

THE LEOPARD

THE WORLD'S MOST PERSECUTED BIG CAT

Luke Hunter and Guy Balme

For 18 months, we followed him, recording his every move and sharing the ordeals faced by a young leopard in an environment wrought with obstacles and dangers. We saw him first as a timid sub-adult, furtive and unsure of his social status, watching him as he grew into a confident territory holder, master of his home range and the females that resided within. We experienced his first bungling attempts at hunting, hopelessly challenging giraffes and rhinos, through the transition to ultimate killer, capable of pulling down a fully-grown wildebeest bull many times his own weight. We witnessed the colossal battle in which he toppled the local resident male, crushing cervical vertebrae in the fatal bite, leaving his rival crippled and bleeding to die under African stars. We observed as he sired his first progeny, mating dozens of times with an experienced old female whose range overlapped his, and four months later we enjoyed a rare glimpse of the result: three spotted bundles, completely defenceless with eyes tightly shut. And then, in a second, he was gone. Shot for straying onto a nearby game farm where the landowner viewed all predators as vermin. A threat to the farmer's antelope, natural prey to the leopard. The carcass buried and his tanned skin mounted on a bed of felt for someone's floor. A lifeless, fading testimony to the epic odyssey endured by a big cat in a world prejudiced against his existence.

The story of M5 — the fifth leopard added to our study exploring the effects of hunting on the species in KwaZulu-Natal — is a familiar one. Throughout Africa, there are few countries where leopards are safe once they leave reserves and National Parks. Although legally protected in most nations, leopards are widely considered so common and widespread that, as in South Africa where M5 lived and died, they are effectively treated as vermin outside protected areas. It means that more leopards are killed every year than any other large cat.

Of course, that is partly because there are lots of them. The most widespread large cat, with a global range that comprises at least 80 countries (about half in Africa), the leopard is the only African cat inhabiting rainforest to desert and all habitats between. Except perhaps for the African Wild Cat (which may cease to exist as a pure species in a matter of decades as its genetic purity is eroded by hybridization with domestic cats) and the Caracal, there is no other cat in Africa so ubiquitous. It begs the question, should we even care how many leopards are killed? The answer lies in very recent history, when extinction seemed a possibility even for the adaptable leopard.

The cause of the leopard's near miss with oblivion was fashion. By 1969, over 50 000 leopards were being killed each year in Africa to supply the demand for high-priced fur coats, mainly in Europe, Japan and the United States of America. Responding to a growing awareness that the rates of harvest were not sustainable, the United States listed

the leopard as an endangered species in 1972. Under the US Endangered Species Act (ESA), any trade in leopards — living or dead and parts or products of them — was immediately prohibited. The listing heralded the collapse of the trade in leopard furs. In the US, it effectively ceased overnight. Elsewhere — Spain, France, Italy, Scandinavia and Japan — the demand for spotted cat skins persisted for a few years but the tide of public sentiment was against the trade. During the 1970s, tolerance for spotted fur coats was already ebbing when the launch of a well-orchestrated advertising campaign saw them become unacceptable by the end of the decade. (All, however, is not yet over in this saga — in a breath-taking display of poor taste and ignorance, the February 2004 fashion pages of the New York Times celebrated a revival in the wearing of spotted cat fur coats on the super-hip avenues of Manhattan).

HUNTING THE LEOPARD

The US listing also prohibited American hunters from importing their trophies. At the time the Americans instituted their ban, the first multi-national effort to regulate international trade in endangered species was emerging. In 1973, the inaugural meeting of CITES (Convention for the International Trade of Endangered Species) classified leopards as an Appendix I species. Although comparable to the US category of endangered, Appendix I of the Convention does not exclude all trade. In fact, from 1975 (when CITES became effective), the import of hunting trophies has always been permitted provided the scientific authority of both the importing and exporting nations is able to demonstrate that trophy hunting is sustainable. Even so, the ESA held sway. As long as the US continued to ban all commerce in leopard skins, other nations were nervous about permitting the movement of hunting trophies. Even though commercial traffic in furs was banned, many countries felt that permitting trade in trophies would foster the re-emergence of the trade.

So began a decade-long campaign from the sport-hunting lobby to reclassify the leopard as a Threatened Species in America, a distinction allowing them to bring their hunting trophies back to the US. In 1982, the legislation was passed. The US re-classified the leopard as Threatened in all countries south of an east-west line connecting Kenya to Gabon; elsewhere in Africa, the species was (and is still) classified by the US as endangered. The following year, CITES approved the first requests from seven southern and East African nations to export leopard trophies. The leopard remains today a CITES Appendix I species, banning commercial trade in skins, but permitting import and export of hunting trophies between countries.

Today, 11 nations are permitted exports of leopard trophies under the approval of CITES (Table 1). Although commercial trade is



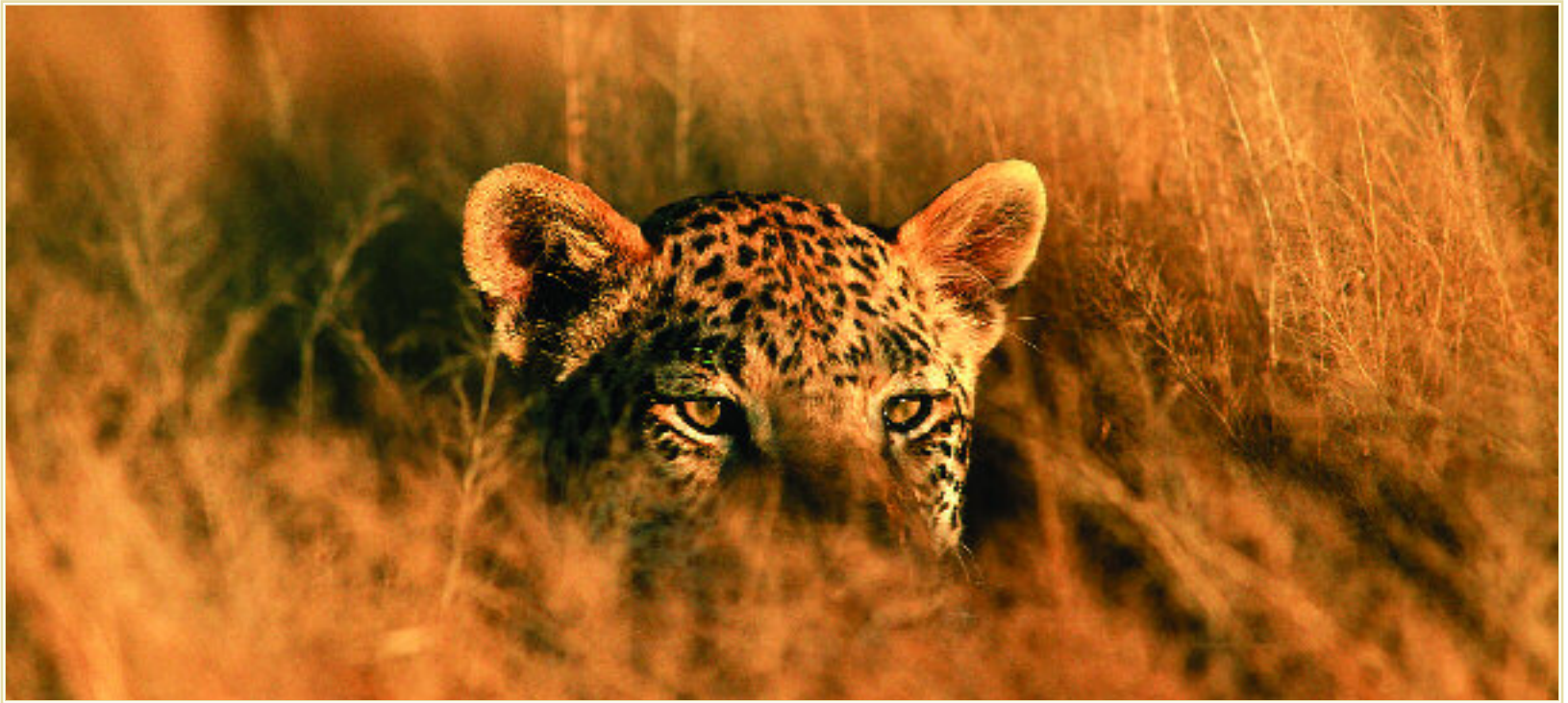


Photo: Martin Harvey

prohibited, quotas can include skins from animals killed in government ‘problem animal control’ (PAC) operations which is why leopard skin rugs are sometimes for sale in the airport curio shops of these countries. Gabon does not allow trophy hunting but has approval to sell five such skins. In total, the number of leopards approved by CITES for export each year is 2 345 (including a quota for five live leopards for the Democratic Republic of Congo).

In most countries, hunters actually shoot fewer leopards than is permitted. In 2001, the most recent year for which CITES has published figures, only 741 animals were reported as exports. Tanzania stands alone as the only nation that consistently harvests its entire quota. Indeed, as of November 2002, Tanzania applied for and was granted approval to double its quota from 250 to 500 leopards killed per year.

For such a widespread species, 2 000-odd animals does not seem excessive. It is certainly a far cry from the 50 000 cats killed in the heyday of the fur trade, and 2 340 trophies does not threaten the leopard as a species. But the key issue to guard against over-hunting is numbers; how can a country set a quota unless it knows how many leopards there are? This is especially critical when hunting is permitted in localized and isolated populations. Tanzania’s quota of 500 may seem sustainable when tallied against a national population in the thousands, but it depends where those 500 are being shot. To address these questions, CITES charged two scientists in 1987 with the Herculean task of estimating leopard populations throughout the 38 sub-Saharan African countries in which they still survive. Rowan Martin, then of the Zimbabwe Department of National Parks and Wildlife Management, and Tom de Meulenaer, a Belgium biologist, used a computer model to provide the answer.

The model assumed reasonably that leopard numbers were governed by the availability of suitable habitat and abundance of natural prey. To estimate the latter, Martin and de Meulenaer used local rainfall, based on a reliable correlation between rainfall and

herbivore numbers established for savannah habitats in East Africa. When the model had done its work, the total leopard population for sub-Saharan Africa was estimated at more than 714 000 animals. South Africa alone was found to host 23 472 leopards.

It only takes a second’s scrutiny to realize that these are impossible figures. South Africa’s estimate becomes absurd when one considers that the Kruger National Park, largest of the country’s protected areas and excellent leopard habitat, actually only holds around 900 individuals. Following the publication of Martin and de Meulenaer’s figures, Peter Norton, a South African specialist on leopards, estimated populations individually for each habitat type in the country and came up with a total of just 2 390, an order of magnitude differential. He, along with many other carnivore biologists, wildlife managers and mathematicians, declared the model so flawed as to make it virtually worthless and concluded that we “should just accept that it is impossible to achieve any real estimate of the numbers of leopards occurring in Africa.”

Norton is probably correct, certainly for the entire continent where a total population estimate would still be little more than a guess. But for those countries harvesting leopards, surely quotas must be based on reliable figures? In fact, most countries still have no idea how many leopards they have. Tanzania has a lot of leopards but it cannot say how many; is it reasonable therefore to assume that shooting 500 is not having an impact? Presumably, time will tell but in the meantime, Martin and de Meulenaer’s inflated estimates are still quoted at CITES meetings. For most nations, particularly those wishing to increase the number of leopard skins for export, Martin and de Meulenaer’s model is the only estimate they have, and its overblown figures help their cause.

Importantly, to argue for its 2002 doubling in quota, Tanzania commissioned a new study that incorporated greatly improved data including the results of radio-tracking research, a detailed analysis of hunting effort and remote sensing habitat information. The study did



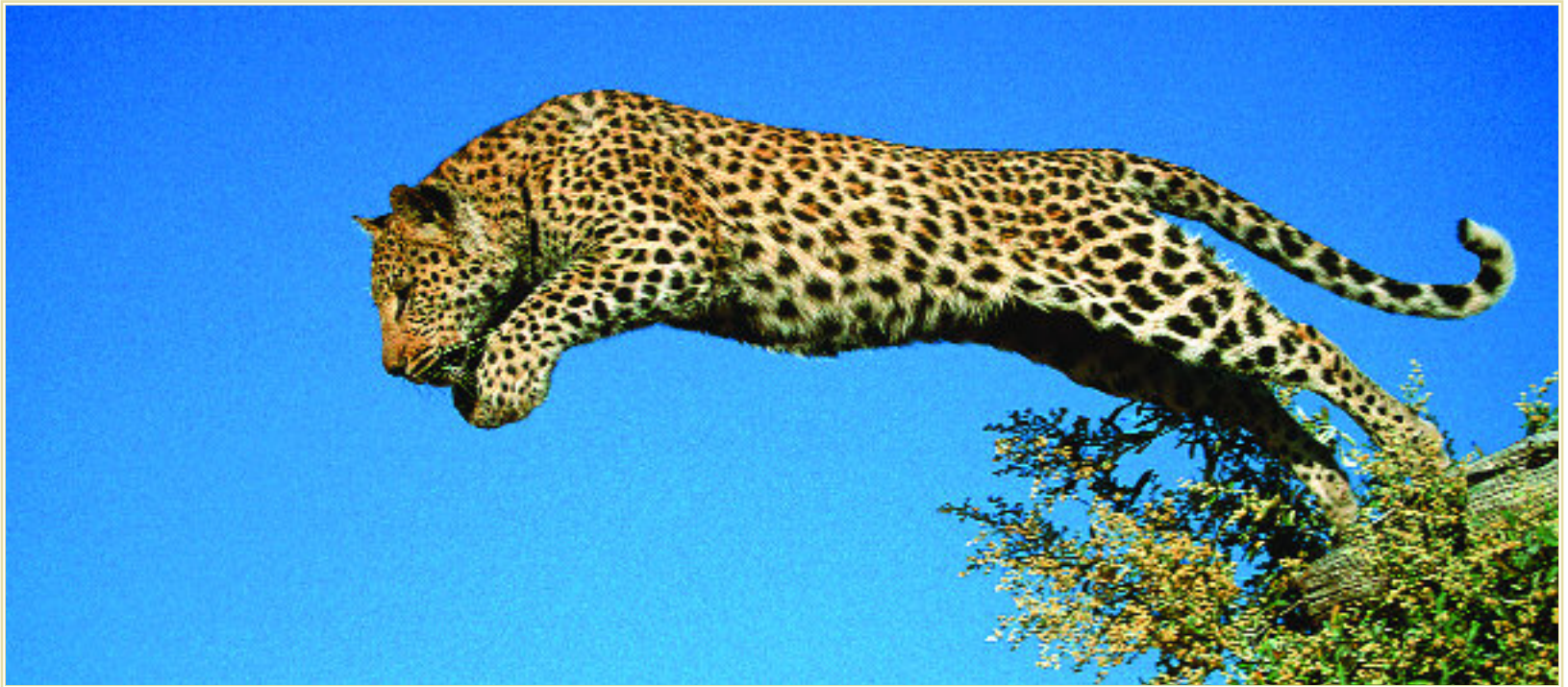


Photo: Martin Harvey

not attempt a total population estimate, but it did conclude that an increased quota would not threaten the leopard population. The Tanzania survey is a considerable improvement on Martin and de Meulenaer's estimates, yet it includes some disturbing omissions. Among them, even though it is legal to only shoot males in Tanzania, a genetic analysis of 77 trophies from 2000 by Goran Spong and colleagues revealed that over 28% were females. Many hunting companies refused Spong's requests for samples, which raises further questions about the industry's willingness to self-regulate. Shooting females has far greater potential to impact on leopard populations than male-only quotas, yet even now, with off-take twice as high, it does not feature in Tanzania's thinking about setting quotas. Worse still, some countries with CITES quotas permit hunting of females, but even they make no attempt to understand the effects of removing females.

Fortunately, questionable science notwithstanding, current levels of trophy hunting are very unlikely to fuel the over-exploitation threat as the fashion for fur coats once did. Nonetheless, CITES regulations remain crucial, not only to protect the leopard as a species but to protect national and local populations of them. Leopard populations in many countries are too fragile to permit trophy hunting, partly the reason why only 11 nations currently have CITES quotas. All those 11, while probably boasting robust national populations, also have a patchwork of small, fragmented populations now too denuded to sustain the additional pressure of hunters. How they ended up that way represents a far greater danger to the leopard.

ON THE HORNS OF A DILEMMA

As with the great majority of species on the planet, loss and degradation of habitat is the foremost threat to the leopard. According to one recent estimate, at least 50% of the original habitats in Africa have been destroyed with some of the greatest losses occurring from the savannah and forest biomes, habitats normally

home to the highest leopard densities. Predictably, intensification of agriculture, the spread of semi-subsistence farming and deforestation are the engines of this devastation. But even more inevitable, the proliferation of livestock is responsible for thousands of leopard deaths every year. As natural prey disappears, leopards, like many large carnivores, are forced to take livestock. The number of leopards killed in retaliatory or preventative problem animal control across Africa far outnumbers those shot by sport hunters.

This is hardly surprising. Leopards do kill livestock and pastoralists should be permitted to protect their livelihood. But in general, livestock losses to leopards are low. In Namibia, interviews with ranchers by the Veterinary Services Department showed that leopards were responsible for an average annual loss of 320 cattle and 375 sheep and goats between 1986 and 1991. Nationally, these losses amounted to only 0,03% of the total cattle holdings, and 0,01% of total small stock. Deaths from other, preventable factors such as nutritional problems, haphazard husbandry and poor management comprised a far greater percentage.

Leopards are also widely blamed for depredation caused by other predators. In northern KwaZulu-Natal, leopards are regularly killed for stock losses actually committed by Spotted Hyaenas and, most often, domestic dogs. Further, as is true for many carnivore species, when leopards do kill stock, a handful of individuals typically accounts for most losses. Of nine leopards monitored on a Kenyan ranch where wild ungulates were also present, only one individual habitually took livestock. Stock killing is more likely to be committed by males than females and more often by dispersing sub-adults than resident adults. Males become stock-killers because they have larger ranges and are more likely to encounter livestock, while young, inexperienced leopards mostly kill livestock because it is easier to tackle than natural prey. Critically though, they often have no choice. Many young adults are driven onto farms and ranches because there is no space for them in protected areas.





LEOPARD FACTS

Leopard *Panthera pardus*

Size: Highly variable, depending on productivity of habitat. Savannah and woodland leopards are generally largest while mountain and desert animals tend to be smaller. Males exceptionally up to 91kg, average 31-65kg; total length up to 2,3m, average 1,8m-2,1m. Females 17-58kg, total length average 1,7-1,9m.

Habitat: Occurs in all habitats except the most arid desert interior. Reaches highest densities in woodland savannah.

Diet: Very diverse, ranging from insects to adult male elands (900kg). Preferred prey generally mammals between 20-80kg range. Hoists kills as large as 125kg into trees to avoid scavengers. Plucks fur prior to feeding which usually begins at the underbelly or hind legs. Occasionally cannibalistic, and scavenges.

Reproduction: Gestation 90-105 days, litter size 1-4, average 2-3. Cubs weaned at 3-5 months, sexually mature at 2-3 years. Age at first breeding, females 30-36 months; males, 24-36 months. Oestrus lasts for about 7 days and occurs in approximately 46 day cycles. Inter-litter interval, 15 months to 2 years. Both sexes are fertile until age 19 in captivity but almost certainly never survive to that age in the wild.

Longevity: Up to 21 years in captivity, recorded up to 15 in the wild but probably averages 10-12.

Status: Safe in many conservation areas, able to exist outside them but often at far lower densities (as low as 0.01% of that in protected areas). Critically endangered in North Africa and likely endangered in parts of West Africa and north-east Africa.

Biographical notes: Luke Hunter and Guy Balme.

Many leopard deaths could be avoided by removing actual culprits rather than just any leopard. Indeed, a recent global review headed by Wildlife Conservation Society biologist Adrian Treves, found that up to 71% of large carnivores killed in depredation operations worldwide bore no evidence of involvement in conflicts. It is rare for control operations to specifically target the individual responsible for livestock damage, mainly because it requires less effort to simply remove any individual unfortunate enough to be in the area.

This is puzzling, given how effective some modern options can be. Fitting stock with toxic collars impregnated with poison delivered when a predator goes for a throat bite, is extremely selective and ensures that only the perpetrator is killed. Toxic collars have been used with success on coyotes and wolves in the Northern Hemisphere, and a handful of ranchers are now experimenting with them in Africa. Similarly, aversion training, in which livestock carcasses are injected with a nauseating compound that provokes violent vomiting also hold some promise. One repeat-offender in Kenya stopped killing sheep entirely after feeding on a carcass laced with lithium chloride. Even dogs specifically bred for guarding livestock can be effective against leopards. Large breeds such as the Anatolian shepherd or Akbash are not entirely invulnerable to leopards, but they can deter many potential offenders, especially young adults. In Namibia, an Anatolian shepherd dog recently killed a leopard in defence of its herd.

More so than new devices or even dogs, farmers can curb stock losses dramatically by implementing a few simple and intuitive improvements to the way they manage their herds. These include limiting birth seasons to winter months when vegetation is less dense, corralling stock at night, and permitting wild prey species to co-exist with livestock to provide the leopard with a dietary alternative. Of course, all these strategies require money or, at least, some planning. Most are not especially expensive but all cost more than a bullet, gin-trap or poison. It remains the case that, unless people are somehow motivated to exercise a little additional effort, a great many leopards (and indeed other large carnivores) will be killed wherever there is livestock.

LEOPARDS AND PEOPLE AS COMPETING PREDATORS

If herders, ranchers and other livestock owners across Africa adopted some of these techniques, the leopard's conservation problems would be solved. Not entirely, though. Leopards face a further challenge where even these innovations will not work; where people and leopard compete for the cat's natural prey. In two very different contexts, commercial game farms in southern and East Africa, and the rainforests of Central and West Africa, leopards are threatened because they are in direct competition with people for their natural prey.

On the game farms, leopards are persecuted outright. As with M5, the leopard who began our story, leopards are perceived as a problem because they kill wild ungulates that somebody owns. Exemplified in South Africa where private landowners are legally permitted to sell the wild antelopes on their land for hunting trophies, venison or as



REPORTED EXPORTS OF LEOPARD (<i>Panthera pardus</i>) SKINS 1999-2001. Source: CITES.				
Country	1999 export	2000 export	2001 export	2004 Quota*
Botswana	115	124	54	130
Central African Republic	11	22	26	40
Ethiopia	0	0	0	500 (2002 quota: 215)
Gabon	No quota sought	No quota sought	No quota sought	5
Kenya	1	0	0	80
Malawi	0	no report	no report	50
Mozambique	42	51	26	60
Namibia	45	61	55	100
South Africa	15	37	35	75
Tanzania	259 (includes 23 specimens collected in previous years)	248	260 (includes 16 specimens collected in previous years)	500 (pre-2003 quota: 250)
Zambia	76	55	10	300
Zimbabwe	131	185	275	500

*Quota is the upper limit permitted, not necessarily the number taken.

live sales (usually to other game farms), and faced with greater losses than cattle owners, game farmers are even more hostile to leopards than are the herders and ranchers.

In the rainforests of equatorial Africa, the problem is thornier. There the issue is also one of over-hunting, not particularly of leopards (although they are persecuted opportunistically) but of their prey. In Gabon, researcher Philipp Henschel has discovered that bushmeat hunting by people targets exactly the same species preferred by leopards – small and medium-sized antelopes, especially duikers. In some rainforest tracts where bushmeat hunting is intense, there are no longer any leopards. Leopard ecology in the rainforest is still too poorly known to conclusively link competition from people to leopard disappearance, but the fact remains that leopards are vanishing from habitats once thought to be inviolate. In many seemingly pristine African rainforests, researchers are forced to acknowledge the ‘Empty Forest Syndrome’ first described from Latin America – forests filled with trees but devoid of wildlife due to hunting for meat.

Is there any hope for these leopards? The catchphrase “if it pays, it stays” highlights the growing pragmatism of conservation across much of Africa. Indeed, the reason the great game reserves work is due, in large part, to the revenue they generate. Sadly, for leopards to also persist in many unprotected environments, they are going to need to prove their worth.

That brings us full-circle, back to hunting. Economic incentives to conserve big cats are few, and arguably the only two with real potential are trophy hunting and ‘eco-tourism’. Calculating the dollar value of a leopard is problematic, but without doubt, the accumulated worth of an eco-tourism-friendly big cat over its lifetime far exceeds the one-off return from shooting it. In their 1987 survey, Martin and de Meulenaer estimated that one female leopard habituated to vehicles at the Londolozi Game Reserve in South Africa, was worth approximately US\$50 000 a year. To shoot a leopard, a hunter pays up to around half that (and it may be considerably less), a small percentage of which is the trophy fee; the balance is made up of operator fees, accommodation and other

incidental costs.

So which is best? Gabon has opted for eco-tourism. With one of the newest and most comprehensive systems of protected areas anywhere in forested Africa, Gabon is now developing a tourism industry modelled on the decades-old one perfected by its neighbours to the east. It does not matter much that a leopard sighting in the rainforest is an exceedingly rare event; a trickle of paying tourists attracted by guaranteed viewing of gorillas, forest elephants, situngas and spectacular bird life may represent the birth of an economy that pays to protect the rainforest as a whole. If, as has happened in parts of southern Africa, the benefits of tourism flow from the parks to surrounding communities, people may ultimately gain the means to limit their meat harvests from the forest. Leopards will benefit not only in the parks (where some illegal hunting still occurs) but outside them where hunting is most intense.

On game farms, the potential for eco-tourism is even greater. Wildlife occurs at far higher densities in savannah woodlands than in the rainforest and is much easier to spot. But this kind of tourism requires the capital to build lodges, roads, and other infrastructure, and then successfully market the product in an industry saturated with options. Trophy hunting requires far less investment, mainly because far fewer ‘guests’ are needed to balance the books. International hunters pay much higher tariffs than most safari-goers, so while thousands of visitors each year make sure that Londolozi’s \$50 000 leopard pays her way, a hunting operation only needs a few successful clients to generate the same figure. As is the case on many private ranches across Africa, a small hunting camp occupied for a few months of the year creates enough supplementary income to make hunting a worthwhile sideline without incurring the costs of setting up a successful eco-tourism business.

But does it help leopards? In theory, landowners enjoying a profit from shooting leopards will begin to foster a population of the cats on their properties because they want to be able to get their quota next year, and the year after that. It is true in cases, but many game farmers shoot leopards with little thought for the future, believing that the supply will always be bottomless. Some landowners simply





Photo: Martin Harvey

want to rid their properties of leopards and turn as much of a profit as they can in the process. Perhaps the conservancy model will provide a remedy.

LEOPARD CONSERVANCIES

The 'Conservancy' is an emerging model which may balance the competing needs of the hunting and ecotourism industries while also ensuring the protection of leopard populations on privately owned land. At its core, the conservancy is an agreement among adjacent landowners – privately owned reserves, game farms and livestock land – to utilize leopards sustainably. Leopard harvests, either trophy hunts or problem animal removals, are established by consensus which, in the best scenario, is informed by science.

In the MunYaWana Leopard Conservancy in northern KwaZulu-Natal, six landowners have agreed to apply as a single entity for permits to hunt or remove leopards, and numbers are established by scientific methods that include radio-tracking and camera-trapping. The right to hunt leopards is allocated on a rotational basis that ensures all members have access to permits, but never in excess of the agreed-upon quota.

Still in its infancy, the Conservancy relies upon community coordination and compromise rather than members doing as they have always done, operating as independent entities. It is too early to tell whether it is working.

THE ENDURING LEOPARD?

There is no doubt that there are still many leopards in Africa. They are by far the most common of the continent's three big cat species, and their distribution extends into every available niche except for the hyper-arid depths of the Sahara. But as Henschel's work in Gabon demonstrates, we can no longer simply assume that the adaptable leopard will always persist.

Leopards were largely extirpated from the narrow belt of forest running along West Africa's coast by 1945. Bwindi Impenetrable National Park, the jewel in Uganda's conservation network and still home to mountain gorillas and chimpanzees, lost its leopards in the

1960s and they appear to have vanished very recently from Cameroon's Banyang-Mbo Wildlife Sanctuary. In North Africa, a few individuals may remain in the mountains of Morocco, but the species there is effectively extinct.

The leopard is the most resilient, the most adaptable and the most widespread of Africa's big cats. In most areas, it will always be the last of the three to disappear. But if that is our standard for conservation, then we have already failed.

USING CAMERAS TO COUNT LEOPARDS.

Elusive, solitary and nocturnal, leopards are exceedingly difficult to count. It clouds the issue of sustainable hunting as no country can reliably state how many leopards they have or even how many there are in the regions where hunting is allowed. Pioneered with tigers in India and Nepal, camera-trapping may be the answer.

Triggered remotely when an animal passes by the camera, the resulting photographs allow individual leopards to be identified by their unique coat patterns. The number of animals photographed and the number of times each individual is 'recaptured' feeds some statistical calculations that produce the most accurate density estimates available for the species.

The technique also furnishes data on sex ratios and age structures as well as helping to calculate mortality rates and reproductive success by comparing results from surveys conducted over successive years. In Africa, biologists are counting leopards with camera-traps in Gabon, South Africa and Tanzania, and they are widely used for leopards through their Asian range.

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