Set free	Possession of derivatives	Processing of carcass	Sale/ trade of carcass & derivatives	Export/ convey: live, carcass & derivatives - from Province	Export: live, carcass & derivatives – inter-national
			Written permission	Permit	Permit	Permit	Permit	Permit	Permit	Permit	CITES
EC	CNC 1974	A1	y	y	y	?	y, carcass	y	y	y, carcass	y, in terms of CITES regulations
FS	FSNC1969	Ex (Live) & A1 (live & derivatives)	y	n	Y & n: depends on activity	y	n	n	n	Y & n: depends on activity	" "
GT	TNC 1983	Ex	y	n	n	y	no regulations	no regulations	no regulations	no regulations	" "
KZN	KZNNC 1992	Ex	y	Authorisation*	Authorisation	?	Authorisation	?	y	y	" "
LP	LEM 2003	Ex	y	y	y, convey	?	no regulations	no regulations	n	y, only lawfully dead Tigers	" "
MP	MNC 1998	Ex	y	n	y - import/ convey; n - possess/ sell	y	no regulations	no regulations	no regulations	no regulations	" "
NC	CNC 1974 & NCNC 2009	A1	y	y	y		y, carcass	y	y	y, carcass	" "
NW	TNC 1983	Ex	y	n	n	y	no regulations	no regulations	no regulations	no regulations	" "
WC	CNC 1974	A1	y	y	y	?	y, carcass	y	y	y, carcass	" "

Abbreviations for Ordinances or Acts: CNC1974: *Cape Nature Conservation Ordinance No. 19 of 1974*; FSNC 1969: *Free State Nature Conservation Ordinance No. 8 of 1969*; KZNNC 1992: *KwaZulu-Natal Nature Conservation Act No. 29 of 1992*; LEM 2003: *Limpopo Environmental Management Act No. 7 of 2003*; MNC 1998: *Mpumalanga Nature Conservation Act No. 10 of 1998*; NCNC 2009: Northern Cape Nature Conservation Act No. 9 of 2009; TNC 1983: *Transvaal Nature Conservation Ordinance No. 12 of 1983*.

* Authorization: Ordinance does not specifically state that permits are required

Notes:

1. **Exotic mammal (Ex)**: any live vertebrate that is not a recognized domestic species or subspecies and the habitat of which is not in the Republic (of South Africa). The KZN act specifies that the regulations apply to animals that are dead or alive, or any part thereof. Some provinces have specially listed exotic animals in Schedules to the ordinances, but Tigers are not specially listed. Provinces: FS, GT, KZN, LP, MP, NW
2. **Endangered wild animal (A1)**: means any wild animal of any species that is in danger of extinction and is specified in Appendix I of CITES. The regulations don't specify if the animals are alive or dead. Provinces: FS, EC, NC, WC.

Several permits for the keeping, breeding and exhibition of Tigers have been issued in South Africa. Many of these permits were issued to private collectors and are not linked to any zoological, research, tourism or educational institution. Legislation in South Africa is extremely fragmented and renders very little protection to these non-indigenous animals without a regulatory framework. While CITES controls the trade of Tigers and their parts and derivatives, it is very easy to mix Tiger with Lion bones because the current approval and checking system is ineffective and thus opportunities for illicit activities are available. As an example, the *Transvaal Nature Conservation Ordinance 12 of 1983* currently in effect in Gauteng and North West only deals with the import and release of Tigers (Table 17). This implies that all other activities such as hunting, processing and the sale of body parts within South Africa is not regulated or monitored. No information is generated by the current regulatory system on the statistics of Tigers in captivity, mortalities and the subsequent management of carcasses of the animals. This raises a serious question on the actual objective of some Tiger operations and the sustainability thereof. The North West Province has, for example, a Vietnamese national who owns a farm with more than 50 Tigers in captivity (Anon., pers. comm., July 2013) – however, little is known about the actual activities being conducted on this farm. If Tigers are being bred on this facility for international trade in their parts and derivatives, then this would be in contravention of CITES *Resolution Conf. 12.10* (Rev. CoP15) for the "Registration of operations than breed Appendix I animal species in captivity for commercial purposes", due to its non-registered status, and CITES *Decision 14.69* which states that "*Parties with intensive operations breeding tigers on a commercial scale shall implement measures to restrict the captive population to a level supportive only to conserving wild tigers; tigers should not be bred for trade in their parts and derivatives"* (CITES, 2009). Furthermore, *Resolution Conf. 12.5* (Rev. CoP16) urges "*Parties and non-Parties on whose territories tigers and other Asian big cat species are bred in captivity to ensure that adequate management practices and controls are in place to prevent parts and derivatives from entering illegal trade from or through such facilities*". Although aimed primarily at Tiger range States, this Decision clearly also applies to South Africa.

Anonymous tip-offs to conservation officials in the Free State have alerted them to incidences of Tigers possibly being hunted in small enclosures, followed by applications shortly thereafter for permits to export products such as skins (W. Boing, pers. comm., May 2013). The Free State does not allow the hunting of exotic animals, and so Tiger hunting is illegal in this province. The anonymity of the informants has meant that cases of mortality allegedly caused by hunting and "pneumonia" could not be confirmed.

Applications for permits to export Tiger bones to Lao PDR have been received by the Free State, in particular by at least two bone agents (no information was provided on the year of the application) (W. Boing, pers. comm., May 2013). Permits to export 11 Tiger skeletons from the province have been issued to date, and it is believed that this market will grow in future (W. Boing, pers. comm., May 2013). Up to the end of 2011, however, there were no records in the annual CITES reports provided by DEA of any Tiger bones being exported (DEA, 2013). Hence, these reports of permits to export Tiger bone should be examined when South Africa compiles its 2012 CITES report.

That Tiger bone exports from South Africa to East–Southeast Asia are known to have happened means that it is not improbable for Tiger skeletons to have been exported as "lion" using CITES Appendix II permits instead of Appendix I – but there is currently no evidence to prove that false species declarations have occurred. Tiger and Lion bones are morphologically very similar, and to the untrained eye it would be hard to make a correct determination of a species in a consignment. Morphological differences in the skulls are a subtle, but not a fool proof, detection method (Figure A1 in Appendix 4). Hence, random DNA testing remains the only way to get an incontestable identification.

It seems improbable that non-Asian South African breeders are engaged in specific programs to rear Tigers for their bones or other products/derivatives, but the intentions of the Vietnamese-owned Tiger facility in the North West are unknown and should be investigated. The Free State banned the establishment of new Tiger breeding facilities about five years ago (W. Boing, pers. comm., May 2013). Free State farmers can thus keep the Tigers they have, but no permits will be issued to new breeders. Whether this clampdown on breeding facilities in the Free State has led, like the Lions, to breeders shifting their operations to the North West to exploit weaknesses in the regulations should be considered.

The opinion of law enforcement and conservation officials in the North West is that there is currently no evidence of Tigers being hunted to supply the bone industry (Multiple interviewees, pers. comm., May 2013). However, the province has had many enquiries from people wanting to hunt Tigers (especially in the last three years) and they feel that eventually the bones will end up in trade after the trophy has been exported. When questioned on how the province handles the management of Tigers given its CITES Appendix I status, the response was that Tiger management is not regulated – hence a person can hunt a Tiger if they so want. Only the export of the body parts and derivatives would be subject to the necessary CITES regulations and permits. That said, one respondent didn't think that the province was openly selling any of their Tiger bones (i.e. with CITES permits) – but, IF the bones were being exported, then they were probably being illegally *"smuggled out as lion bones"*.

Tiger breeding has not been on the radar of concerns for the provinces. In relation to the awareness generated by this Lion bone investigation, however, some respondents in the North West agreed that there was a need to monitor the trophy hunting of Tigers and to scrutinize what Tiger breeders say they do with their dead Tigers. And, while live animals are the bulk of the exports, there is a growing trade in skins and trophies that are likely to be generating notable revenues (Figure 33).

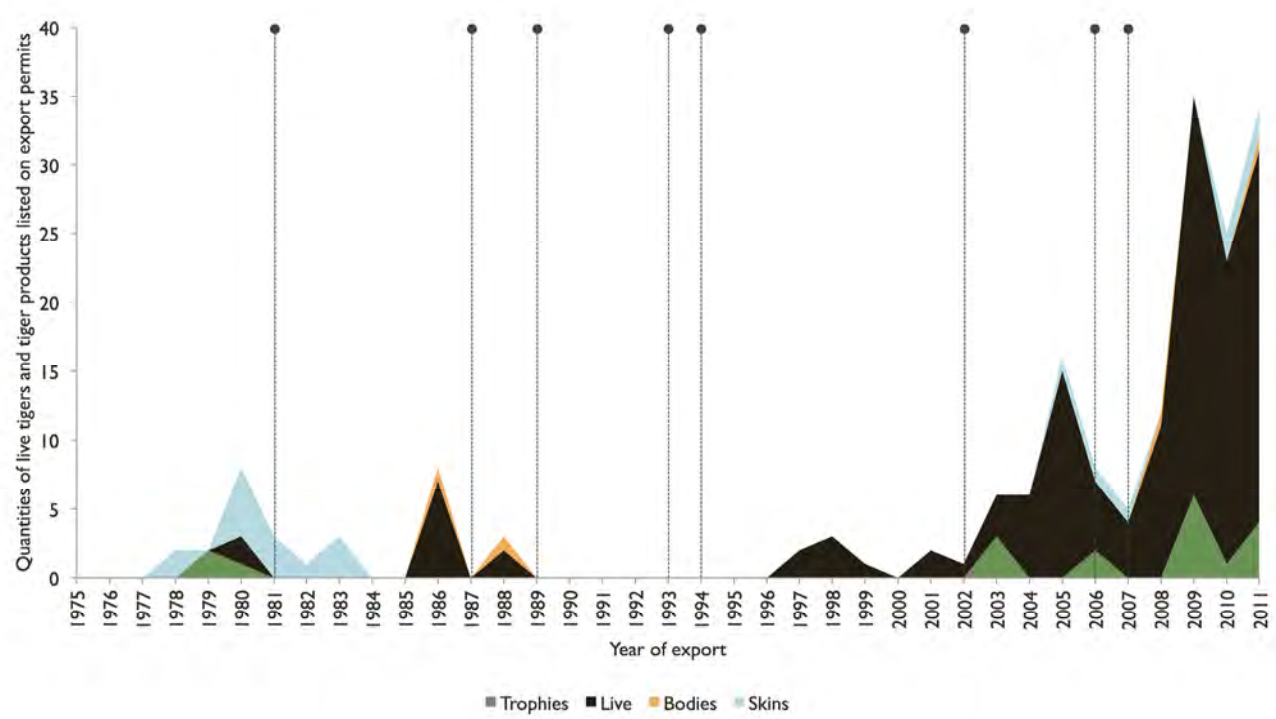

Figure 33 Combined quantities of Tigers recorded on permits issued by South Africa to export live Tigers, trophies, bodies and skins to various international destinations. Exports are mainly for Bengal Tigers *Panthera tigris* ssp. *tigris*. Vertical lines indicate years that measures were adopted to protect Tigers and Asian big cats. (*Source*: UNEP-WCMC CITES trade database, and DEA annual CITES reports)

TIGER EXPORTS FROM SOUTH AFRICA

The bulk of South Africa's Tiger exports are live animals – mainly from the Free State and North West provinces (Table 18; Figure 33). There is a growing trade in trophies (officially none from the North West) and skins – mostly all from the Free State (Tables 19 & 20) [*Note*: as with Lion parts, Tiger products do not necessarily originate from the provinces that the export permits are issued in]. No permits to export bones and skeletons had been recorded in the national CITES reports up to the end of 2011. The trade records show that apart from three live animals in 2004, a body in 2008, and a claw in 2011 being exported to China, the only other exports of Tigers to Southeast Asia were live animals destined for Viet Nam, Myanmar and Thailand.

Table 18 Number of Tigers recorded on permits issued by the provinces to export live animals

Year	DEA annual CITES reports for the provinces						
	North West	Limpopo	Free State	Gauteng	Mpumalanga	KwaZulu-Natal	Total
2006	2					3	5
2007			2			2	4
2008			2				2
2009	5		6		14		25
2010	2		6			4	12
2011	2	10	9	6		7	34
Total	**11**	**10**	**25**	**6**	**14**	**16**	**82**

Table 19 Number of Tiger trophies recorded on export permits issued by the provinces

Year	DEA annual CITES reports for the provinces						
	North West	Limpopo	Free State	Gauteng	Mpumalanga	KwaZulu-Natal	Total
2006			2				2
2007							
2008							
2009			1		5		6
2010			1				1
2011			3			1	4
Total			**7**		**5**	**1**	**13**

Table 20 Number of Tiger skins recorded on export permits issued by the provinces

Year	DEA annual CITES reports for the provinces						
	North West	Limpopo	Free State	Gauteng	Mpumalanga	KwaZulu-Natal	Total
2006			1				1
2007			1				1
2008							
2009							
2010	1		1				2
2011			2				2
Total	**1**		**7**				**6**

1. Exports of live Tigers

From 2002 to 2011 permits were issued to export 58 live Tigers to the United Arab Emirates (AE or UAE) from South Africa (Figure 34), which is 39% of the total number. Exports of live Tigers to Botswana (BW) average four per year, and they are reportedly the second largest importers. Viet Nam and Myanmar have so far applied to import eight live animals each, starting in 2009 and 2010 respectively. Tiger exports to Myanmar are especially noteworthy since the country is known to have a thriving trade in wild cat species (Oswell, 2010; Schmidt, 2012; Shepherd and Nijman, 2008). Reports of imports of three and two Bengal Tigers to China and Thailand occurred once in 2004 and 2009 respectively.

The fate of live Tigers exported from Africa to Asia has not been widely documented. The non-profit environmental pressure group "Annamaticus" allege that the UAE is *"a transit route increasingly used by wildlife traffickers to deliver contraband to consumers in east and Southeast Asia"* (Pappin, 2012a). Macleod (2012a) further claims that *"the UAE is a well-known staging point for the illegal trade in wildlife from Africa, and any live tigers sent to Vietnam will end up in an Asian traditional medicine pot to be stewed for some tonic"*.

A question put to the National Assembly (2012) confirmed that in 2009 and 2010 permits were issued to four and two sellers respectively to export Tigers to the UAE (National Assembly, 2012). Exports to Botswana are a conundrum: Tigers do not naturally occur there and they do not appear to be exported from Botswana, yet there have been allegations in the media that South African breeders are using Botswana as a laundering point for wildlife trade (Macleod, 2012a). Also, 11 of the 28 Tigers known to have been exported to Botswana were sent back – either because they were refused entry or were confiscated by authorities (Macleod, 2012a).

Free State granted permission for the most number of live Tigers to be exported, followed by KwaZulu-Natal and Mpumalanga (Table 18). All permits issued by KwaZulu-Natal are for Tigers to be exported to Botswana, whereas most Tigers from the Free State are destined for the UAE. Mpumalanga has issued permits for Tigers going to UAE, Viet Nam and Thailand.

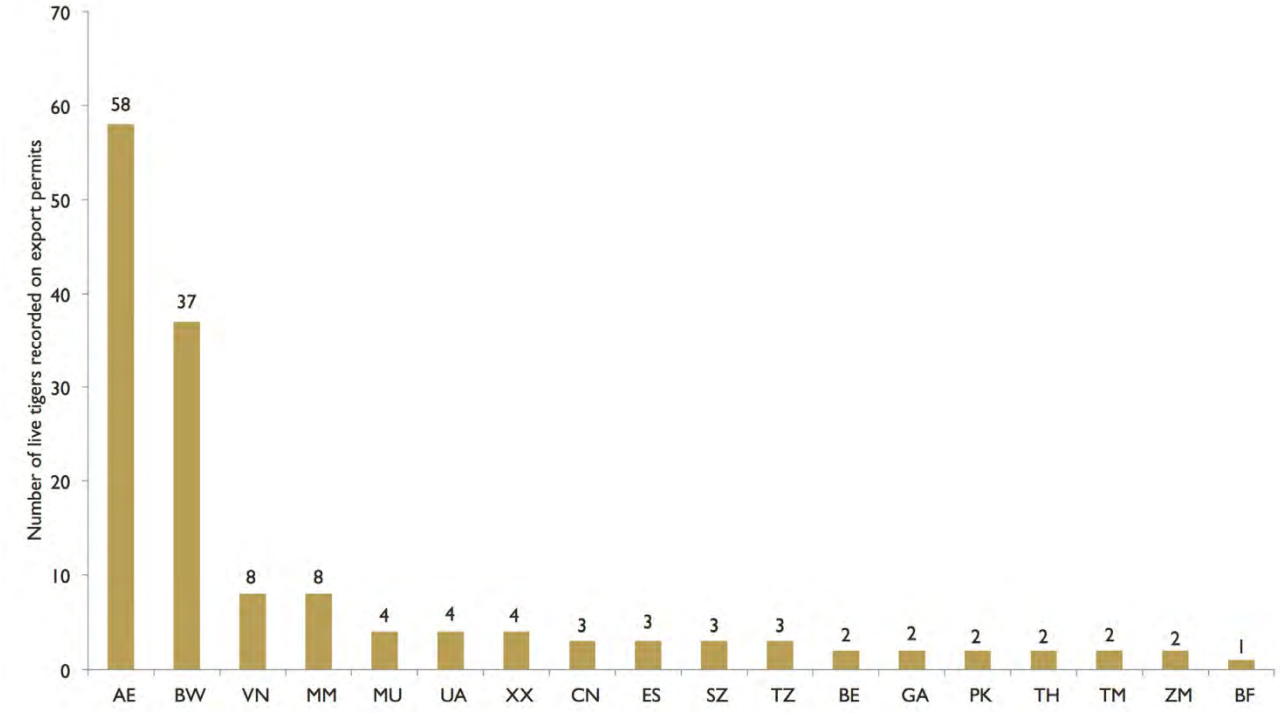

Figure 34 Number of live Tigers and their destination recorded on export permits issued by South Africa for 2002–2011 (*n*=148 Tigers in total). (Country codes from left to right: AE=United Arab Emirates, UAE; BE=Belgium; BF=Burkina Faso; BW=Botswana; CN=China; ES=Spain; GA=Gabon; MM=Myanmar; MU=Mauritius; PK=Pakistan; SZ=Swaziland; TH=Thailand; TM=Turkmenistan; TZ=Tanzania; UA=Ukraine; VN=Viet Nam; XX=unknown; ZM=Zambia) (*Source*: the national CITES report and UNEP-WCMC CITES trade database)

2. Exports of Tiger trophies and skins

Permits issued to export Tiger trophies and skins might be increasing, but there are insufficient records to establish whether there are notable trends – except that exports increased after 2002 when regulations inhibiting the Tiger trade would have made it impossible for hunters to hunt Tigers and export trophies from within Tiger range States (Tables 19 & 20). Most of the permits were issued in the Free State, and none of the trophies were destined for Southeast Asia.

In conclusion, there are concerns about the growth of the trade in Tigers and associated products from South Africa and calls by the media for transparency in the matter (Pappin, 2012b). Although trade from South Africa seems to have largely excluded East–Southeast Asia, with the exception of a few live animals to three countries, some of the countries to which the exports were destined have been implicated as being on transnational trade routes for illicit wildlife activities. Limitations in the South African legislation applying to endangered exotic animals have made it possible for an unregulated domestic trade in Tigers and for them to be "euthanized" under dubious circumstances. Furthermore, given the similarity of Lion and Tiger skeletons, Tiger bones originating from South Africa may be laundered as Lion bones using CITES Appendix II permits.

The trade in Tigers was a peripheral aspect of this study and not part of the investigation as set out in the aims. However, concerns were brought to the fore near the finalisation of this report when a set of "lion" bones with a very large skull that had features resembling a Tiger were observed. The photo of the skull was shown to an experienced predator breeder who was undecided as to its identity. As a result, this preliminary investigation into the matter was conducted and is not a comprehensive assessment of the South African Tiger trade nor the legislative instruments that govern their consumptive and non-consumptive utilization. Therefore, further research into the matter would be appropriate given the growing Asian trend in sourcing wildlife from African countries.

CONCLUSION: IMPACT ON SOUTH AFRICA'S WILD LION POPULATION

There is a concern that the use of African Lion as a substitute for Tiger could stimulate a demand that would impact wild lion populations (Nowell and Ling, 2007). Another concern expressed in the media is that wild populations will be affected because consumers in East–Southeast Asia are allegedly prepared to pay more for bones from free-ranging Lions because of a belief that the effects are more potent than those of captive animals (Macleod, 2012a). From all the interviews conducted with the provincial conservation authorities, however, Lion skeletons of South African origin are almost certainly all derived from captive bred, not wild, animals. The trophy hunting industry, which is mostly from captive animals, is the main source of carcasses once the trophy hunter has taken the skin and skull. There thus appears to be little evidence that the Lion bone trade is currently adversely impacting the wild Lion population in South Africa – but this situation is not adequately known for the rest of Africa and future trends based on current trade levels have not been extrapolated to determine whether there would be "spill over" into poaching wild Lions in South Africa in the future to meet the demand.

Reports of poaching incidents involving wild South African Lions are sporadic and have not been conclusively linked to the Lion bone trade. Poaching has been associated instead with subsistence use by rural communities rather than commercial trade, for example the traditional medicine trade. Illegal exports of Lion bones are occurring, usually involving (1) people who have not obtained all the necessary permits to carry out all restricted activities involving Lions and thus the causes of mortality, and the legality thereof, cannot be established; (2) an exporter not having the correct documentation, or (3) traders trying to smuggle the Lion parts out of South Africa without the required permits. Official records on the incidences of illegal activities have not been obtainable, largely because this is a confidential matter involving law enforcement officers. However, the Lion parts being exported illegally are believed to come from captive animals since this is the cheapest source of the bones and involves less personal risk to the exporter/importer/poacher. There was also no evidence of a premium being paid for South African wild Lion bones – instead, a premium is paid for complete skeletons with the skull and floating bones.

Further evidence that the Lion bone trade is having little impact on wild populations in South Africa comes from the provinces issuing the CITES export permits. The North West, Free State and Eastern Cape are the only provinces issuing export permits for Lion bones, and the Lions in these provinces are nearly all captive bred.

One statement made by a former government official that captures an opinion on the Lion bone trade and its impact is by Buyelwa Sonjica (former South African Minister of Water and Environmental Affairs). When asked if the government would consider the banning of the export of Lion bones and if not, why not, the minister said *"No. The banning of the export of lion bones will only be considered if the export has a negative impact on the survival of species in the wild. This is not currently the case"* (National Assembly, 2010b).

After consulting with many stakeholders, the South African CITES Scientific Authority (2013) made the following succinct statements about hunting and the Lion bone trade:

1. *Utilization of lion in South Africa is considered to be sustainable, and wild populations are stable to increasing.*
2. *No hunting is allowed in national parks or provincial state reserves, which collectively represents almost all the original wild populations and accounts for >75% of the total lion population.*
3. *Utilization of lion for commercial purposes is mostly restricted to private game reserves where lions have been reintroduced since the 1990s.*
4. *Trophy hunting of lions is popular in South Africa, although hunted lions are predominantly sourced from captive bred populations, thereby reducing the hunting pressure on wild lion.*
5. *Captive breeding facilities are located primarily in the Eastern Cape, Free State and North West provinces, where the majority of lion hunts takes place.*
6. *Hunting of wild lion on private property is limited, with <5% of successful lion hunts conducted over the 2008 to 2010 period targeting wild lions.*
7. *Private landowners that conduct legal hunts of wild lions have an interest in ensuring the stability of their lion populations.*

8. *The revenue generated through hunting contributes to the maintenance of areas where these lion populations can continue to exist.*
9. *The economic benefits to the private sector of keeping and trading wild lion may provide a strong incentive for conserving the species and the habitat.*

If the bone trade has little or no impact on South Africa's wild Lion populations, then the question is: is the bone trade fuelling the demand for Lion bones in other parts of Africa and negatively affecting wild populations as some have suggested? The question cannot yet be answered, although it needs addressing in the immediate future. There is no doubt, however, that Asian wildlife trafficking syndicates are operating in developing African countries – sometimes under the guise of legitimate businesses that are providing economic opportunities in underdeveloped areas whilst systematically exploiting local natural resources. Thus a priority now is to investigate the trade of Lion body parts and products in other African countries.

RECOMMENDATIONS

While the trade in Tiger bones is an established threat to Tiger conservation and many recommendations have been made in various reports, the emergence of the Lion bone trade between South Africa and East–Southeast Asia to sustain the demand for parts and derivatives (especially bones) from big cat species is as recent as 2008 and growing. This is the first full research report on the matter and many issues and concerns were raised by all of the interviewees during this investigation. Since it seems unlikely that the trade in Lion bones will be banned in South Africa in the near future, or that syndicates, traders and Southeast Asian consumers will cease consumptive practices involving Lions and Tigers, the pragmatic blanket recommendation is that measures currently in place to impede opportunities for illegal activities are strengthened across the entire supply chain from Lion breeding to skeleton exports.

In view of the research findings, the following actions are recommended:

- Develop an integrated national system for issuing permits that can be crosschecked by all enforcement and Customs officials in other provinces.
- CITES export permits should record the number of sets of skeletons and the combined mass thereof in a shipment. There is no benefit to recording the number of individual bones on a permit since this obscures the total number of bone sets and therefore the number of animals in trade.
- National and Provincial permit issuers, law enforcement and Customs officials should use the graph provided in Appendix 5 as a way of cross-checking the accuracy of declared skeleton quantities versus bone/consignment mass recorded on the applications for CITES export permits and/or the waybills. Recording the mass and number of skeletons on the CITES permits will assist vigilant Environmental Management Inspectors (EMIs) and freight forwarders with identifying discrepancies and anomalous declarations in shipments that contain more animals than were declared on the export permit and waybill.
- Develop a user-friendly means to determine whether a skeleton is that of a Lion or a Tiger. We have recommended one way to distinguish between Lion and Tiger skulls (Figure A1 in Appendix 4), but other characters may exist and require further development.
- Since it is not currently possible to determine whether CITES Appendix I Tigers are being illegally shipped as Appendix II Lion bones, spot checks and DNA tests of the exported consignments should be conducted to determine whether a skeleton is that of a Lion or Tiger. The relevant officers could be provided with DNA collecting kits and trained to collect tissue in a manner that would be acceptable to the justice system.
- Investigate the use of South African seaports as a gateway for Lion and Tiger product exports.
- Conduct a trade study on what happens to Lion bones and derivatives once they reach Asia and especially East–Southeast Asia, including an assessment of the trade routes and the value of the products along the supply chain.
- Investigate the Tiger trade in South Africa, including an assessment of the *ex situ* population, consumptive and non-consumptive utilization, national and provincial legislation with respect to keeping and hunting exotic animals, and, the inappropriate use of CITES Appendix II permit to trade products.
- Investigate the trade in Lion products (especially bones) in other African countries besides South Africa to determine: (a) the extent to which the products are available through legitimate and illegitimate sources, (b) the origin of the products (wild or captive bred), and (c) whether there are negative impacts on regional wild Lion populations across Lion range States in Africa.
- Although the compliance of provinces to national and provincial statutes relevant to Lions was researched at a broad level, time constraints precluded detailed examination of alleged individual transgressions. There remains a need to evaluate and, where necessary, synchronize the South African national and provincial legal frameworks to remove loopholes creating opportunities for non-compliance and illegal activities.
- It appears that more Lion hunting is taking place than is being reported by professional hunters. The sources of the discrepancies should be determined and various departments must find an appropriate way of "fixing" the hunting register and not issue permits without the register. The extent of the domestic hunting market for Lion should also be evaluated.
- Improve transparency within the bone trade, by considering a system (possibly including the use of studbooks and microchips) that tracks individual captive bred Lions from birth to death and from origin to final destination so that all exported skeletons and trophies can be traced back to the original source and mode of mortality
- The South African Revenue Service (SARS) must insist that all wildlife related cargos be stopped for inspection by EMIs and not simply released without examination.
- Conduct awareness campaigns targeting all cargo handlers/freight forwarders/cargo agents on a regular basis so that they are aware of sensitive wildlife cargoes and are able to identify illegal or suspicious shipments.

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Appendix 1: Asiatic Lion Timelines and Poaching

There have been sporadic reports of Gir/Asiatic Lions (*Panthera leo* ssp. *persica*) being poached in India's Gir National Park since the mid-1990s, allegedly for their claws since these were typically missing when carcasses were found (Anon., 2005; Anon., 2006; Dutt, 2006). For example: two Lions were poached in 1996 (Pati *et al.*, 2002); one Lion skin was recorded during a seizure/prosecution incident in India in June 1996 (TRAFFIC, 2013); one injured Lion was found in April 2004 with its right paw nearly ripped off – a sign that a leg-hold jaw trap typically used to kill Tigers had been used (Johnsingh, 2009); and, at least four Lions were poached between August and December 2005 (Anon., 2005; Dutt, 2006). Since usually only the claws were missing, the motives for poaching were attributed to the local demand for amulets and not traditional medicine. However, in March/April 2007, at least eight Lions were killed in three incidents[21] – and for the first time the TCM trade was implicated (and eventually proved) to be the motive for the killings because the bones and skulls, in addition to the claws, were removed (Anon., 2007; EIA, 2014b; Fair, 2009; Johnsingh, 2009; Kotecha, 2007; T. Ghose, *in litt.*, 11 April 2014). The *"dearth of tigers"* was purported to be the reason why the gang of poachers targeted the Lions (Fair, 2009).

The incidents in March/April 2007 seem to have taken the Indian conservation authorities by surprise. Even though Tiger poaching for bones for TCM had spread to India and had contributed to the extirpation of Tigers in reserves such as the Sariska Tiger Reserve by 2004, Johnsingh (2009) wrote *"No one thought that this demand for tiger bones [for TCM] would lead to the traders promoting lion poaching"*. References for the alleged use of Asiatic Lions in traditional medicine surfaced in the 1990s. In connection with the demand and consumption of Indian Tigers for TCM, Khoshoo (1997) predicted *"once tiger is decimated, the next target will be lion, followed by leopard (even bear) and all other felines from Asia and Africa"*. At that stage, images of Lions had already replaced Tigers on some manufactured Chinese medicines (Mills, 1997) and so it was valid to presume that Tiger parts could eventually be substituted with parts from Asiatic Lions.

After a six-year gap in the literature, mention of Asiatic Lion use in traditional medicine reappeared in the available online sources again in April 2003 when Ali (2003) alleges, *"tigers and lions are killed for their skin and bones. The skin ends up as a wall decoration in homes while the bones are used to make medicinal balm"*. Shortly thereafter, Singh *et al.* (2004) published a paper on novel microsatellite markers for forensically identifying big cats (including Asiatic Lions) in India that are *"continually facing the danger of extinction mainly due to poaching and hunting for their body parts, which are greatly valued by apothecaries marketing traditional Chinese medicines"* – it would thus seem that these authors had some basis for their concern that bones from Gir Lions were a target for TCM. Similarly, the observation of a live Asiatic Lion in a wildlife market in Mong La on the Myanmar-China border in August 2006 (Oswell, 2010) signposted an incipient market for the species in Southeast Asia.

The three incidents that resulted in at least eight Lions being caught and killed in March/April 2007 led to arrest and the conviction of more than 20 people from the Baheliya community (a hunting tribe from Madhya Pradesh that specializes in poaching activities in India and are known for poaching Tigers) (Balakrishna, 2008; Bukhari, 2007a; Dubey, 2007; Fair, 2009). Members of the tribe had been arrested in Gir before for hunting leopards: in 2001, 10 members of a gang were apprehended in possession of iron traps and other hunting implements, and in May 2004 another gang was arrested for being in possession of four leopard skins and iron traps (Bukhari, 2007b; Srivastava, 2007).

[21] *Incident one:* 3 skinned carcasses of lionesses (two adults and one subadult) found on March 3rd. The claws, skulls, teeth and bones were removed but the skins were left behind. *Incident two:* skinned remains of two adult males and one cub found on March 29th. *Incident three:* body parts belonging to at least two lions found on April 14th. Some reports list the total number of lions found during that period as 10, but most literature reports the total as eight. The poachers that were arrested only admitted to killing eight lions, but the kingpin arrested later confessed that more than eight lions were killed (Bukhari, 2007c). The same *modus operandi* was used in all three incidents.

Before the Baheliya suspects were arrested and convicted, the Chief Conservation Officer at Gir, Mr Bharat Pathak, was quoted saying, *"We suspect a (poaching) gang involvement…The traps that we found are similar in nature to those used by poachers in (the neighbouring state of) Madhya Pradesh. (The bones) could have been taken for Chinese medicine which is why the skins were left behind"* (Ramesh, 2007). A month later, the Wildlife Protection Society of India (WPSI, 2007) released a statement that included the following: *"…since Tigers are so scarce in the wild, these poachers are now targeting the last remaining Asiatic Lions…Their bones are also virtually indistinguishable from those of Tigers. There is no market for big cat parts in India, and their poaching and trade is entirely driven by demand from outside India's borders, for use in traditional Chinese medicine…"*.

After the tribe members were arrested for the Gir Lion killings, an investigator from India's Criminal Investigation Department was quoted as saying: *"Since the winter of 2006 they are now specifically targeting lions"* (Srivastava, 2007). Furthermore, Belinda Wright (head of WPSI) viewed these incidents as a new phase in poaching India's wildcats that could lead to the Asiatic Lion being "wiped out" and said, *"It is still too early to say that lion body parts are being passed on as that of tigers. But it is also true that the organized poachers are in communication with the traders in India and China, and there appears to be an increased demand for lion parts in the Chinese mainland"*[22] (Srivastava, 2007). The kingpin of the poachers was arrested less than a month after the gang and admitted *"he along with the other poachers targeted Gir Lions 'as there were no Tigers left in Sariska'"* (Bukhari, 2007c). At the conclusion of the trial, more than 20 people were sentenced to three years imprisonment and fined INR10 000 each (about USD200) (Balakrishna, 2008; HuntersNetworks, 2008; Wildlife Trust of India, 2008). The accused admitted that trade in body parts was the motive for hunting. Keshav Kumar, the Inspector General of Police, proclaimed *"This is the first known case in India in which lions were hunted for trade. Tigers are the first preference as each part of it is highly valuable. But with tigers disappearing, the poachers thought that lions would have to do…"* (Balakrishna, 2008; Wildlife Trust of India, 2008).

The 2007 poaching incidents led officials to re-examine earlier incidents of Lion and leopard poaching in the region to establish whether the culprits were the same. There were similarities between the case involving the Lion injured in April 2004 and the activities of Baheliya's from Madhya Pradesh who were arrested in 2004 for being in possession of leopard skins and traps. Furthermore, those arrested in 2004 and 2007 belonged to the same tribal community, and the traps used in all cases were similar (Bukhari, 2007b). This led officials to conclude that the Lion injured in April 2004 may have been the first (unsuccessful) target of the poaching gang from Madhya Pradesh (Bukhari, 2007b).

[22] The article by Sravistava (2007) goes on to say *"The information from China suggests that Wright's apprehension could be true…Now that tigers are hard to find, lions are being made effective substitutes. In all likelihood, lion bones fetch the same prices as the tiger's as there is no visual difference. To meet the demand* [for TCM] *China has a huge stockpile of dead and alive tigers and lions…The soaring prices of tiger/lion bones and rapid increase in demand have become a powerful incentive to poach. The price is estimated to be between US$140–$370 per kilogram depending on the size of the bones…Powdered tiger humerus bone…brings up to $1,450 per pound in Seoul"*.

Table A1 Summary of notable regulations and activities in the timelines of the Asiatic Lion with respect to TCM

Activities involving Gir/Asiatic Lions	Year	Legislation (details in Table 1)
	1993	China implements a complete ban on the trade in Tiger bones.[1,2]
	1994	CITES adopts *Resolution Conf. 9.13*.[1,3]
	1995	
	1996	
Khoshoo predicts that Lions and other felines in Asia and Africa will be the next target for parts for TCM once the Indian Tiger *"is decimated"*.[4]	1997	
	1998	
	1999	
	2000	
	2001	
	2002	CITES *Resolution Conf. 9.14* superseded by *Resolution Conf. 12.5*.[1,5,6]
Mention of Asiatic Lion parts allegedly used in traditional medicine.[7]	2003	
* Paper published on novel microsatellite markers for forensically identifying big cats (including Asiatic Lions) in India. The rationale for conducting the study was that Asian big cats in India were threatened by hunting for body parts used by Chinese "apothecaries".[8] * An injured Lion was found with its paw nearly ripped off (April). The case was reopened in 2007 by authorities investigating the 2007 March/April poaching incidents. Officials were trying to establish whether the culprits were the same. They concluded that this may have been the gang's first unsuccessful attempt at poaching Lions.[9]	2004	
	2005	
* Live Asiatic Lion observed in a market in Mong La, Myanmar (August).[10] * Alleged by the Gujarat Criminal Investigation Department that poachers from Madhya Pradesh were specifically targeting Gir Lions for use in TCM since the winter of 2006.[11]	2006	Regulation banning leopard hunting and the purchase of leopard bones in China.[1,2]
Eight Asiatic Lions poached in Gir National Park and their skulls and bones removed (March/April). The motive for their killing was confirmed as being for TCM.[12,13,14,15]	2007	*Decision 14.69* against Tiger farming and breeding for parts and products.[5]
The poachers arrested for killing 8 Gir Lions in 2007 are sentenced to three years imprisonment and fined INR10 000 each.[14,15]	2008	

References: 1=Nowell and Ling (2007); 2=People's Republic of China (2006); 3=Williamson and Henry (2008); 4=Khoshoo (1997); 5=CITES (2007a); 6=Henry (2004); 7=Ali (2003); 8=Singh *et al.* (2004); 9=Bukhari (2007b); 10=Oswell (2010); 11=Srivastava (2007); 12=EIA (2014b); 13=Fair (2009); 14= Balakrishna (2008); 15=Wildlife Trust of India (2008).

Appendix 2: IUCN Red List Status of the South African Lion Population

- The 2004 IUCN Red List assessment for South African Lions classified the species as Vulnerable according to the D1 criteria – i.e. that the number of mature individuals was <1000 (Friedmann and Daly, 2004).

- The 2004 assessment was based on a total population estimate of 2520 free-ranging individuals of all ages, and thus <800 mature individuals if adults are one-third of the population.

- Our conservative estimates for the 2013 wild population size is 2939 – and it is suspected that the counts for Lions are based on mature individuals since provinces usually record the adults and not the cubs – but this requires confirmation. There are thus more than 1000 adults.

- The conservation status of Lions in South Africa can only be assessed based on the size of the mature population since they don't meet the criteria for population decline (Criterion A: ≥30% decline in three generations – 21 years) or restricted geographic range (e.g. Criterion B1: an Extent Of Occurrence <20 000 km^2).

- Since the size of the South African Lion population has grown in the last decade and there are >1000 mature individuals, the South African national Red List status of Lions requires downgrading to Near Threatened or Least Concern.

- In the next Red List assessment in preparation, Lions in South Africa will be categorized as Least Concern (Bauer *et al.*, 2015).

- One thing to consider in the assessment of the number of Lions in South Africa (and thus the number of adults) is the Kgalagadi population that straddles South Africa and Botswana. If one does a country-by-country assessment – then the number of Lions in the South African side is about 190 according to latest figures (CITES Scientific Authority 2013; P. van Niekerk, *in litt.,* June 2013). The total Lion population in the Kgalagadi is about 600 individuals (P. van Niekerk, *in litt.*, June 2013). However, Lions in Kgalagadi are not geographically constrained by the Nossob River border and the population is contiguous across the Transfrontier park (P. Funston, *in litt.*, July 2013). Since the adults are free to roam across the park there is no artificial fragmentation of the population, one can't limit the adult population to being one-third of 190, but rather one-third of 600. This pushes the number of wild Lions up to over 3000 for the region and thus an adult population of >1000 individuals

- Downgrading to Least Concern would not change the status with respect to TOPS regulations since the species would still be protected.

Appendix 3: LION POPULATION IN SOUTH AFRICA C.2013

The following tables show the raw data on the size of the Lion population in South Africa and the source of those data. Tables A2 to A6 show the breakdown of the number of Lions per reserve type and captive facility. Tables A7 to A11 further summarize these data.

Table A2 Total number of wild Lions protected within South African National Parks (SANParks) (excludes Lions protected within the provincial State-owned game reserves – see Table A3)

S.A. National Park (NP)	Province	Naturally occurring "founders" or reintroduced	Estimated no. Lions	Reference
Kgalagadi Transfrontier NP[1]	Northern Cape/ Botswana	Naturally occurring	190 – South African side 600 – total in park (See Appendix 2)	P. van Niekerk (pers. comm., June 2013)
Kruger NP[2]	Limpopo/ Mpumalanga	Naturally occurring	2000	See Table footnote.
Addo Elephant NP[3]	Eastern Cape	Reintroduced	14	CITES Scientific Authority (2013)
Karoo NP[3]	Western Cape	Reintroduced	8	CITES Scientific Authority (2013)
Mapungubwe NP	Limpopo	Reintroduced	<10	Funston and Miller (2013)
Marakele NP[3]	Limpopo	Reintroduced	13	CITES Scientific Authority (2013)
Mountain Zebra NP[4]	Eastern Cape	Reintroduced	3	SANParks Media Release (2013)
Total			≈ 2238 (conservative estimate) [or, 2648 IF the Kgalagadi population is considered to be 600 since the Lions on the Botswana "side" of the park are free to move to the South African "side"] ≈ 97.9% are naturally occurring from founder populations	

1. The Kalahari Gemsbok National Park in South Africa and the Gemsbok National Park in Botswana were amalgamated in May 2000. The higher estimate of Lion numbers provided by Pieter van Niekerk from the Department of Environment and Conservation, Northern Cape, was used. However, Funston and Miller (2013) and Miller *et al.* (2013) estimate about 450 Lions reside in the whole park, with about 125 individuals in the South African section. There are plans to count the Lions in the park in the near future (P. van Niekerk, pers. comm., May 2013). See Appendix 2
2. The estimate is for the greater Kruger National Park ecosystem, and includes Lions living on national and private reserves where the border fences have been removed between the reserves and the Kruger NP allowing Lions to roam freely within the ecosystem. The report by the CITES Scientific Authority (2013) estimated the Kruger portion of the population size to be 1617–1751 Lions, with a median of 1684, in 2004/05. Miller *et al.* (2013) and P. Funston (*in litt.*, July 2013) report that there are 1700 Lions in Kruger and an additional 300 Lions in private reserves bordering Kruger. The Lions living on the private reserves are part of the greater Kruger National Park ecosystem and part of the founder population. Hence, after some deliberation, we have reported the total population to be approximately 2000 Lions.
3. The estimates by the CITES Scientific Authority (2013) for c.2011.
4. Three Lions introduced in April 2013 from the Karoo National Park and the Welgevonden Game Reserve in Limpopo (http://www.sanparks.org/about/news/default.php?id=55509)

Table A3 Total number of secondary wild and free-roaming Lions protected within provincial State-owned game reserves

Provincial Game Reserve (State-owned)	Province	Genetic origin of Lions	Estimated no. Lions	References
Hluhluwe-Umfalozi Park	KwaZulu-Natal	Reintroduced; Kruger origin	<200[1]	CITES Scientific Authority (2013) Funston and Miller (2013)
Tembe GR	KwaZulu-Natal	Reintroduced; Etosha origin via Pilanesburg/Madikwe	34	CITES Scientific Authority (2013); Slotow and Hunter (2009)
Mthethomusha	Mpumalanga	Reintroduced; Kruger origin	0	Had 2 Lions until 2013 (J. de Beer, pers. comm., May 2013). Lions may be reintroduced in future.
Pilanesberg GR	North West	Introduced in 1994; Etosha origin	60	CITES Scientific Authority (2013); Slotow and Hunter (2009)
Madikwe GR[2] (part state-owned)	North West	Introduced in 1995; Etosha origin	80	CITES Scientific Authority (2013)
Other	There are a number of provincial nature reserves in Limpopo and Mpumalanga adjoining the western boundary of the Kruger National Park. The boundaries with Kruger are not fenced, and Lions can roam freely across the greater Kruger ecosystem. These numbers are included in Table A4.			
Total			**<374**	

1. A participant of the Lion Biodiversity and Management Plan (BMP) workshop in Pretoria on 17 June 2013 stated that there are currently fewer than 200 Lions.
2. A joint State-private-community run reserve.

Table A4 Estimated number of Lions within small, fenced private game reserves. For Limpopo and Mpumalanga, these figures exclude reserves that are unfenced systems and part of the greater Kruger National Park ecosystem. Most stock originates from Etosha, Kruger and Kgalagadi (determined from Slotow and Hunter, 2009). Some reserves have introduced captive-bred Lions in the free-roaming system, but the actual numbers are not known. Some hunting might take place on a limited number of these properties

Province	No. private Reserves	Introduced or reintroduced	Estimated no. Lions	Reference
Eastern Cape (EC)	12	Introduced & reintroduced	61	CITES Scientific Authority (2013); Eastern Cape Province interviews (pers. comm., May 2013)
Gauteng (GT)	1	Introduced	8	CITES Scientific Authority (2013)
KwaZulu-Natal (KZN)	5	Introduced & reintroduced	82	CITES Scientific Authority (2013);
Limpopo (LP)	20	Introduced & reintroduced	122	CITES Scientific Authority (2013).
Mpumalanga (MP)	1	Reintroduced	4	J. de Beer (pers. comm., May 2013)
North West (NW)	??		??	Unclear if there are any private fenced reserves that do not allow hunting
Northern Cape (NC)	1	Reintroduced	30[1]	CITES Scientific Authority (2013); P. van Niekerk (pers. comm., May 2013)
Western Cape (WC)	6	Introduced	>20	Multiple internet sources (April 2013)
Total	**>46**		**>327**	

1. Does not include the fenced reserve that allows hunting – see Table A5

With the large number of facilities that breed and release Lions into reserves for hunting purposes in the North West province, it has been difficult to establish whether there are any facilities (excluding sanctuaries and zoos)

that do not have any connection to the hunting industry. Hence, the number of Lions than might exist in a small, fenced, non-hunting reserve is indeterminate at this juncture.

Table A5 The number of captive-breeding and hunting facilities, and the number of Lions within these facilities. Some hunting facilities do not breed Lions

Province	No. breeding facilities	Estimated no. Lions	No. hunting facilities	Reference
Eastern Cape	10	250	>2	CITES Scientific Authority (2013)
Free State[1]	70 breeding only	3000	2	W. Boing (pers. comm., May 2013).
Gauteng	0	0	0	CITES Scientific Authority (2013)
KwaZulu-Natal	0	0	0	CITES Scientific Authority (2013)
Limpopo[2]	2	350	?	CITES Scientific Authority (2013)
Mpumalanga	0	0	0	
North West	64	2196	12	CITES Scientific Authority (2013)
Northern Cape	0	20	1	CITES Scientific Authority (2013)
Western Cape	0	0	0	CITES Scientific Authority (2013)
Total	**146**	**>5816**	**>17 excl. Limpopo[3]**	**Total hunting and breeding facilities ≈152.**

1. Free State do not allow breeding and hunting on the same facility, and the number of breeders and hunting facilities in this province have recently declined. The number of facilities in the province has dropped from the 98 reported by the CITES Scientific Authority (2013).
2. Not validated yet. Occasional hunting of wild Lions appears to take place on some private land, but these Lions are not captive sourced and the total number of Lions hunted is less than 5% of the annual national total (CITES Scientific Authority, 2013).
3. Professor Pieter Potgieter, Chairman of the South African Predator Breeders Association, said that there were no more than 15 hunting facilities in South Africa (pers. comm., June 2013).

Table A6 Minimum estimates for the number of Lions in *ex situ* facilities (private sanctuaries, Lion parks, zoos, etc.). The information is inferred from a non-exhaustive Internet search.

Province	No. of facilities	Estimated no. Lions	Reference
Eastern Cape	5	>72	Multiple internet sources (accessed April 2013); meeting with EC conservation officials
Free State	1	6	Multiple internet sources (accessed June 2013)
Gauteng	>6	>118	Multiple internet sources (accessed April 2013);
KwaZulu-Natal*	1	>10	Multiple internet sources (accessed April 2013);
Limpopo	4	>64	Multiple internet sources (accessed April 2013)
Mpumalanga	3	10	J. de Beer (pers. comm., July 2012)
North West	6	>40	Multiple internet sources (accessed April 2013)
Northern Cape	1	2	P. van Niekerk (pers. comm., May 2013)
Western Cape*	4	>50	Multiple internet sources (accessed April 2013)
Total	**31**	**>372**	

* In July 2009, DEA published an account on the number of TOPS species in captivity per province (National Assembly 2009d). The numbers reported for the Eastern Cape, Free State and North West corresponds with number of Lions in breeding facilities in the provinces at the time. However, it was further reported that there were 50 Lions in KwaZulu-Natal and 70 in the Western Cape. These numbers have not been included in these estimates since there is uncertainty as to whether these are breeding facilities or *ex situ* facilities.

Table A7 Summary of the number of wild/free-roaming Lions in different reserve types

Reserve/facility type	Number of facilities	Estimated no. Lions	Average no. Lions per facility	
SANParks National Parks (Table A2)	7	>2238[1]	319.7	Naturally occurring (wild/founder) and reintroduced
Provincial Nature Reserves (Table A3)	4	>374	93.5	Reintroduced and free-roaming
Private small fenced reserves (Table A4)	46	>327	7.3	Reintroduced and free-roaming
Total	**57**	**>2939**	**➔ 2190 (74.5%)** Lions are in naturally occurring ("founder") populations **➔ 422 (14.4%)** are (re)introductions into state-owned reserves (incl. SANParks) **➔ 327 (11.1%)** are (re)introductions into privately-owned small fenced reserves	

1. Assuming Kgalagadi population is 190 on the South African side and not 600 for the total population

Table A8 Summary of the number of Lions in *ex situ* facilities

Facility type	Number of facilities	Estimated no. Lions	Average no. Lions per facility
Captive-breeding facilities (Table A5)	146	>5816	39.8
Hunting facilities	>17	See above	Included above
Private sanctuaries, parks, zoos (Table A6)	31	>372	12.0
Total	**>194** (excl. 17 hunting that might be breeding)	**>6188**	**➔ 5816 (94.0%)** captive bred **➔ 372 (6.0%)** are *ex situ*

Table A9 Summary per province of the number of wild/free-roaming Lions in different reserve types (Province acronyms listed in Table A4 and Map 2)

Province	SANParks National Parks (Table A2)		Provincial Reserves (Table A3)		Private Reserves (Table A4)		**Total**	
	No. parks	No. Lions	*No. reserves*	No. Lions	*No. reserves*	No. Lions	*No. reserves*	No. Lions
EC	*2*	17			*12*	61	***14***	**>78**
FS							***0***	**0**
GT					*1*	8	***1***	**8**
KZN			*2*	234	*5*	82	***7***	**316**
LP	*3*	2023			*20*	122	***23***	**2145**
MP					*1*	4	***1***	**4**
NW			*2*	140	*??*	??	***2***	**>140**
NC	*1*	190			*1*	30	***2***	**220[1]**
WC	*1*	8			*6*	>20	***7***	**>28**
Total	***7***	**2238**	***4***	**374**	***>46***	**>327**	***57***	**>2939**

1. Assuming Kgalagadi population is 190 on the South African side and not 600 for the total population

Table A10 Summary of the number of Lions in captive or hunting facilities per province (Province acronyms listed in Table A4 and Map 2)

Province	Captive breeding and hunting (Table A5)		*Ex situ* (Table A6)		**Total**	
	No. facilities	No. Lions	*No. facilities*	No. Lions	*No. facilities*	No. Lions
EC	*10*	250	*5*	>72	***15***	**>322**
FS	*72*	3000	*1*	6	***73***	**3006**
GT	*0*	0	*>6*	>118	***>6***	**>188**
KZN	*0*	0	*1*	10	***1***	**10**
LP	*2*	350	*4*	>64	***6***	**>414**
MP	*0*	0	*3*	10	***3***	**10**
NW	*64*	2196	*6*	>40	***70***	**>2236**
NC	*1*	18	*1*	2	***2***	**22**
WC	*0*	0	*4*	>50	***4***	**>50**
Total	***149***	**5816**	***31***	**>372**	***180***	**>6188**

Table A11 Summary of the number of free-roaming and captive Lions in South Africa (Province acronyms listed in Table A4 and Map 1)

Province	Wild and free-roaming		In captivity (breeding *and ex situ)*		**Total**	
	No. reserves	No. Lions	*No. facilities*	No. Lions	No. facilities	No. Lions
EC	*14*	>78	*15*	>322	**29**	**400**
FS	*0*	0	*73*	3006	**73**	**3006**
GT	*1*	8	*>6*	>118	**>7**	**>126**
KZN	*7*	316	*1*	10	**>8**	**326**
LP	*23*	2145	*6*	>414	**29**	**2559**
MP	*1*	4	*>3*	>10	**>4**	**>14**
NW	*2*	>140	*70*	>2236	**72**	**2376**
NC	*2*	220[1]	*2*	22	**4**	**242**
WC	*7*	>28	*4*	>50	**11**	**78**
Total	***57***	**>2939**	***180***	**>6188**	**>237**	**>9127**

1. Assuming Kgalagadi population is 190 on the South African side and not 600 for the total population

Appendix 4: LION ANATOMY

Differences between Lions and Tigers

While Lion bones are substituted for Tiger bones in East–Southeast Asian markets, there are also justified concerns that bones from captive Tigers in South Africa are being illegally exported and falsely declared as "lion" bones. It is thus important to be able to distinguish between the two species. The bold, brown-black stripes across a Tiger's body make it easily recognisable compared to the plain tan colouring of a Lion. However, Lions and Tigers share the same skeletal structure and are anatomically extremely alike – making it difficult for usually anyone but an expert to discern the differences between the species on the basis of internal form and structure. Untrained Customs officials intercepting consignments of *Panthera* spp. bones are even less likely to be able to tell bones from the species apart.

While body size is an age- and sex-related morphological variable difficult to detect in skeletons, Lions are usually smaller than Tigers (Table A12). In addition, Lions have two fewer hyoid bones (Weissengruber *et al.*, 2002) and their skulls are broader and flatter across the bridge of the nose. The position and alignment of the posterior projections of the naso-frontal and maxilla-frontal sutures on the skull might, however, offer the best rule for identification and allow quick determinations to be made (Figure A1). Ultimately, forensic DNA testing would be the most dependable method for correctly determining the species (Cao *et al.*, 2011; Tobe and Linacre, 2010)

Table A12 Comparative morphological differences of Lions and Tigers

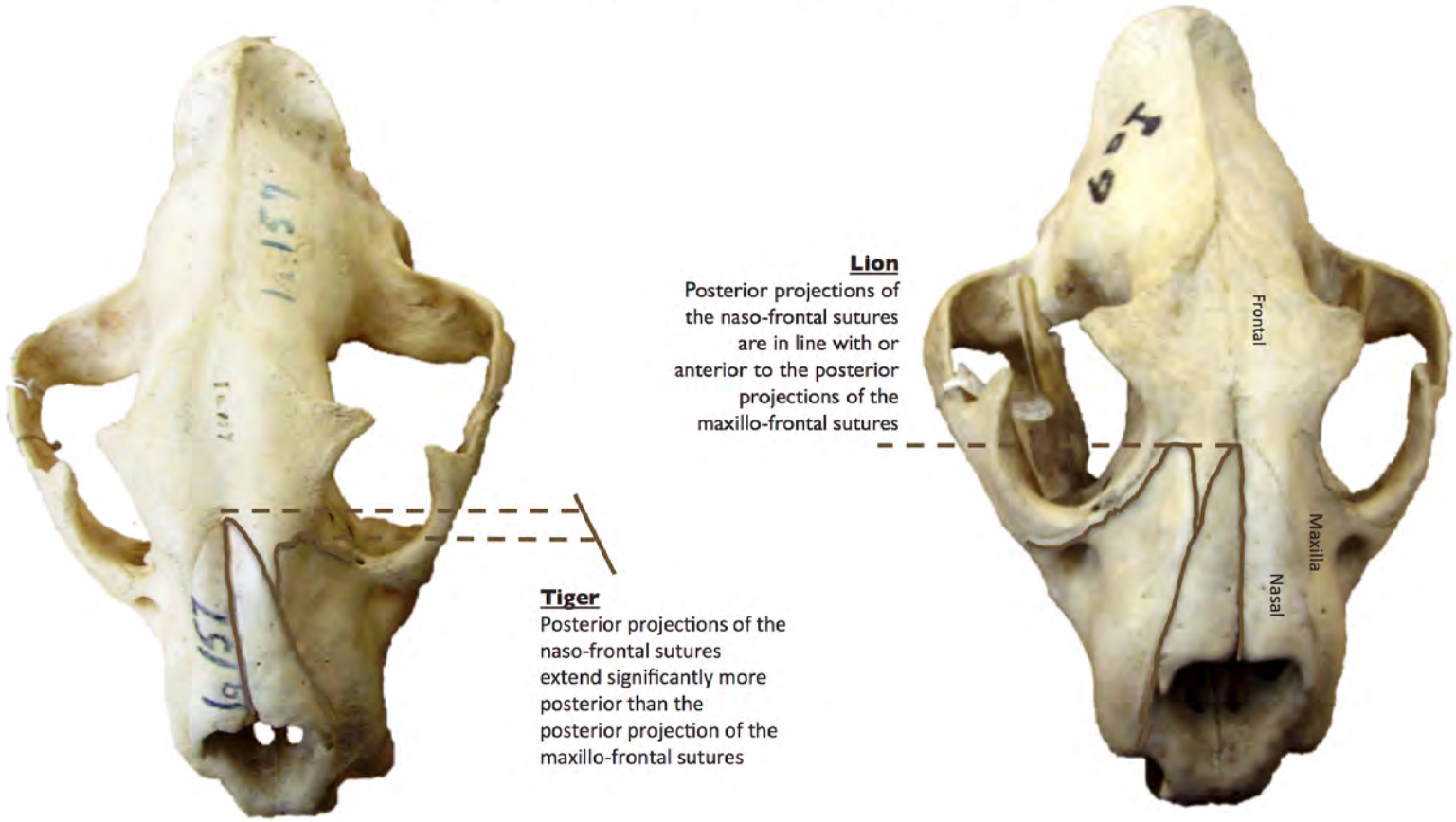
Feature	Lion*	Tiger	Notes and information source
Body weight (kg)	♂ mean: 189.6 (range 150.0–225.0) ♀ mean: 103.8 (range 83.0–165.0)	♂ mean: 225 (range 195–325) ♀ mean: 121 (range 96–160)	Lions in captivity are normally larger than those in the wild. Macdonald *et al.* (2010)
Head/body length (mm)	♂ mean: 1949 (range 1835–2000) ♀ mean: 1710 (range 1425–1850)	♂ mean: 2300 (range 1900–2900) ♀ mean: 1711 (range 1460–1770)	Macdonald *et al.* (2010)
Skull	Generally broader and flatter across the bridge of the nose, and the face is upturned.	Generally more rounded skull that is narrower and sharper along the bridge of the nose. The face tends to tilt sharply downwards.	*Source*: Raptor's Nest (2008), who derived the information from identification criteria published by Merriam and Stock (1932).
Maxillo-frontal & naso-frontal sutures	In dorsal view, the apex of the nasals is either in line with the apices of the maxilla-frontal processes or more anterior to these.	In dorsal view, the nasal projections extend significantly more posterior than the posterior projection of the maxillae	This is a more consistent feature. See Figure A1.
Hyoid bones	7	9	*Source*: De Iuliis and Pulerà (2007); Weissengruber *et al.* (2002)

* For southern African Lion populations; Lions in East Africa are generally larger (Macdonald *et al.*, 2010)

Skeletal Anatomy of Lions

Provinces issuing permits to export Lion bones variously record the quantity being exported as either the number of skeletons, and sometimes the mass thereof, or the number of bones (*Source*: DEA annual CITES reports for 2006–2011). In one case a permit listed all the names of the bones in the "set" and the numbers thereof (e.g. 3 x xiphoid process; sets of carpels in wrist). However, the Management Authorities in charge of issuing CITES permits currently have no practical identification guide describing the skeletal anatomy of Lions that would be useful for evaluating permit applications. To address this need, a guide to the names and numbers of the bones was produced (Figure A2; Tables A13 & A14).

Dorsal view of tiger (left) and lion (right) skulls. The cranial sutures between the nasal/frontal and maxilla/frontal bones on one side of the skull are outlined.
Source: http://mambobob-raptorsnest.blogspot.com/2008/07/lion-and-tiger.html



Panthera tigris 1a157

Panthera leo 1a9

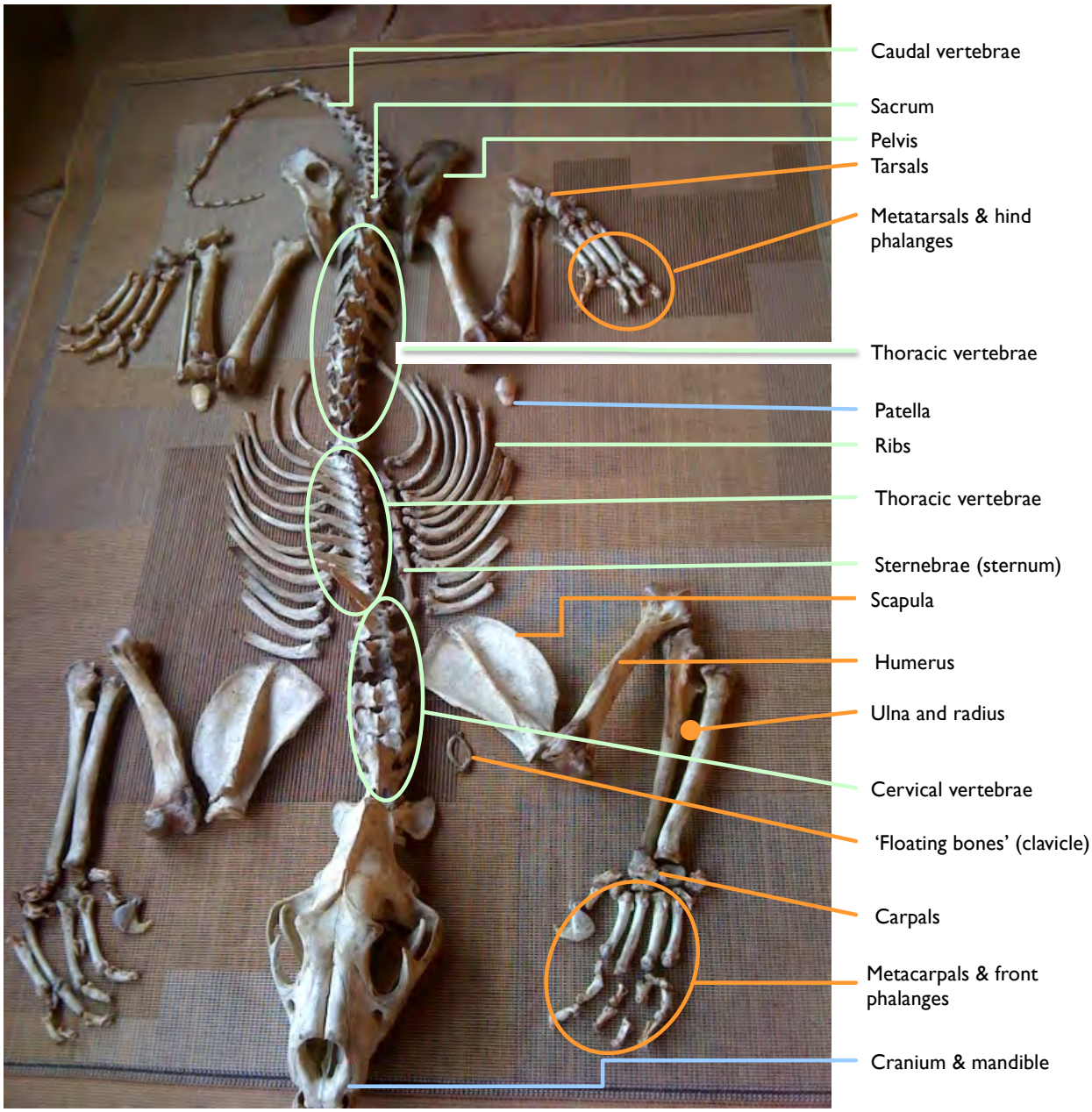


Figure A2 A reassembled Lion skeleton. Colours correspond to columns in Tables A13 & A14. Bones labelled in blue and orange are important to buyers in East–Southeast Asia; bones labelled in green are not always exported

There are up to 309 bones in a Lion skeleton – including the ossicles in the ear, the hyoid bones in the throat, the sesamoid bones in the digits and joints, and the teeth (Table A13). The ossicles, sesamoids and hyoid bones are not typically included in sets destined for export given their small sizes. Assuming the bones came from a non-trophy hunted Lion, a typical "set" of bones exported to East–Southeast Asia could comprise up to 240 bones and teeth plus the claws (Figure A2, Table A13).

Trophy hunters, usually take the skull and teeth, and sometimes the floating bones, as mementos from their hunts (Table A15) – hence only 14% of skeletons obtained from trophy hunted Lions are likely to have a complete set of bones available for export (data derived from the annual CITES reports for 2006–2011 supplied by DEA). The "floating bones" (a pair of clavicles), considered a symbol of power in Tigers (Nowell, 2000), are less frequently taken with the hunter as a memento, and only 10% are exported (Table A15). Accordingly, a set of bones obtained from most trophy-hunted Lions would typically have up to 206 bones (Table A14). The skulls, along with the patellas (knee caps), are important since these are the most valuable bones in a Tiger skeleton

(Nowell, 2000) and a Lion skeleton from South Africa could sell for an additional ZAR3000 to ZAR5000 (USD315–USD525) if these bones are present in the set (see Table 12).

Table A13 Typical skeletal anatomy of an adult *Panthera leo*. Colours of the shaded cells correspond with the label lines in Figure A2. Bones in the blue and orange cells are important to buyers in East–Southeast Asia; bones in the green cells are not always exported; bones in the purple cells are seldom or never exported

	Name	Number of bones	Notes
Cranial skeleton	Cranium	1	
	Mandible	1	
	Ossicles (ear)	6	
	Hyoid bones (throat region)	9	Tigers have 7 hyoid bones (Weissengruber *et al.*, 2002)
	Set of teeth	30	
Postcranial skeleton	Set of cervical (neck) vertebrae	7	
	Set of thoracic (chest) vertebrae	13	
	Set of lumbar vertebrae	7	
	Sacrum	1	Three fused sacral vertebrae
	Set of caudal (tail) vertebra	up to 26	Cited variously as 18-20, 23, or 25-26 bones by several sources
	Ribs	26	
	Sternum/sternebrae	8	
	Forelimbs		
	Scapula	2	
	Clavicle ("floating bones")	2	Frequently mistakenly referred to as "floating ribs"
	Humerus	2	
	Ulna	2	
	Radius	2	
	Set of carpals in forepaw	14	Incl. pisiform bones
	Set of metacarpals	10	
	Set of phalanges (digits/toes)	28	
	Hind limbs		
	Pelvis	2	Paired innominate bones, each with a fused ilium, ischium and pubis
	Femur	2	
	Set of patella (knee caps)	2	Lions only have 2 knee caps, not 4 as has been erroneously reported by consignors on some export permits
	Tibia	2	
	Fibula	2	
	Set of tarsals in hind foot	14	Incl. calcaneus heel bones
	Set of metatarsals	10	
	Set of phalanges (digits/toes)	24	
	Sesamoids (in digits and joints)	54	(digits: 9+4 per front foot; 8+4 per hind foot) + (joints: 2 per hind leg) (see Evadiugan, 2011). 32 of these bones are the most discernable
	Set of claws		18 (10 on forepaws; 8 on hind paws)
	Total	**Up to 309**	

Source: Information derived from examining permit records sent by DEA; from De Iuliis and Pulerà (2007); Evadiugan (2011); Weissengruber *et al.* (2002); Andrew Kitchener (Principal Curator Vertebrates, National Museums Scotland; *in litt.*, 2013); Multiple internet sources.

Table A14 Lion bones likely to be included in a "set" from trophy and non-trophy animals. Green-shaded cells indicate differences in bone numbers from Table A13. See text for explanation for information in the last column and how the information was derived

	Name	Bones likely to be in a "set" from a non-trophy animal (Figure A2)	Bones likely to be in a "set" from a trophy animal	Example. Orange cells: unnamed parts of a Lion skeleton that total "117" bones recorded on a 2010 CITES permit. Blue cells: bones named on the permit. Green cells: bones not named and unlikely to be part of a set of 117 bones.
Cranial skeleton	Cranium	1	85.8% exported by trophy hunters (see Table A15)	(1)
	Mandible	1		(1)
	Ossicles			
	Hyoid bones			
	Set of teeth	30	Variable inclusion	(30)
Postcranial skeleton	Set of cervical (neck) vertebrae	7	7	
	Set of thoracic (chest) vertebrae	13	13	
	Set of lumbar vertebrae	7	7	
	Sacrum	1	1	
	Set of caudal (tail) vertebra	26	26	
	Ribs	26	26	
	Sternum/sternebrae	8	8	
	Forelimbs			
	Scapula	2	2	2
	Clavicle ("floating bones")	2	10.0% exported by trophy hunters (Table A15)	2
	Humerus	2	2	2
	Ulna	2	2	2
	Radius	2	2	2
	Set of carpals in forepaw	14	14	16
	Set of metacarpals	10	10	10
	Set of phalanges (digits/toes)	28	28	28
	Hind limbs			
	Pelvis	2	2	2 halves or 1 fused
	Femur	2	2	2
	Set of knee patella	2	2	(2)
	Tibia	2	2	2
	Fibula	2	2	2
	Set of tarsals in hind foot	14	14	14
	Set of metatarsals	10	10	8
	Set of phalanges (digits/toes)	24	24	24
	Sesamoids			
	Total	up to **240 bones**, including teeth	up to **206 bones**, excluding teeth	up to **117 bones**

Table A15 The proportion of Lion trophies that are exported with or without the skull and floating bones and thus the proportion of "complete" sets of skeletons (with ±240 bones) likely to be represented in the total number of Lion skeletons exported annually

	% of skeletons obtained from trophies that exclude these bones	% of "complete" skeletons obtained from trophies that include these bones	Sample size, *n* (i.e. no. of permits used to estimate the % completeness skeletons)
Trophies exported with or without the skull	85.8%	14.2%	*n*=1464 of 1706 permits
Trophies exported or without floating bones	10.0%	90.0%	*n*=135 of 1356 permits

DEA supplied detailed information from the 2006–2011 CITES Lion reports (T. Carroll, *in litt.*, May 2013); the reports list the permits issued per province to export/re-export Lions and Lion products. The information supplied excluded the names and addresses of the importers and exporters, but included a description of the specimens(s) (e.g. "full skins & 2 pairs floating bones"), the quantity of each specimen, the country of export/re-export, and the unique CITES permit number. A critical evaluation of the permits issued to export Lion products (especially bones to East–Southeast Asia) could thus be conducted. For example, in 2010 four CITES permits were issued to export bones to Lao PDR; the following information was recorded in the Description (D) and Quantity (Q) fields on the permit:

a) 117x9 bones (D); 9 (Q)
b) 117x9 bones (D); 9 (Q)
c) 117x3 bones (D); 117 (Q)
d) 117x6 bones (D); 117 (Q)

The question is: which bones from a Lion would make up a set of 117 bones? To answer the question, bone numbers from Table A13 were added up in various combinations. If one counts the pelvis as one fused bone instead of two halves, then a set of 117 bones:

- *Includes*: all the bones in the orange-shaded cells in the last column of Table A14 (mainly limb bones);
- *Excludes*: the cranium, mandible, teeth and patellas (indicated in blue-shaded cells);
- *Excludes*: all the ribs and vertebrae (indicated in green-shaded cells in the last column of Table A14).

Unlike the ribs and vertebrae, however, the cranium/mandible/teeth/patella were exported with the four consignments (*a–d* above), but they were specifically itemized on separate lines of the permits (judging from the permit numbers accompanying the report). Furthermore, the quantities recorded in permits *a–d* above add up to 27 partially complete skeletons (with ≈3159 bones, excluding skulls, teeth and patella) and not 252 bones as the total for Q seems to indicate. Tiger bones are generally sold in one of three forms in East–Southeast Asia: (1) as whole joints (usually from one of the limbs to treat arthritis and joint pain), (2) dry fragments, or (3) derivatives rendered into another product such as wine (Nowell, 2000). Skulls, teeth and claws are also preferred. The apparent absence of the ribs and vertebrae in the consignment of 27 Lion skeletons (Table A14), and the inclusion of the bones from the hind- and forelimbs, is thus indicative of the greater worth of the limbs to Traditional Asian Medicine.

In another example from four consecutive CITES permit issued in 2010, an exporter went to great lengths to list the scientific names of the bones (e.g. 6 pisiform bones, 3 sets of caudal vertebrae; 6 sets of metacarpals; 3 sets manubrium/illium/ischium/pubis; etc.). In the process, however, they incorrectly named and numbered some of the "bones" – for example 6 x "calcaneus/clavicle/olecranon/shoulder blades" – and thereby obfuscated the real number of bones and thus skeletons being exported. The olecranon, for example is not an individual bone, but a process extending from the top of the ulna (and the ulna was recorded in a separate entry); the calcaneus is the heel bone. It was this series of permits that prompted the development of the guide to Lion skeletal anatomy. By comparing the entries on the permit with Figure A2 and the terminology for parts the postcranial skeleton of cats from De Iuliis and Pulerà (2007) and Table A13, it was determined that the four permits were for

bones from three Lion skeletons totalling about 720 bones (and not 586 bones as was finally captured on the UNEP-WCMC CITES trade database).

The Mass of Lion Skeletons

Knowledge of the average mass of a cleaned skeleton is necessary for: (1) interpreting approximately how many skeletons are being exported when only the mass of a consignment is recorded on a CITES permit; (2) standardizing and consolidating the total quantities exported as either *x*-number of skeletons or *y*-total-mass of skeletons; and (3) verifying whether an exporter is being honest in their declarations of the quantities being exported (this is especially useful for the Management Authorities issuing CITES permits). Tiger skeletons are estimated to weigh 12 kg (Nowell, 2000), but there were no data available with a large enough sample size to indicate the average mass of a Lion skeleton. Given the smaller body size of Lions (Table A12), the skeletons were expected to weigh less than that of a Tiger.

Most CITES permits issued to export Lion bones record the quantity only as the number of skeletons and/or bones and do not include the mass of the consignment. In some cases where mass was recorded, there was no indication of the number of skeletons the mass was equivalent to. Occasionally both the mass and the number of skeletons were recorded on a permit, and information from 16 permits to export what was originally believed to be 433 skeletons to Southeast Asia were obtained (Table A16). In addition, two skull-less skeletons from male Lions were weighed at the Ditsong National Museum of Natural History in Pretoria as a reference. The museum specimens weighed 6.25kg and 8.99kg.

The mean mass per skeleton was initially calculated to be 10.81 ± 3.66 kg (S.D.) (Table A16). However, the mass per skeleton of two records appeared anomalous and unusually high (Permits 1 and 2, Table A16, where skeletons on Permit 1 were 2.3 times heavier than the heaviest museum specimen), suggesting that the number of skeletons being exported had been incorrectly or falsely declared on the permit. To test this presumption of a false declaration, a simple linear regression of the relationship between the number of skeletons and the mass of the consignment indicated an R^2=0.716 and two possible outliers (*n*=16 consolidated consignments and "433" skeletons) (Figure A3). When data from these two anomalous exports were excluded from the calculations, the average mass of a skeleton in a consolidated consignment was 9.53 ± 1.05 kg, which was only 540 grammes heavier than the heaviest museum specimen. An assumption was thus made that twice as many skeletons were in these two consignments than was declared on the permit. When the number of skeletons was doubled for these permits and the linear regression was revised, the correlation increased to R^2=0.991 and the average mass per Lion skeleton was 9.57 ± 1.00 kg (n=16 consignments, and the number of skeletons revised to 513) (Figure A4; Table A16).

When data on skeleton mass obtained from the museum, the 16 consolidated consignments and 34 bags of individually weighed Lion bones (Table A17) were combined, the mean mass of a Lion skeleton was recalculated and estimated to weigh **8.95 kg ± 1.78 kg** (*n*=551 skeletons). The skeletons were assumed to be mostly skull-less since about 86% of exported skeletons are inferred to be incomplete (i.e. missing the skull) if they are derived from trophy hunts (Table A15). However, the actual proportion of exported Lion bones derived from non-trophy animals is not known, and so the proportion of skull-less skeletons cannot be verified without having viewed the consignments.

Table A16 Permit data on the declared mass of a consignment and the number of skeletons. The skeletons were assumed to be of mixed age, sex and completeness (i.e. some were missing skulls). The number of skeletons declared on Permits 1 and 2 were presumed to be anomalous (see Figure A3) and thus corrected for (Figure A4)

Permit No.	Declared mass of the consignment (kg)	Declared number of skeletons	Mass per skeleton ± S.D. (kg/skeleton)
Permit 1	661.0	32* (64)	20.66* (10.33)
Permit 2	947.0	50* (100)	18.94* (9.47)
Permit 3	47.6	5	9.52
Permit 4	144.0	19	7.58
Permit 5	146.0	13	11.23
Permit 6	129.0	12	10.75
Permit 7	409.0	46	8.89
Permit 8	651.0	66	9.86
Permit 9	192.0	19	10.11
Permit 10	76.0	10	7.60
Permit 11	47.6	5	9.52
Permit 12	137.6	14	9.83
Permit 13	364.0	39	9.33
Permit 14	247.0	25	9.88
Permit 15	380.0	43	8.84
Permit 16	366.0	35	10.46
Provisional result		*n*=433 skeletons	Mean=~~10.81 ± 3.66 kg/skeleton~~ * likely to be incorrect
Corrected: the results after the quantities declared on Permits 1 and 2 were doubled		*n*=515 skeletons	Mean=9.57 ± 1.00 kg/skeleton corrected

* Anomalous mass and thus probably a false declaration on the CITES permit for the number of skeletons declared to be exported. The number of skeletons was thus revised and doubled to correct the anomaly (see text).

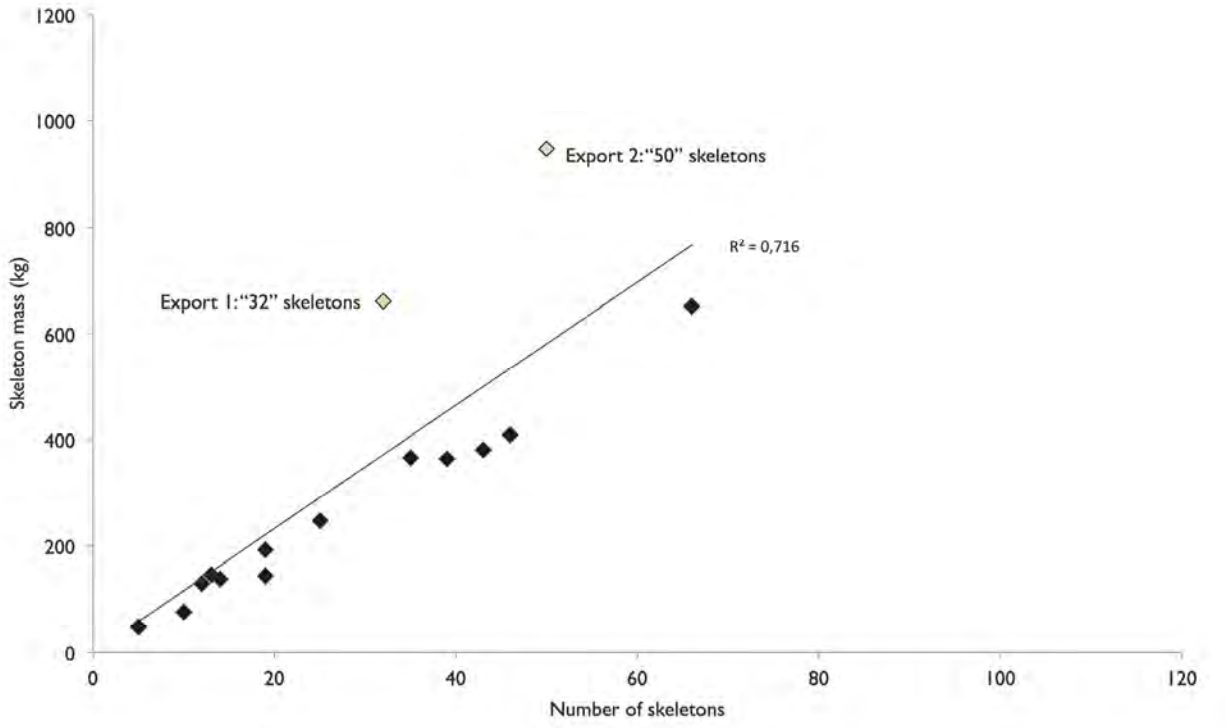


Figure A3 Linear regression for data in Table A16. Two of the exports appeared anomalous for the number of skeletons declared

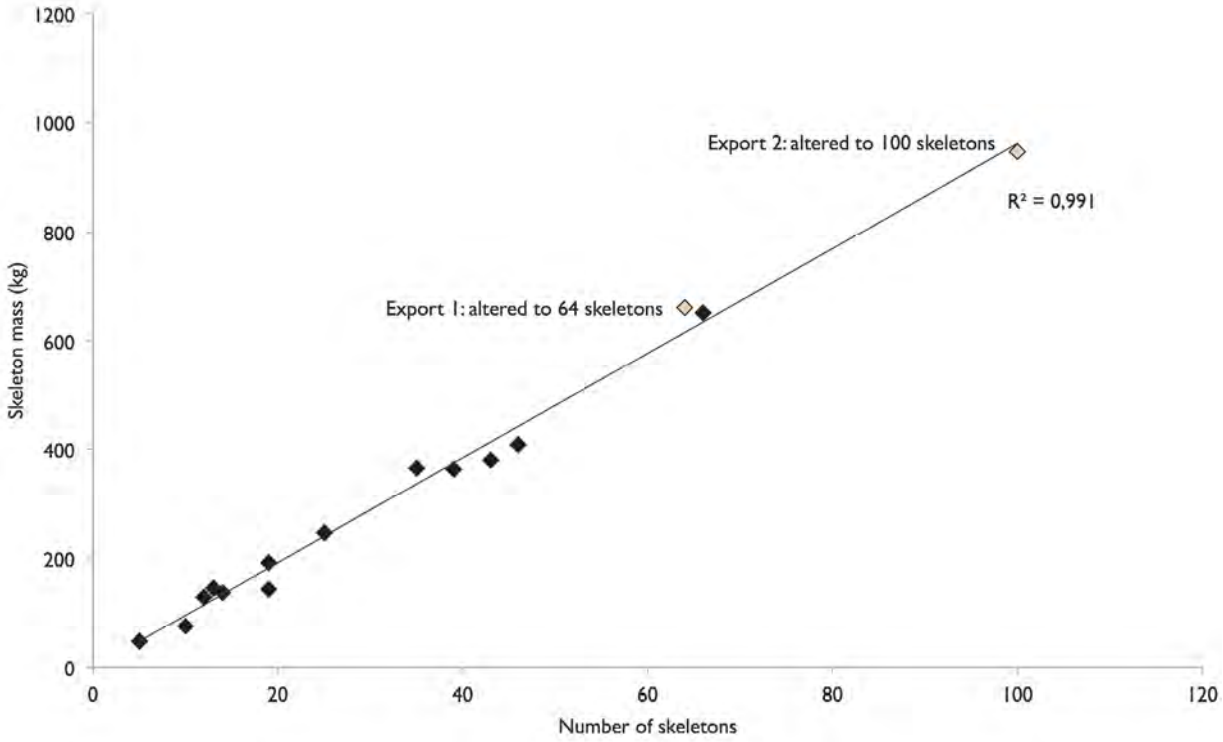


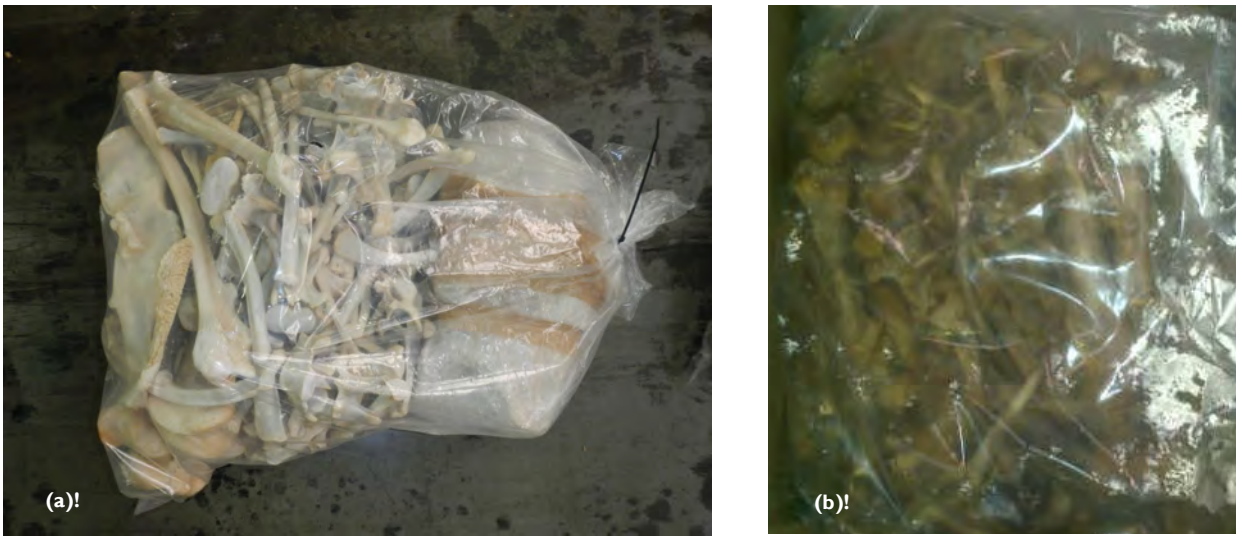
Figure A4 Revised linear regression with the anomalous data two exports corrected for. See Appendix 5 for larger version of this graph that can be used to crosscheck declared quantities of exported skeletons

The assumptions made thus far when calculating the average mass of a Lion skeleton are that the skeletons are: (1) of mixed sex, (2) of mixed age, and (3) are derived from a mixture of non-trophy hunted and trophy hunted animals (i.e. with and without skulls respectively). Therefore, the estimate takes into account normal variations in the mass of skeletons of different sexes, ages and skeleton completeness.

A subsample of 34 bags of skeletons derived from two consignments that were being exported with skulls (Figure A5a), without the skulls (Figure A5b), and unknown skull presence/absence was made available to this study (Table A17). The skeletons with skulls weighed on average 2.15 kg more than the skeletons without skulls.

Table A17 Average mass of a subsample of 34 bags of Lion bones with and without skulls (refer to Box 4 for overall mean)

	Number of bags	Mean ± S.D
Skeletons with skulls	10	9.05 ± 2.34 kg/bag
Skeletons without skulls	10	6.90 ± 0.74 kg/bag
Skull presence/absence not recorded	14	9.83 ± 1.43 kg/bag



(a) © VIVIENNE WILLIAMS; (B) © *"ANONYMOUS"*

Figure A5 Bags containing one Lion skeleton each with **(a)** a skull, and **(b)** no skull, *en route* to East–Southeast Asia

BOX 4: Summary of lion skeleton and skull mass (excluding juveniles)

1. Skulls weigh: **1.34 ± 0.45 kg** (range: 0.72 – 2.68 kg) (*n*=71)**
2. Skeletons of mixed age and gender and unknown completeness (i.e. presence of skulls mostly not known) weigh: **9.28 ± 1.30 kg/skeleton** (*N*=13 consignments + 2 museum specimens totalling *n*=414 skeletons) (range: 6.25 – 11.23 kg)
3. Adult skeletons of mixed gender with skulls weigh: **9.05 ± 2.34 kg/skeleton** (*n*=10) (range: 6.5 – 13.0 kg) (Table A17)
4. Adult skeletons without skulls (likely trophy males) weigh: **6.90 ± 0.74 kg/skeleton** (*n*=10) (range: 6 – 8 kg) (Table A17)
5. Taking into consideration the standard deviation of the mean for estimates in (2), (3) and (4) above, the combined normal range (95% confidence interval) for the mass of an adult lion skeleton is **6.16 to 11.39 kg**.

** Unpublished data: determined from 71 skulls (crania and mandibles): from the Ditsong National Museum (Pretoria, South Africa), the Oxford University Museum of Natural History (Oxford, U.K.), the University of the Witwatersrand (Johannesburg, South Africa), and Hwange National Park (Zimbabwe)

Appendix 5: A Guide to the Mass vs. Number of Skeletons in Consignments of Exported Lion Bones

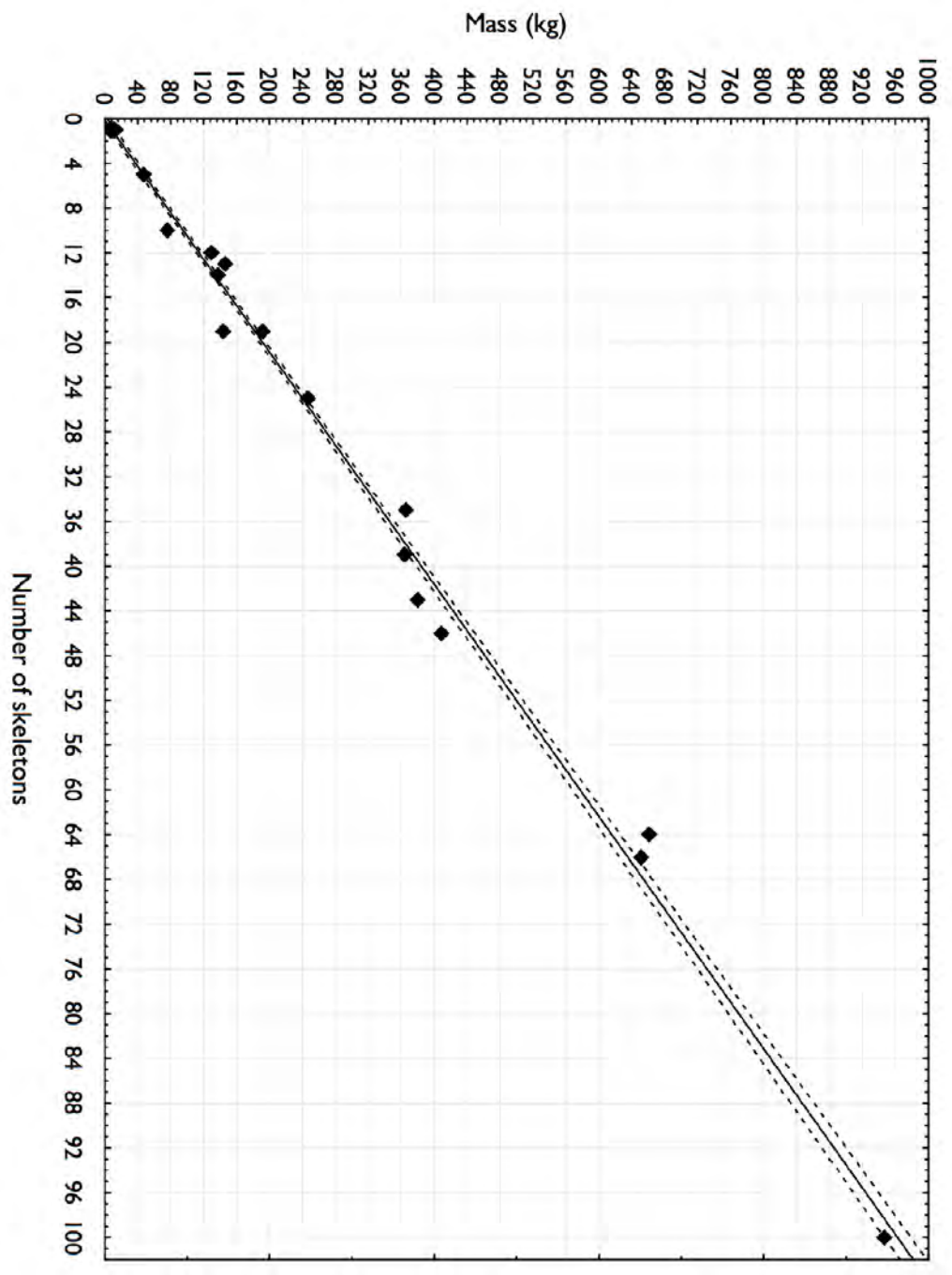


Figure A6 A guide for CITES permit issuers and others on what a consignment of a specified number of cleaned lion skeletons of varying completeness should weigh. The information is derived from 515 skeletons consolidated into 16 consignments. Dashed lines parallel to the regression (solid line) indicate the range within 95% of the mean. y=9.6456x–1.4851; R^2=0.993

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