



ILLEGAL RHINO HORN TRADE IN EASTERN ASIA STILL THREATENS KRUGER'S RHINOS

LUCY VIGNE and ESMOND MARTIN

2018



South Africa has supplied many countries with white rhinos, as seen here in Kenya.



ILLEGAL RHINO HORN TRADE IN EASTERN ASIA STILL THREATENS KRUGER'S RHINOS

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The Aspinall Foundation
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Front cover: Rhino horn is commonly processed into pendants, sometimes with a dragon design for the Chinese market, as seen here for sale in Laos.

Title page: White rhinos

Back cover: The largest white rhino horns are the most popular for processing into large items that are sold in Vietnam, Laos, Myanmar and China to meet Chinese demand.

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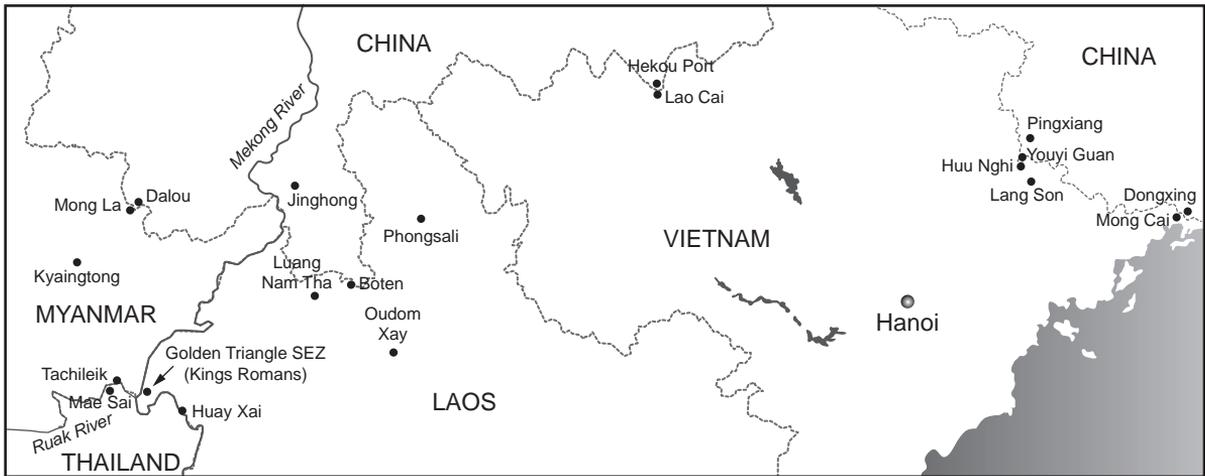
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Country boundary Park



Country boundary Park

Executive summary

✿ The aim of this study is to outline what is known about the recent trends in rhino poaching and the demand for rhino horn. We draw on published material, interviews and discussions with experts, and extensive fieldwork in South Africa and eastern Asia. Fieldwork in South Africa focused on Kruger National Park, as the area with the largest number of rhinos and hardest hit by poaching. Fieldwork in Asia, focusing on retail outlets, took place in China in 2014 and 2015, Vietnam in 2015, Laos in 2015 and 2016, and finally in Myanmar in 2017.

✿ In the 1800s there were thousands of white and black rhinos in South Africa, but most were killed by early settlers. The southern white rhino population in South Africa numbered perhaps only 200 by the early 1900s. By late 2012, however, there were about 19,000 white rhinos in South Africa, according to the IUCN African Rhino Specialist Group, and wild white rhino populations had grown in other countries following translocations of animals from South Africa. This represents a great conservation success story.

✿ In South Africa's Kruger National Park, the last black rhino was seen in 1936 at a time when white rhinos were locally extinct. In the early 1960s, Ian Player and other wildlife officials in Natal (now KwaZulu-Natal), where the last rhinos in South Africa survived, pioneered a scheme whereby the then Natal Parks Board supplied surplus white rhinos to restock other protected wildlife areas. Black rhinos were subsequently reintroduced to the Park from 1971 onwards, some from the Natal Parks Board and some from Zimbabwe. Their numbers grew, to over 10,000 white rhinos and more than 600 black rhinos in Kruger National Park by 2010.



White rhino



Black rhino and calf

❁ By 2016 poaching had reduced white and black rhino numbers in Kruger to an estimated 7,235 and 406 respectively. From 10 rhinos illegally killed in Kruger in 2007, poaching escalated, peaking at a reported 827 in 2014 before declining by 39% to 504 in 2017. For South Africa as a whole, over 1,000 rhinos have been poached every year since 2013, the majority in Kruger. Nevertheless, in late 2015 South Africa still had 20,506 rhinos (18,613 white and 1,893 black), representing 90% of Africa's white rhinos and 36% of Africa's black rhinos.

❁ Mozambicans and South Africans are the main poachers of rhinos in Kruger, especially poor people living near the Park. A long eastern border with Mozambique that is difficult to police and protect enables poachers (usually gangs of three) to cross into Kruger with high calibre rifles and escape with rhino horns back across the border. In 2008, 70% of the poachers in Kruger entered from the east. In response, security along the border with Mozambique was strengthened. As a result the proportion of poachers coming in the Park from the Mozambique side decreased to 45% by 2016.

❁ Attempts by law enforcement agencies and most notably Kruger's dedicated anti-poaching staff to respond to this ongoing threat to Kruger have reduced poaching levels, but these remain high. While the arrests of poachers have increased, few colluding officials and traders have been arrested and prosecuted.

❁ A paramilitary strategy was introduced to protect wildlife in the Park but has struggled to contain the poaching. Staff who were interviewed noted that the lack of coordination among government departments contrasts with the efficient operations of the illegal wildlife traders. There were still not enough rangers or trained dogs; moreover there was inadequate use of intelligence, and a lack of effective cooperation with agencies outside the Park. Theft of rhino horns from provincial stocks further encouraged illegal traders. The communities surrounding the Park generally feel marginalized and unheard; they do not benefit from the Park so do not support the anti-poaching efforts. They dislike the Park's 'fortress conservation' approach and some are themselves poachers.

❁ As the illegal trade has grown, Kruger's revenue from sales of live rhinos has decreased, and the increased cost of protecting its rhinos is substantial and, some say, unsustainable. In addition to the financial losses there is also a mounting human cost. Some poachers are killed in combat, and rangers also fear for their lives daily. If a poacher is killed in combat, resentment and desire for revenge builds up in the surrounding villages. More young men are spurred on to side with the criminal kingpins, who supply them with arms and ammunition and the chance to make a lot of money by poaching.



White rhino



White rhino

❁ Smuggling of Kruger's rhino horn continues unabated. Poached rhino horn leaves Africa through Mozambique or South Africa, mainly destined for Vietnam en route to China. Other countries in eastern Asia, notably Laos and Myanmar, have become involved in the cross-border trade in rhino horn, mainly to meet Chinese demand. Traffickers take advantage of weaknesses in governance all along the chain. In Africa and Asia there is corruption among officials who are sometimes bribed to turn a blind eye to illegal transactions and shipments of rhino horn, or are even more directly involved in the crimes.

❁ Criminal wildlife traders have become very sophisticated and there are high profits to be made from the trade in rhino horn. In 2016 poachers received an average price of USD 2,273/kg for an average 5-kg pair of rhino horns from Kruger. (For comparison, the minimum monthly salary in Mozambique in 2016 was USD 47/month.) The horns were sold by criminal middlemen for an average of USD 8,749/kg to Vietnamese, Chinese, Mozambican and South African exporters. An exporter based in South Africa received about USD 16,000/kg for a full horn from a trafficker in Asia. Traffickers sold the imported rhino horn to dealers for a wholesale price (based on 2016 prices in Vietnam) of around USD 26,000/kg.

❁ Thus the money made illegally from selling the horns of Kruger's rhinos is huge. In 2016, when 662 rhinos are known to have been poached, the horns of about 86% are estimated to have reached illegal markets. Based on estimates of average weights of horns and prices paid to poachers, this represents 2,835 kg of rhino horn, for which poachers received USD 6,466,685. Based on the wholesale price in Vietnam of USD 26,000/kg, these horns from Kruger could have been worth, on the illegal wholesale market in Asia, an estimated USD 73,710,000.

❁ Most of the principal kingpin traders are based in Indochina and China. At present most rhino horn leaves South Africa as whole fresh rhino horns. However, there are concerns that rhino horn is being processed in South Africa prior to export, which will make detection more difficult until more effective means of tracing it are found.

❁ Rhino horn was historically important in Asian culture and there is a long history of trade in rhino horn from Africa and within Asia. From 1977 in accordance with the provisions of CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora), almost all international trade in rhino horns from all five species has been illegal amongst member states. In the 2000s, however, despite the CITES ban, demand soared among Vietnamese and Chinese consumers. Wholesale prices escalated, peaking at USD 60,000–65,000/kg in 2012. Prices then fell by rough half in the region to about USD 30,000 in 2015 and have generally been around USD 20,000–26,000/kg since late 2016. It appears that the fall in price that started in 2014/2015 was due to a sudden increase in supply relative to demand for wholesale rhino horn at that time.

❁ Legal sales of antique rhino horn in China's auction houses increased from 2005 onwards, with an exponential growth from 2009 to 2011, as thousands of antique rhino horn libation cups, rhino horn carvings and old rhino horn trophies were sold by auction to avid Chinese collectors and investors. This trade also functioned as a grey market for illegal trade in non-antique rhino horn products, until the government prohibited auction sales of rhino horn products on 15 December 2011. Buyers and sellers of rhino horn then had to look elsewhere to conduct their trade. Also in the early 2000s, Vietnamese traders began importing rhino horn from South Africa. Some of these horns initially came from animals shot by Vietnamese 'pseudo hunters', who obtained legitimate permits to hunt rhinos for their horns as trophies. These 'trophies' could thus be legally exported to Vietnam under the provisions of CITES. The rhino horn was then smuggled over the border into China or sold illegally in Vietnam to newly-rich Vietnamese and Chinese, both as a status symbol and as traditional medicine. Traders in Vietnam started to manufacture plain jewellery items made out of rhino horn, which could be produced quickly and required few if any carving skills, and these luxury products became increasingly sought after for power, protection and prestige, especially amongst Chinese consumers.

❁ The activities of Vietnamese traders expanded into neighbouring Laos, strategically positioned between Vietnam and China, where Chinese shops steadily increased in number, especially from 2014 onwards. Poor law enforcement in Laos means that these shops can openly display rhino horn

accessories, as well as leftover chips and shavings for traditional Chinese medicine to the growing numbers of Chinese workers and tourists in the country.

✿ During our fieldwork, we were offered genuine rhino horn on display for sale in retail shops in all four countries visited with very few openly seen in the retail outlets of China. Nevertheless the Chinese are the principal consumers of rhino horn in the region.

✿ A survey in Laos in late 2016 found 163 rhino horn items on display in shops in three principal locations: Vientiane, Luang Prabang and the Kings Romans casino complex in the Golden Triangle Special Economic Zone. These were prominently on view in the front of glass display counters. Rhino horn items on display included large pendants, big bead bracelets and bangles (generally for men), and plain Chinese small cups and larger plain bowls. There were also packets and bottles of leftover rhino horn for medicinal use.

✿ Trade routes for rhino horn also reach Myanmar, which shares borders with Laos and China. The eastern town of Mong La has become infamous as a playground for wealthy Chinese visitors, with illegal wildlife products openly on sale, as well as prostitution and nearby casinos for Chinese gamblers. In late 2017 five Chinese retail outlets in one main district in the town were seen openly selling rhino horn items.



White rhino



White rhinos

❁ Most new rhino horn items for sale today are machine-made accessories that are sold per gram as they have no artistic merit. The dark centre part of the horn, being rarer, is more expensive and sells for about USD 100–150/g. The paler outer part of the horn costs about USD 40–100/g. The leftover bits used for medicine are less expensive, with prices ranging from USD 10 to 33/g according to our surveys carried out in 2015–2017.

❁ However, what is seen on view in the shops is the tip of the iceberg. As law enforcement is tightened in Vietnam and China, vendors in certain shops often keep rhino horn items, including whole rhino horns, locked up in back rooms. They are shown to interested Chinese customers, out of sight from the police or Western tourists who may disapprove. Nowadays rhino horn items are also increasingly on sale on social media and online trading platforms. Rhino horn trinkets have become increasingly available by this means, particularly for sale to the growing numbers of wealthy middle class in China.

❁ As long as prices and demand remain high and good profits can be made from the trade, organized crime networks will continue their involvement in rhino poaching and trafficking rhino horn. Law enforcement efforts to tackle the soaring illegal rhino horn trade in the 2000s have so far been unable to dismantle the big trading networks and apprehend the so-called ‘kingpins’ who control illegal trade in Africa and Asia.

❁ Poaching and smuggling of rhino horn is increasingly recognized as a serious crime and heavier sentences are being imposed on those caught and convicted. Law enforcement action has to be continuous, however, as the criminals reorganize over time and new people are brought in to replace those taken out of the system.

❁ Intelligence, if properly collected and analysed, can provide reliable information about sales, markets, consumer demand and, most importantly, the activities of the criminal networks. Government agencies are aware of the need to collaborate across borders and, if intelligence is shared and acted upon, it is one of the most cost-effective tools for law enforcement. The threat of trade sanctions, though rarely used, has worked before in putting pressure on governments to take effective action to end illegal rhino horn trade.

❁ A multi-pronged approach, looking at all the causes and symptoms of rhino poaching and consumer demand with fact-based evidence to guide policy decisions is the way forward. Only then can there be headway in reducing rhino poaching significantly in Kruger and securing the future of the largest rhino population in the world, and of rhinos everywhere.



White rhino

Part 1: Introduction

Background to international trade in African rhino horn

There are five species of rhinoceros: the greater one-horned (*Rhinoceros unicornis*), Sumatran (*Dicerorhinus sumatrensis*) and Javan rhinoceros (*Rhinoceros sondaicus*) in Asia, and the black (*Diceros bicornis*) and white rhinoceros (*Ceratotherium simum*), which are native to Africa. Rhino horns have been traded for centuries, mainly for the Asian market, where they were traditionally used for ornamental and medicinal purposes. Hunting and habitat loss over many years have reduced populations of all five species considerably. The Sumatran and Javan rhinos are now close to extinction (see Table 1). The population of greater one-horned rhinos was reduced to perhaps 200 individuals in India in the early 20th century (Rookmaaker et al. 2016) and an estimated 160 in Nepal in 1961 (Gee 1962), but thanks to conservation efforts has since recovered to more than 3,500 (Table 1).

Table 1. The world's population of rhinos estimated up to the end of 2015

Species	Number
White rhino	20,584
Black rhino	5,261
Greater one-horned rhino	3,557
Sumatran rhino	76
Javan rhino	63

Sources: Emslie et al. 2016; figures supplied by the IUCN African and Asian Rhino Specialist Groups (Emslie, pers. comm., August 2018).

In Africa, black rhinos were the most numerous species throughout most of the 20th century, numbering perhaps 65,000 in 1970 (Martin and Ryan 1970), but populations declined precipitously to an estimated 2,410 by 1995 (Emslie 2012). The crisis was averted, with populations slowly recovering to more than 5,000 today (Table 1). Africa's northern white rhinos numbered an estimated 2,230 in 1960 (Emslie and Brooks 1999), but the species is now extinct in the wild and only two captive females were left by mid-2018 (FFI 2018). The southern white rhino was on the brink of extinction at the start of the 20th century, with a mere 200 animals remaining in South Africa Rookmaaker 2002; Emslie and Brooks 2002), but numbers have since rebounded. By late 2012, there were about 19,000 white rhinos in South Africa, according to the IUCN African Rhino Specialist Group (AfRSG), and wild white rhino populations have grown in other countries following many translocations of animals from South Africa. This represents a great conservation success

story. With a population of over 20,000, the white rhino is now by far the most numerous of the five species in the world, and thus also the source of most rhino horn that is traded today (Table 1).

Since the start of the 21st century there has been a massive escalation in poaching and growth of illegal trade in rhino horn, with South Africa now hardest hit. This study explores the illegal trade, in both source and consumer countries, and its impact on Kruger National Park in South Africa, which is now home to the largest population of rhinos in the world.

The present crisis is the second time in less than 50 years that an upsurge in poaching has threatened rhino populations. In the 1970s and 1980s, poaching of African species was rife over much of their range in sub-Saharan Africa. Growing civil unrest and the increased availability of guns, originating from countries such as Chad, Central African Republic (CAR) and Sudan, made it easy to kill rhinos. These problems were compounded by general mismanagement, a lack of resources and corruption, including at the highest levels. The most important source of demand at this time was North Yemen. The economic oil boom from 1970 onwards had attracted many men from then North Yemen to Saudi Arabia, where they could earn money to send back to their families. The men could now afford *jambiyas* with expensive rhino horn handles instead of cheaper alternatives made of wood or water buffalo horn. These traditional curved daggers were worn daily by most North Yemeni men, but until then only the elite had been able to afford rhino horn handles. They were mostly crafted in Sanaa, the country's capital. This growing North Yemeni demand for ivory posed a dangerous threat to the survival of many rhino populations in Africa. The wholesale import price of African rhino horn rose dramatically from USD 100/kg in 1976 to 766/kg by 1980 (Martin et al. 1997).

In the 1970s nearly 8 tonnes of African rhino horn left the continent each year, representing a total of 30,000 mainly black rhinos killed in that decade for exports alone. Of these, over three tonnes of rhino horn were imported for the North Yemen market annually, representing 40% of the rhino horn on the world market. The other main importing countries for rhino horn in the 1970s were all in eastern Asia, principally China, Japan, Taiwan and South Korea. Hong Kong, Macau, Indonesia, Malaysia, and Thailand were also important markets for both Asian and African rhino horn for traditional medicinal use (Martin 1979, 1983).

Severe droughts during this period also killed thousands of rhinos in Kenya and Tanzania. During the 1980s, as both black and northern white rhino populations collapsed across most of their range, poaching spread to the southern region of Africa. By the mid-1990s, the impact of poaching to meet

the insatiable demand for rhino horn had hugely reduced the previously large populations of rhinos in Zambia and Zimbabwe.

As concern grew about the fate of rhinos in Africa and Asia, international pressure against the rhino horn trade built up. In the 1970s multilateral efforts to ensure that trade in specimens of wild animals and plants would not threaten their survival resulted in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), which was signed in Washington DC on 3 March 1973 and entered into force on 1 July 1975. By 1977 the international trade in rhino products from all five species was banned amongst CITES member states (the Asian species in 1975, white rhinos in 1976 and black rhinos in 1977). Japan was one of the first rhino horn consumer countries to join CITES and an import ban came into force there in 1980, following a last minute surge in trade as importers built up stocks in anticipation of the ban (Martin 1983; Kitade and Toko 2016). Although it took several years before all the other main consumer countries joined CITES, the provisions of the Convention were used as a benchmark by international agencies, governments and NGOs to increase pressure on all countries to crack down on the trade.

In 1982, for example, North Yemen enacted Ministerial Decree No. 193 of the Ministry of Economy and Industry prohibiting all rhino horn imports into the country. The authors of this report (LV and EM) worked with the government from the mid-1980s onwards to improve legislation and curtail the illegal rhino horn trade in North Yemen. As a result, in 1987, Ministerial Decree No. 29 of the Ministry of Supply and Trade prohibited the re-export of rhino horn (Martin et al. 1997). In 1990 North Yemen (Yemen Arab Republic) and South Yemen (People's Democratic Republic of Yemen) united to form one country, the Republic of Yemen, or Yemen. Following further meetings with ministers



Most jambiyas with rhino horn handles were made in Sanaa, the capital of Yemen.

and much encouragement, the country finally acceded to CITES on 5 May 1997 and the treaty came into force there on 3 August 1997.

In China, rhino horn had been used for centuries in art and traditional Chinese medicine (TCM). From the 1970s onwards, most of North Yemen's rhino horn chips and shavings left over from making jambiya handles were sent to China to make into patent medicines, which were a valuable export commodity. In North Yemen the price of rhino horn leftovers for export to China rose from USD 219/kg in 1983 to USD 340/kg in 1990 and USD 500/kg in 1993 (Martin et al. 1997). Following intensive international pressure, including the imposition of sanctions by the US government (see Part 3 of the report), China banned the trade in rhino horn products in 1993 (Vigne and Martin 1994b). Most of Africa's rhinos had been killed by then (Table 2).

Table 2. Population estimates of rhinos in Africa in 1980, 1984, 1995, 2012 and 2015

Country	1980	1984	1995	2012	2015
<i>Black rhino</i>					
Angola	300	90	0	1	0
Botswana	30	10	?	9	48
Cameroon	110	110	7	0	0
CAR	3,000	170	0	0	0
Chad	25	5	0	0	0
Ethiopia	20	10	1	0	0
Kenya	1,500	550	420	631	679
Malawi	40	20	2	26	26
Mozambique	250	130	?	0	2
Namibia	300	400	598	1,750	1,957
Rwanda	30	15	0	0	0
Somalia	300	90	0	0	0
South Africa	630	640	1,024	1,806	1,893
Sudan	300	100	0	0	0
Swaziland	0	0	9	18	20
Tanzania	3,795	3,130	32	127	133
Uganda	5	0	0	0	0
Zambia	2,750	1,650	?	27	32
Zimbabwe	1,400	1,680	315	424	471
Total black	14,785	8,800	2,408	4,819	5,261

Table 2. continued

Country	1980	1984	1995	2012	2015
<i>White rhino</i>					
Botswana	70	190	20	185	239
CAR ^a	20	1	0	0	0
DRC/Zaire ^a	<300	15	31	0	0
Kenya	25	33	122	394	444
Mozambique	30	1	0	1	29
Namibia	150	70	107	524	826
South Africa	2,500	3,234	7,095	19,112	18,613
Sudan ^a	300	10	?	0	0
Swaziland	60	60	41	84	76
Uganda ^b	1	1	0	14	15
Zambia	5	10	5	10	10
Zimbabwe	180	200	138	284	332
Total white	3,641	3,825	7,559	20,608	20,378
Total black & white	18,426	12,625	9,967	25,427	25,844

^a Northern white rhino

^b Northern white rhino in 1980/1984, southern white rhino in 2012/2015

Sources: Figures supplied in 1981 and 1984 by the IUCN African Elephant and Rhino Specialist Group, (Kes Hillman Smith, former Chair of the IUCN African Rhino Specialist Group, pers. comm., September 2018), Western and Vigne 1984, 1985; figures supplied by the IUCN African Rhino Specialist Group (Emslie, pers. comm., September 2018).

NB: CAR = Central African Republic; DRC = Democratic Republic of Congo

But in the late 1990s, just as black rhino populations were beginning to recover, a new threat was starting to emerge. In the 1980s, people in Vietnam and China had been among the poorest in Asia and could not afford to buy rhino horn. In the late 1990s and early 2000s, the governments of China and Vietnam began to relax their strict policies of state control and open up their economies to free trade. Traders from these countries made business connections with South Africa and discovered that rhino horn was available. This was like the opening of Pandora's Box. Latent demand for rhino horn was reawakened. Towards the end of the 2000s, there was a quantum leap in demand from Vietnam and China that triggered a huge increase in rhino poaching in South Africa. The trade in rhino horn soon spread to Laos and Myanmar, almost entirely to meet Chinese demand, where it was able to take root due to weak law enforcement and widespread corruption.

Background to rhino poaching in South Africa

In the 1800s there were thousands of white and black rhinos in South Africa, but most were wiped out by early settlers, who killed them for their horns and in general conflict. By 1900, the country had at most perhaps only 200 white rhinos (Rookmaaker 2002; Emslie and Brooks 2002) and very few black rhinos (Penny 1988).

Rhino numbers in South Africa remained very low throughout the first half of the 20th century. However, in the 1970s and 1980s, while the rhino horn trade decimated rhino populations in most of Africa, the number of rhinos in South Africa grew considerably (Table 2). This was thanks to very successful rhino conservation strategies that were based on giving financial value to rhinos. Starting in the early 1960s, Ian Player and other wildlife officials in Natal (now KwaZulu-Natal), where the last rhinos in South Africa survived, pioneered a scheme whereby the then Natal Parks Board supplied surplus white rhinos to restock other protected wildlife areas. Rhinos were also auctioned for sale to private individuals within the country and for export. The scheme provided significant revenue for state conservation agencies and this financial incentive encouraged wildlife officials to improve management of rhinos. Private game reserves expanded in number in South Africa, with increased rangeland for rhino populations, bringing more wealth to their owners from live sales, tourist game viewing and trophy hunting. Thus from the 1960s to the 2000s numbers of rhino rose quickly across the country on both public and private land.

For the country as a whole, 2012 marked the pinnacle for rhino numbers with population numbers reaching 19,112 white rhinos and 1,806 black rhinos, a total of almost 21,000 individuals (Table 2). This increase was and remains the greatest for any country in the world. By 2015, estimated numbers of white rhinos had fallen somewhat, but South Africa still had the largest populations of rhinos in the world, with 20,506 individuals, or 79% of all rhinos in Africa (Table 2). In late 2015 South Africa's 1,893 black and 18,613 white rhinos represented 36% and 90%, respectively of total populations of these two species. The largest numbers of rhinos of both species were in Kruger National Park.

The fall in rhino numbers between 2012 and 2015 was the result of a huge increase in the illegal killing of rhinos in South Africa that had begun several years earlier, in 2008. From 1990 to 2007, 275 rhinos were poached in South Africa (the majority in Kruger), i.e. an average of 15 a year. From 2008 to the end of 2016 more than 6,000 rhinos were killed, i.e. an average of 666 a year. This represents a 44-fold increase in average annual numbers of rhinos poached compared with the period before 2008. Based on data for

individual years the contrast is even starker: rhino poaching in South Africa shot up from 13 animals killed in 2007 to 1,215 rhinos in 2014, with numbers of rhinos poached falling only slightly thereafter to 1,054 in 2016 (Table 3). It is important to remember that these poaching figures, and similar data presented elsewhere in this report, should be considered minimum estimates as not all carcasses were found.

Table 3. Estimated rhino numbers in Kruger specifically and South Africa from 1993 to 2017

Year	White rhino		Black rhino	
	Kruger	South Africa	Kruger	South Africa
1993	2,250	6,376	200	897
1995	2,890	7,095	210	962
1997	3,643	7,913	205	1,043
2005	6,942	13,555	391	1,328
2007	8,629	16,273	400	1,456
2010	10,500	18,780	653	1,916
2011	10,621	–	489	1,877
2012	10,495	19,112	459	1,806
2013	8,968	–	414	1,860
2014	8,619	–	309–371	1,842
2015	8,875	18,613	384	1,893
2016	7,235	–	406	–
2017	5,142*	–	507	–

Sources: SANParks statistics, African Rhino Specialist Group and SADC Rhino Monitoring Group data, various years (Emslie, pers. comm., September 2018).

* Decline also a function of drought as well as poaching; – data unavailable

Objectives of this report

The aim of this study is to outline what is known about recent trends in rhino poaching and the demand for rhino horn. To this end we draw on published material, interviews and discussions with experts, and fieldwork in South Africa and eastern Asia.

Our fieldwork in South Africa focused on Kruger National Park, as the area with the largest number of rhinos and hardest hit by poaching. We carried out extensive interviews with Park staff and other experts during three visits to South Africa in 2016. Our fieldwork in eastern Asia, where traders offer illegal rhino horn for sale to the general public, took place in China in 2014 and 2015, Vietnam in 2015, Laos in 2015 and 2016, and finally in Myanmar in 2017. We visited shops selling rhino horn, recording the numbers and prices of items on display. We talked to vendors to find out more about their trade.

We learned about rhino horn processing today and collected information on smuggling routes and wholesale prices for rhino horn along the supply chain.

To understand why rhino poaching and the rhino horn trade has increased so dramatically, we examined internal factors affecting rhino poaching within South Africa and external factors driving demand in eastern Asia. We also considered the underlying conditions that sustain rhino poaching and the illegal trade, including the long history of trade, the high profit potential of rhino horn, inadequate law enforcement, and social deprivation in communities around Kruger.

By providing a summary of current knowledge, we hope the report will prove useful to policy makers in their efforts to develop effective ways to secure the future of wild rhino populations. By identifying knowledge gaps, we hope it will also serve as a stimulus for future research.



White rhinos in Kruger National Park have bred well and numbers have grown considerably in recent decades.

Part 2: Kruger National Park

Methodology of fieldwork

We visited different areas of Kruger National Park three times in 2016. In February, we met rhino experts from South Africa and various countries who were attending a meeting of the IUCN AfRSG held in the south of the Park. In March, LV went to the far northern section of the Park to observe the international boundary overlooking Zimbabwe and Mozambique and for eight days in September we stayed at Skukuza, location of the administrative headquarters of the Park. This was followed by further discussions when we attended the 17th Meeting of the Conference of the Parties to CITES (CoP17), held in Johannesburg from 24 September to 5 October.

During the AfRSG meeting in Kruger we took advantage of the opportunity to interview a number of participants, mainly wildlife conservationists and researchers about their efforts to combat poaching and the illegal trade in rhino horn in Asia. Later, in Skukuza we collected data and learned about the views of senior employees of South African National Parks (SANParks). We obtained prices paid to the poachers for Kruger's rhino horn and the first set of middlemen, and we ascertained the nationalities of poachers, details of any arrests or sentences, and where they had lived both at the time of arrest and in the past. We recorded methods used to kill rhinos in Kruger, how poachers remove the horns and what other parts of the animals are taken and for what purposes. We examined the trade routes from Kruger through to other parts of South Africa and Mozambique. We studied the government budget for Kruger and, in our discussions with Park staff, considered the ideal number of staff needed to protect rhinos in the field during this poaching emergency. We heard the views of Park staff on how the crisis could be overcome through intelligence, community involvement, and effective legislation against corruption and the illegal wildlife trade. We analysed data obtained during these visits to ascertain the weights and prices of rhino horn in South Africa.

At CoP17, we talked to representatives of the Parties, NGOs and observers present to learn about new developments in countries affected by rhino poaching and illegal trade. We listened to the debate on Swaziland's proposal to allow international trade in their white rhino horn (which was defeated) and noted any changes in policy, especially in South Africa, regarding rhinos.

History of rhinos in Kruger National Park

Kruger is one of the largest national parks in Africa. It is located in the northeast of South Africa and covers 19,500 km², which is about the size of Israel or Wales. Its boundary touches the international border with Zimbabwe to the north and runs along the border with Mozambique for more than 300 km on the Park's long eastern side. In 1898 Paul Kruger established a game reserve in the area, which he called Sabie Game Reserve. In 1926 it was named Kruger National Park. Since then, the government has extended the Park several times to its present size. It now is part of the Great Limpopo Transfrontier Park, a peace park that links Kruger National Park with Gonarezhou National Park in Zimbabwe and with Limpopo National Park in Mozambique.

Tourism began around 1927, when there were only 27 official visitors. Annual visitor numbers rose to 37,166 after World War II (in 1946). They reached 898,191 in the financial year 1999/2000 and about 1,700,000 in 2015/2016 (SANParks statistics, unpublished).

The Park has become famous for its large rhino numbers. Most rhinos (with about 24 times more white rhinos than blacks) are found in the south of the Park in what is now called the Intensive Protection Zone (IPZ) and there are excellent viewing opportunities for visitors in the Park's extensive grassland areas.

This represents a dramatic change from the situation in the first half of the 20th century when rhinos were virtually extinct in the area. In 1896 the last white rhino was shot dead in the game reserve area that later became Kruger National Park (Player 1972). In 1936, Ranger Kirkman saw the last black rhino in this area east of Skukuza village (Pienaar 1963). The restocking of Kruger National Park with white rhinos began in 1961, when four white rhinos were translocated from Umfolozi Game Reserve in Natal (today's Hluhluwe Imfolozi National Park). From June 1962 to September 1964 Natal Parks Board sent another 92 white rhinos to Kruger (Player 1967). By 1972, 351 white rhinos had been introduced into the Park (Ferreira et al. 2017). In 1971 Natal Parks Board donated 20 black rhinos to the Park. A year later 12 more black rhinos were translocated to the Park from the Zambezi Valley in Zimbabwe (Mike Knight, Chairman of the AfRSG, pers. comm., August 2017). By 1993 Kruger's white and black rhino populations had reached 2,250 and 200 respectively and 14 years later (2007) white rhino numbers had quadrupled to 8,629 and those of black rhinos had doubled to 400. In 2012, numbers for both species reached a high of 11,216, including 10,495 white and 7,235 black rhinos (Table 3).

Trends in poaching in Kruger have mirrored those in South Africa as a whole. Based on official records, numbers of rhinos poached in the Park rose from an average of 12 per year from 2001 through 2007, to an average of 336 from 2008 to 2014. The worst year for Kruger was 2014, when 827 rhinos were poached (Table 4). From 2012 to 2014, 65% of the total rhinos poached annually in South Africa were from Kruger. By the end of 2016, white rhino numbers in Kruger had fallen to 7,235 and those of black rhinos to 406, according to official SANParks statistics supplied to the AfRSG (Table 3). Thus, from a high of 11,216 for both species of rhinos in Kruger in 2012 their numbers had fallen to 7,641 by the end of 2016.

Table 4. Numbers of rhinos recorded as being killed by poachers in Kruger, South Africa and Africa

Date	Kruger	South Africa	Africa
2006	17	36	60
2007	10	13	62
2008	36	83	262
2009	50	122	201
2010	146	333	426
2011	258	448	532
2012	428	668	751
2013	609	1,004	1,123
2014	827	1,215	1,324
2015	826	1,175	1,342
2016	662	1,054	1,164
2017	504	1,028	1,112

Sources: Knight 2017; Emslie et al. 2016; figures supplied by SANParks and the IUCN African Rhino Specialist Group (Emslie, pers. comm., August 2018)

Legislation and policies affecting Kruger’s rhinos

South Africa became the 15th country to ratify CITES on 15 July 1975 and the Convention came into force in the country on 13 October 1975. CITES banned the international trade in rhino products from white and black rhinos in 1976 and 1977 respectively. However, in accordance with decisions taken at the 9th Conference of the Parties (CoP9) in 1994 and at the 13th Conference of the Parties (CoP13) in 2004 white rhinos in South Africa and Swaziland were put on Appendix II “for the exclusive purpose of allowing international trade in live animals to appropriate and acceptable destinations and hunting trophies”. At CITES CoP14 in Bangkok in March 2013, trophy hunting of black rhinos was also authorized in South Africa and Namibia with a quota

of five animals per country per year. There is a detailed set of criteria that has to be met before an application to hunt a black rhino can be approved, which are designed to ensure that decisions are made on conservation grounds first and foremost (Emslie, pers. comm., August 2018).

At the AfRSG meeting held in Tanzania in 2008, the Chair Mike Knight gave notice of a serious emerging threat to rhinos, due to a sudden surge in demand for rhino horn from Vietnam. Some Vietnamese in South Africa found a new way to obtain rhino horn, by applying for legitimate permits to hunt rhinos for their horns as trophies. Trophy hunting was being used as cover by a growing numbers of 'pseudo hunters' to acquire rhino horns, which were exported with legal permits as 'trophies' to Asia, where they entered the illegal trade, ending up for sale on the grey market in Vietnam and China. Some traders even paid Thai prostitutes living in Johannesburg to come to the rhino shoots in order for them to pose as hunters and obtain export permits, so the traders could get the rhino horns legally out of South Africa and into Vietnam. This has been well documented in the academic literature (Milliken and Shaw 2012; Rademeyer 2012 and 2016a,b). In response, in 2009, the South African government imposed restrictions on the issue of permits for trophy hunting, denying permits to those without a trophy hunting track record, a measure that effectively excluded Vietnamese pseudo hunters. South Africa introduced further measures to curb and control pseudo hunting in 2014. These have proved successful, with trophy hunting reduced back down to previous levels, i.e. prior to the upsurge of pseudo hunting (Emslie et al. 2016).

However, as these restrictions came into effect, Vietnamese traders, with good links in South Africa, found other means of obtaining rhino horn, such as via Czech trophy hunters (Rademeyer 2016a), as well as by theft of horns held in stocks and museums (Homans 2014). When law enforcement measures to counter these thefts further restricted supply, there was a greater shift to active poaching of rhinos in nature reserves and national parks. Demand for rhino horns from South Africa exploded (for reasons further discussed in Part 3 of this report) and, as prices rose in both China and Vietnam, poaching intensified both on public and private land.

In 2014, in response to evidence of an increase in rhino poaching in South Africa, and recognising that "poaching is part of a multi-billion dollar worldwide illicit wildlife trade" the South African Cabinet announced its commitment to "continue to strengthen holistic and integrated interventions and explore new innovative options to ensure the long-term survival of the species". The implementation plan for the Integrated Strategic Management of Rhinoceros was refined during a month-long Rhino Laboratory, attended

by key stakeholders, that was held in 2016 as described in a Department of Environmental Affairs media statement of 24 July 2017 (Box 1).

Box 1

Key areas of the implementation plan for Integrated Strategic Management of Rhinoceros, announced by Environment Minister Edna Molewa, in a statement issued in July 2017:

- **Law enforcement (anti-poaching and anti-trafficking):** With significant improvements in intelligence capabilities, a full value chain approach of illicit networks (led by the South African Police Service, SAPS), and ramp up of Province anti-poaching capacities.
- **Demand management:** Describing a detailed view on data required to inform policy, and actionable initiatives for more result oriented communication to different stakeholders.
- **Management of rhino populations:** Outlining processes to develop and share best practices to optimize birth rates.
- **Community empowerment:** Increase economic participation for communities adjacent to parks.
- **Responsive legislation** [including] plans for incentives to stakeholders and improve stockpile management.

In April 2017 the government lifted a 2009 moratorium on domestic rhino horn trade, following a Constitutional Court order that upheld a decision by the High Court in 2015. The case, which attracted worldwide publicity, had been brought by John Hume, whose large farm, as a result of a very successful breeding programme, contains the biggest population of privately-owned rhinos in the world (about 1,500 in 2016). These are dehorned to help protect them from poaching. John Hume had argued that money from sales of rhino horn would enable him to cover the very high costs of protecting his animals. Following the court decision, he held an auction aimed at selling about 500 kg of his stock of more than 6 tonnes of rhino horn, built up over the years from horns taken from dead rhinos and by dehorning live rhinos to deter poachers. In brief, the auction held on 21–24 August 2017, was not at all the success that John Hume had hoped for. In line with CITES regulations, the horns could only be sold for domestic use, and the government imposed tight restrictions to ensure that these and other environmental legislation were complied with. Each sale required a permit and to obtain one a number of conditions had to be met. The rhino horn was required to be registered on the national database, with a DNA certificate and documentary proof of its legality, and

the proposed buyer had to prove he had no criminal record. The legislative bureaucracy discouraged traders from buying his rhino horn. Regarding the government's efforts to conserve Kruger's wild rhinos that are not dehorned, in a statement to the media (25 January 2018), the Minister of Environmental Affairs, Edna Molewa, highlighted the government's continued commitment to the implementation of its plan for the Integrated Strategic Management of Rhinoceros to conserve the country's rhinos.

Results of fieldwork

Activities and identities of rhino poachers

During the first eight months of 2016, 450 rhinos were poached in Kruger, including 17 black rhinos (the number of rhinos poached had risen to 662 by the end of the year). As already mentioned, these are minimum figures as some poached rhinos, possibly 10–20% of the total (Emslie, pers.comm., August 2018), may never be found. Park staff believe that they can find 70% of rhino carcasses in the first week of the animal's death and 90% within three weeks, if there is no heavy rain. The presence of vultures helps in finding rhinos.

Over the same period, there were 2,119 poacher incursions and 122 instances of 'physical contact' (including incidents where shots were exchanged) between Kruger rangers and poachers. A total of 177 poachers were arrested in the Park (of whom 7 were Park staff) and 94 firearms seized. Rangers retrieved 94 horns from rhinos wounded, sometimes fatally, by poachers who had run off before the poachers could remove their horns. Kruger staff estimate that there were 26 poachers in the Park on average each day over this period, mostly in the south where the majority of rhinos are located (Maggs 2016; and unpublished statistics from Kruger).

In order to kill rhinos, middlemen supply poaching gangs with guns, ammunition, food, and transport to and from the edge of Kruger. The average size of a gang coming into Kruger from either Mozambique or South Africa is three: the shooter, the water and food carrier, and the axe carrier. The shooter is the most experienced and most important member of the gang and is thus paid considerably more than the carriers. For example, in 2008 the water and axe carrier each received USD 194–607 and the shooter USD 583–1,822 for a pair of horns; by 2013 these figures had risen to USD 830–1,661 and USD 2,491–4,982 respectively, demonstrating the increased incentive to poach (Table 5). The shooter usually uses a heavy calibre rifle, such as a .375, .458 or .416 Rigby. This is similar to KwaZulu-Natal, where, in known cases, 42% and 21% of rhino poachers were using .375s and .458s, respectively, and the remainder other rifles (Carmen von Tichelen, KwaZulu Wildlife, pers.



Kruger Gate is sometimes used by smugglers to gain access in and out of the Park.



Many rhino poachers entering Kruger National Park come from poor villages across the border in Mozambique. Illegal traders can now afford to build big houses (below).





Dehorning rhinos to protect them from poaching, as seen here on the private rhino breeding farm of John Hume, is not suitable for large areas with wild rhinos, such as Kruger.

comm., February 2016). Rhino poachers often use a silencer, but this blocks the view for the shooter, which can result in rhinos being wounded rather than killed (Ken Maggs, Head Ranger, Kruger, pers. comm., September 2016). A poaching gang prefers to hunt at night during the full moon when it is easier to see the rhinos. However, hunting at night results in more wounded animals. From January to the end of August 2016 in Kruger, two white rhinos were wounded by poachers hunting at night (Sandra Snelling, Manager of Information and Analysis for SANParks, pers. comm., September 2016). A poaching gang covers 25–30 km over a day and a night, sometimes spending up to two to three weeks in the Park. The poachers do not search for rhinos with large horns, but instead shoot the first rhino with horns that they find in order to spend as little time as possible inside the Park. The poachers prefer killing rhinos to elephants because rhino horn is more valuable than ivory. Moreover it can be removed more quickly and is much easier to carry. After killing a rhino, it takes a poaching gang about ten minutes to remove the two horns with an axe, bow saw, knife or panga (machete). The poachers sometimes take other body parts, nails, skin, tails and ears, usually to sell locally, such as for local traditional medicines (*muti*).

Table 5. Prices (in USD) paid to rhino poaching gang in Kruger National Park, for a pair of rhino horns, 2006–2013

Year	Shooter	Water carrier and axe carrier
2006	89–356	89–356
2008	583–1,822	194–607
2010	1,644–3,287	548–1,096
2012	1,464–6,222	488–2,074
2013	2,491–4,982	830–1,661

Source: Haas and Ferreira 2016

Most of the poachers are Mozambicans and South Africans, including some Mozambicans who have managed to change their nationality to South African so they can remain in the country legally, which facilitates poaching. According to Johan Jooste (Commanding Officer, Special Projects, Kruger, pers. comm., February 2016), from the start of the current poaching crisis in 2008 to 2015, about 70% of illegal hunters were Mozambicans who entered Kruger through, under or over the fenced sections of the Park on the eastern side along the border with Mozambique. After the Park authorities significantly improved their anti-poaching strategies on the Park’s eastern boundary around 2014 (see below), more Mozambican poachers started to come into South Africa to enter the Park from the less heavily fenced side on the west. In 2016, perhaps 45% of the poachers entered the Park from the east

and 55% from the west (Maggs, pers. comm., September 2016, while about 55–60% of all poachers were Mozambicans (Kobus de Wet, Senior Manager, Environmental Crime, Kruger, pers. comm., September 2016).

The usual explanation given for the fact that Mozambicans make up the majority of poachers is that Mozambicans who live near the eastern boundary of the Park are mostly very poor, with few opportunities for decent full-time employment. Another factor, further discussed below, is lax law enforcement and widespread corruption in Mozambique, which makes it easier for poachers to operate from there than in South Africa. There is also a ready market for poached rhino horn in Mozambique, due to the presence in the country of large numbers of Vietnamese and Chinese businessmen (Box 2), who are aware of the proximity of Kruger National Park and its rhinos.

Box 2

Mozambique has long had important trade relations with China and Vietnam. After Mozambique's independence in 1975, China granted the country an interest-free loan of USD 56 million and sent in medical teams. This was the start of a burgeoning relationship between the two countries that has become even closer in the 21st century. Several major buildings, including the international airport, and perhaps a third of all roads in Mozambique have been built by Chinese companies. China is also the main importer of timber from Mozambique (Macqueen 2017). By 2008 China was the second largest investor in the country after South Africa (Shinn 2012).

Bilateral economic and trade relations have also grown between Mozambique and Vietnam. Around 2011 Vietnamese employees of the government-owned telecommunications company, Viettel, began to arrive in Mozambique. The company, which in Mozambique is called Movitel, has become the largest mobile telephone operator in the country, with a presence throughout the nation. In March 2016 Vietnam's former President Truong Tan Sang visited Mozambique. In early August 2017 Mozambique's Prime Minister Carlos Agostinho do Rosario paid an official visit to Vietnam, during which Prime Minister Nguyen Xuan Phuc called for more Vietnamese trade with Mozambique, in sectors such as in oil, gas, marine transport, farm produce and seafood. The two prime ministers witnessed the signing of a memorandum of understanding on cooperation to protect and preserve wild flora and fauna and the initialling of an agreement on aviation transport services (Anon. 2017a).

Killing rhinos, and more recently elephants, especially in the north of Kruger, can be lucrative for people from poor communities located close to the Park in South Africa and Mozambique, while the likelihood of being arrested or killed in Kruger is low. The chance of Kruger personnel thwarting a rhino poaching gang is only 10%, while the chance of a poacher losing his life in armed contact with Park officials is less than 1% (Haas and Ferreira 2016).

Not only civilians, but also officials charged with protecting rhinos are sometimes involved in poaching. For example, in March 2017, a policeman and four others were stopped at the Paul Kruger gate entrance and arrested (Anon. 2017b). Organized crime always operates by corrupting some on the inside (Emslie, pers. comm., August 2017). Some Kruger Park staff have shot rhinos, while others have colluded with poaching gangs by informing them of the location of rhinos, and helped them to enter and escape from the Park. From January to the end of August 2016, the authorities arrested seven members of Park staff involved in rhino poaching. Of these, one was a field ranger who shot dead at least one rhino; he was arrested on 27 July 2016 (Maggs, pers. comm., September 2016).

Rhino horn traders and smuggling routes

Rhino horn from poached animals in Kruger passes through the hands of a number of traders operating on different levels before leaving the country en route to eastern Asia. Most poachers in the Park (that the senior Park staff refer to as Level 1) generally sell their rhino horns to a first set of middlemen (Level 2) who then may sell on to another middleman (Level 3) before the horn is sold to the illegal exporter (Level 4), whom the poacher does not know. Most of the middlemen are from South Africa or Mozambique, with a few Tanzanians operating in northern Mozambique. The middlemen from Mozambique usually live near the eastern edge of Kruger and those from South Africa also live near the Park. Until recently these middlemen paid the poachers per pair of horns, not by their weight. But since early 2014 poachers have been paid per kilo (Sam Ferreira, Large Mammal Ecologist, SANParks, pers. comm., February 2016).

In 2016 the first set of middlemen (Level 2) paid a three-man poaching gang an average of USD 2,273/kg. This is based on data from six poaching gangs we heard about who sold their horns for between USD 1,111 and 4,286/kg. This payment has risen significantly since 2006 when three gang members received USD 89–356 each for a pair of horns (Table 5).

On account of the low standard of living in Mozambique, rhino poachers based there may receive less money for rhino horn than South African poachers. There are two types of poaching gangs in Mozambique: experienced ones living along the border with Kruger and others with less experience living further away. Inexperienced hunters do not know the price rhino horn can fetch and could be paid as little as meticaís 50,000 (USD 667)/kg; however, meticaís 200,000 (USD 2,667)/kg was the average price paid in 2016 to those who could deliver the horns quickly with less risk (Carlos Pereira, Head for Law Enforcement and Anti-Poaching Department (ANAC), Mozambique,

pers. comm., October 2016). Usually the make-up of the gangs, firearms and methods of hunting in Mozambique are similar to those in South Africa, as regular poachers communicate with each other and share the best techniques. As in South Africa, firearms are provided by the criminal traders who buy the rhino horn.

Of all the Kruger rhino horn poached in 2016, it is estimated that 60% went east out of Kruger to middlemen in Mozambique (Bruce Leslie, Regional Ranger, Special Operations, Kruger, pers. comm., September 2016). Middlemen in Mozambique have very few difficulties in attracting rhino poachers in a country where the minimum monthly salary (in 2016) was only meticaís 3,500 (USD 47) (Pereira, pers. comm., October 2016).

It is difficult to find out what the middlemen charge the exporters for these rhino horns because so few middlemen are arrested and interrogated for this information. However, according to one Vietnamese informant based in South Africa, in 2016, middlemen normally sold rhino horns to Vietnamese, Chinese, Mozambican and South African exporters based in South Africa for 65,000–180,000 rand/kg (USD 4,643–12,854/kg), i.e. for an average price of USD 8,749/kg. The exporter based in South Africa received about USD 16,000/kg for a full horn from the importer in Asia (Level 5). As discussed further below, rhino horn dealers in Vietnam were buying rhino horn wholesale for around USD 26,000/kg at this time.

Smugglers of rhino horns are often also involved in trading other wildlife products, both legal and illegal. These include Chinese and Vietnamese traders who have come to South Africa and Mozambique to take advantage of the opening up of trade in the region.

Illegal exporters of rhino horn in South Africa generally use either flights departing from OR Tambo International Airport in Johannesburg or, less often, ships sailing out from the port of Durban (Moneron et al. 2017). A third route is by diplomatic bag. Since at least 2006, Vietnamese diplomats based in Pretoria have used their diplomatic immunity to export rhino horns. Diplomats of other nationalities have also used this method to take rhino horn out of South Africa, especially Chinese and North Koreans (Rademeyer 2012, 2016 a,b; Obaji 2017).

Illegal exporters based in Mozambique use two main exit points: Maputo International Airport in the south and the port of Pemba city on the northern coast (Box 3). Some who are involved in transporting rhino horn live in and around the town of Magude, which is also home to some of the middlemen who organize payments to the rhino poachers (Russell 2015). This small town is 70 km from the boundary of Kruger NP and 100 km as the crow flies

Box 3

The population of the port city of Pemba grew from 4,000 in 1970 to 141,000 in 2007 and the city continues to expand in size. Much of this growth has been based on illegal trade in wildlife products, such as timber, ivory, and rhino horn, as well as a large illicit trade in gemstones. The town took off economically in 2005 when the Chinese established it as a base for trading in illegal timber and other products for the Chinese market. The Chinese also obtained legal concessions for timber production in northern Mozambique. By 2016 there were at least 500 Chinese and also many Vietnamese living in and around Pemba involved in exporting the area's natural resources. Traders of both nationalities are known to export rhino horn by ship, and may use other methods, even DHL courier (Pereira, pers. comm., September 2016). While the Chinese typically buy a single large consignment of rhino horn for illegal export, Vietnamese make a larger number of individual transactions of one or two horns.

from Maputo. In this formerly impoverished area, traders in illegal wildlife products have built themselves conspicuous large villas with pillars and porticos surrounded by high walls. A journalist commented that “it is almost as if you have crossed into suburban Johannesburg or even Los Angeles” (Russell 2015). Other active rhino poaching nodes in Mozambique are Mapulanguene (Masse 2017) and Massingir. In Massingir, where expensive houses built by wildlife crime middlemen can also be seen (Matthew Markus, Pembient, pers. comm., April 2018; Daniel Stiles, wildlife trade researcher, pers. comm., September 2018), their activities have brought much-needed money to the town, a development that is appreciated by the poor local people (Hubshcle 2017a).

Confiscations of rhino horn are rarely made in Mozambique. Due to poor inspections, endemic corruption, fear, and inertia most rhino horn is smuggled out almost without hindrance. In May 2015 officials at the international airport in Maputo seized 65 kg of rhino horn and arrested one Chinese traveller (Pereira, pers. comm., September 2017). In early 2017, based on information given by the Maputo police commander to Radio Mozambique (Anon. 2017c), at least five Mozambique police officials and two officials from the Customs department, all based at Maputo International Airport, were arrested for their alleged role in the smuggling of rhino horn out of Mozambique. But such seizures and arrests are rare and there are even fewer convictions, due to the absence of targeted investigations. Lower-level poachers and officials who are dispensable are occasionally arrested and then normally released on bail, but the main players are well protected and largely outside the reach of the law.

Weight and value of rhino horns smuggled from Kruger

As a result of the increase in poaching in the Park, the greater cost of protecting Kruger's rhinos has become substantial and, some say, unsustainable. The money made illegally from selling the horns of Kruger's rhinos is huge. From 2012 to the end of 2016 (five years) 3,352 rhinos were recorded poached in Kruger (Table 4). Using this data we can calculate the amount of horn from rhinos poached in Kruger reaching Asia each year, by assuming that 14% of those horns did not reach the consumer market (based on TRAFFIC data; Moneron et al. 2017), and taking 5 kg as a perhaps conservative estimation (Richard Emslie, pers. comm., August 2018) of the weight of horns carried by each rhino. These calculations show that an estimated 1,840 kg of rhino horn was successfully exported from Kruger to Asia in 2012. The amount rose to a maximum of 3,555 kg in 2014 (and 3,550 kg in 2015), before falling back slightly to 2,835 kg in 2016 (Box 4).

Box 4

Estimated volumes and prices of raw horn from rhinos poached in Kruger reaching the illegal market in Vietnam from 2012 to 2016

2012: 428 poached × 86% = 368 × 5 kg = 1,840 kg × USD 45,000/kg = USD 82,800,000

2013: 609 poached × 86% = 524 × 5 kg = 2,620 kg × USD 65,000/kg = USD 170,300,000

2014: 827 poached × 86% = 711 × 5 kg = 3,555 kg × USD 48,000/kg = USD 170,640,000

2015: 826 poached × 86% = 710 × 5 kg = 3,550 kg × USD 32,000/kg = USD 113,600,000

2016: 662 poached × 86% = 569 × 5 kg = 2,835 kg × USD 26,000/kg = USD 73,710,000

Note: Values are calculated using wholesale prices recorded in Vietnam. The value of rhino horn in 2014 is extrapolated from reported values in 2013 and 2015.

By multiplying these totals by the wholesale prices of rhino horn in Asia, taking Vietnam as an example, we can estimate the total value of rhino horn exported from Kruger each year on the illegal market. These calculations show that the estimated value of rhino horn exported from Kruger to Asia more than doubled between 2012 and 2013, from USD 83 to USD 170 million. In 2014, although the volume of horn exported rose substantially compared to 2013, the total value of horn remained stable (at USD 171 million) due to the falling wholesale price in Asia. Thereafter the value of rhino horn exported continued to fall.

Thus over this five-year period, when poaching in Kruger and prices of rhino horn in Asia were at their peak, illegal traders selling rhino horns

wholesale to traders in Asia could have had a total estimated turnover of USD 605,725,000, an average of USD 121,145,000/year.

Taking the average price received by poachers in Mozambique and South Africa in 2016 to be USD 2,273/kg, we can calculate the total income that poachers could have received from Kruger’s rhinos that year. If the poachers had managed to escape with all the horns from all 662 animals recorded as poached 2016 and had sold them to Level 2 middlemen that year they could have made USD 7,523,630 in that one year alone (i.e. 662 rhinos × 5 kg = 3,310 kg × USD 2,273 = USD 7,523,630). Of course some wounded animals run away to die later and the horns are not taken by the poachers, and Park staff confiscate some horns from poachers apprehended within the Park. On the other hand, since some carcasses will remain undetected in such a huge area, the recorded poaching totals are almost certainly underestimates of actual poaching levels by possibly 10–20% (Emslie, pers. comm., August 2018). So the above figure is probably a reasonable estimate of the income received by poachers in 2016.

The price ‘carried on a rhino’s head’ can be estimated from the wholesale price data in Asia (Table 6) as follows. The value of one live rhino killed for its horns increased sharply from USD 100,000 in 2010 to USD 225,000 in 2012, peaking at USD 325,000 in 2013, and declining thereafter to USD 160,000 in 2015, and USD 130,000 in 2016. This latest figure is still more than 12 times the average price of live sales for white rhinos around that time (Anon. 2017c; Knight, pers. comm., June 2018), making a rhino worth much more dead (to the Asian traffickers) than alive (for potential sale).

Table 6. Examples of wholesale prices (in USD per kg) for illegal raw African rhino horn in China and Indochina in recent years.

Date	China	Vietnam	Laos	Myanmar
1987	2,174–5,435	–	–	–
1989	–	5,000	8,000	–
1993	–	–	–	–
2010	–	20,000	–	–
2012	60,000–65,000	45,000	–	–
2013	60,000–65,000	65,000	60,000–65,000	–
2015	30,000–32,000	29,000–35,100	20,500–30,500	35,000
2016	–	26,000	20,000	–
2017	26,500	19,000–28,000	19,000	20,000–25,000

Sources: Surveys by the authors; Ammann, pers. comms., various years; Crosta et al. 2017

– no reliable data

Prices for rhino horn were especially high from 2012 to 2016. In 2017, for reasons considered in the Discussion, the wholesale price in Indochina fell to as low as USD 19,000/kg, similar to prices before 2010 (Table 5). However, whether the price of rhino horn doubles or halves again, it will still be sufficient incentive for poor poachers to kill rhinos, if they are provided with guns and paid for their efforts, despite the risk involved. Thus, in addition to long-term operations targeting the kingpins, one key to reducing poaching is to tighten gun control laws in Mozambique (as stated by Carlos Pereira, interviewed on the Carte Blanche television documentary 'Follow the Guns', aired on 4 June 2018). Disrupting the supply of weapons used in wildlife crime is an often overlooked conservation tool (conflictawareness.org). For Kruger, this would also serve to reduce the loss of life among poachers and the risks incurred by SANParks rangers in their efforts to safeguard rhino populations in the Park.

Human costs

Park staff can only shoot at poachers if it is in self-defence. Poaching gangs, however, are well-armed and increasingly initiate exchanges of fire, which has resulted in the deaths of between 150 and 200 poachers from 2010 to July 2015 (Rademeyer 2016a), i.e. an average of 33 poachers each year. According to Kruger National Park officials, from 1 January to 31 August 2016 there were 40 to 50 poachers killed when rangers intercepted poaching incursions. This increase compared to previous years was due to a greater number of incursions detected (2,883 in 2016 compared to 2,466 in 2015; Anon. 2017d), combined with increasing aggression from well-armed poachers when encountered, resulting in more life-threatening incidents. Very few Park staff have died protecting rhinos so far, but fighting poachers is a source of great stress among rangers and their families, and places considerable strain on SANParks as a whole. Rangers are trained in conservation and biodiversity management but some say they now spend 90% of their time on anti-poaching work and only 10% on biodiversity conservation (Annecke and Masubele 2016). If this continues it will become harder to recruit dedicated rangers who are prepared to risk their lives in anti-poaching activities. When poachers are killed, this causes resentment among their families and, inevitably, bitterness and hostility towards Kruger. This could provoke even more rhino poaching as acts of revenge. There is a growing perception among villagers that rhinos (and wild animals generally) are valued more highly than local people. As discussed further below, conservationists and law enforcement officials are viewed with hostility in some communities, where they receive little support or cooperation (Hubschle 2017a).

Reasons for the rhino poaching crisis, from the perspective of staff at Kruger

'The paramilitary strategy is not succeeding'

In response to the dramatic rise in rhino poaching since 2008, the South African government has adopted a stronger stance against poachers, particularly in Kruger, the worst-hit area. In addition to notable increases in law enforcement expenditure by South Africa, significant international funds have been provided to help SANParks in its efforts to solve this crisis. In 2014, a joint fund of over USD 23 million was set up to fight poaching in the Park, supported by the Howard G Buffett Foundation in collaboration with SANParks and the African Public Benefit Organization (Sapa 2014).

SANParks has opted for a strong military presence and a paramilitary strategy in order to reduce the illegal killing of rhinos in Kruger (Humphreys and Smith 2014). In 2012 SANParks appointed retired Major General Johan Jooste to develop and implement a strategy to combat rhino poaching. In his first public statement, General Jooste said, "It is a fact that South Africa, a sovereign country, is under attack from armed foreign nationals ... We are going to take the war to these armed bandits and we aim to win it" (Rademeyer 2016a).

The Park administrative headquarters at Skukuza now accommodates, in addition to SANParks staff, large numbers of police and army personnel



White rhinos can be frequently seen in the southern area of Kruger National Park.

from the South African National Defence Force (SANDF). A large area near Skukuza airport has been set aside for offices of anti-poaching staff. By 2016 there were 510 armed field rangers who spent at least 80% of their time on anti-poaching duty (Snelling, pers. comm., September 2016), plus another 1,190 permanent SANParks employees based at Kruger. In addition, about 100 SANDF staff guard and patrol the boundary of the Park, together with police officers, in greater numbers, who help with security and arrests. Four helicopters, several aeroplanes and other sophisticated military equipment have been deployed to detect poachers. Despite the commitment of all this additional manpower and equipment since 2012, in 2016 General Jooste concluded that SANParks had not yet won the poaching war (Jooste, pers. comm., September 2016).

This raises the question: Why has the ‘war’ on rhino poaching not yet been won? During discussions with senior staff of Kruger (mostly in 2016), they identified the following issues that still need to be addressed in order to reduce rhino poaching.

‘Government department corruption in South Africa is widespread’

Senior staff identified corruption as a key factor in the failure to bring the illegal trade in rhino horn under control, echoing the findings of several studies and reports (Rademeyer 2012, 2016a; Milliken and Shaw 2012).



These rhino skulls at the Kruger National Park headquarters in Skukuza show the protuberance that supports the larger front horn.

For instance, in February 2012 Kruger officials arrested a ranger and a traffic officer for abetting the killing of two rhinos (Rademeyer 2012; EIA 2016; Anon. 2017d). But other incidents, particularly outside the Park go undetected. Government officials are known to provide assistance to rhino poachers and traders, especially members of the police force, which has a reputation for corruption across the country. In 2013 the police service produced an audit that found 1,448 serving police officers in South Africa had been convicted as criminals (Rademeyer 2016a).

In order to prevent government staff in the Park getting involved in rhino poaching and illegal trading of the horns, and to help combat general corruption in Kruger, SANParks introduced integrity tests for those applying for jobs in the Park (Nick Funda, Chief Ranger, Kruger, pers. comm., September 2016). These could potentially lead to deployment of an employee away from rhino- and security-related activities but could not, however, be used to dismiss the employee (Markus Hofmeyr, then Head of Veterinary Wildlife Services SANParks, pers. comm., September 2016).

General Jooste acknowledges that his anti-poaching strategy is unable to address underlying causes of rhino poaching, such as corruption: “I am only able to treat one aspect of the poaching problem; that is the poachers inside Kruger, not the criminal gangs, and corrupt government people on the outside. I have not been given enough assistance from the police, which I desperately need” (pers. comm., February 2016).

‘Inter-agency coordination is inadequate’

SANParks has jurisdiction within the country’s national parks, but little authority outside them. General Jooste told us he was aware of this problem and is trying to improve collaboration and coordination with other government departments, such as the police, in order to crack down on the criminals outside the parks (pers. comm., February 2016). An inter-governmental National Strategy for the Safety and Security of Rhinoceros under control and management of the police has been developed but waits national sign-off given the need to commit considerable budgetary resources towards combating illegal wildlife trade crime (Knight, pers. comm., May 2018).

According to Rademeyer (2016a), highest priority should be given to improving communications amongst the police, SANParks, security agencies, defence forces and private security companies. Efforts to stop the illegal rhino horn trade require ‘whole-system thinking’ that addresses the interrelationships among constituent parts of the system, rather than narrowly focusing on the parts themselves. However, collaborative work to

understand the big picture is essentially lacking in the rhino conservation world. Experts concentrate on their individual parts in the rhino saga without having the power to put the whole jigsaw puzzle together and coordinate activities towards the shared goal of enabling wild rhino populations to grow and eventually be sustainable. The problem is known as the ‘the silo effect’, with both private and government personnel working in isolation (in their own ‘silo’), sometimes with diverging aims or goals, because they do not trust other operators. Without this improved cooperation, rhinos will continue to be killed in large numbers (Jooste, pers. comm., February 2016; Danie Pienaar, Head, Scientific Services, SANParks, pers. comm., September 2016; Rademeyer 2016a).

‘Illegal wildlife trading networks are extremely well-organized’

The lack of coordination among crime prevention agencies contrasts starkly with the highly effective organization of the criminals themselves. As a result, these criminals nearly always get away with their crimes, outmanoeuvring officials who are constrained by legislation, bureaucracy and inflexible strategies. They bribe and conceal their illicit activities, keeping their anonymity. Gang members are part of a human supply chain whose participants are often unaware of one another in the chain, so that if dispensable low-level members get caught high-level members can avoid incriminating evidence pointing to themselves. Those at the higher levels, who according to staff at Kruger are mostly Chinese and Vietnamese and often well-protected by powerful officials, are able to make rapid changes in their *modus operandi* to evade the law. When any of these criminals are arrested, new ones can come from Asia to fill the gaps. The authorities then have to re-activate their intelligence operations from scratch to learn about the new traffickers, which takes time and money.

‘Insufficient effort is made to arrest the exporters who control the sales of rhino horn’

Some members of senior staff at Kruger now consider that the main aim of law enforcement in South Africa must be to beat the illegal exporters. These people represent the most important link in the chain, since their activities establish the connection between supplier countries in Africa and consumer countries in Asia. If all the poachers inside Kruger were arrested, they could be easily replaced within a few days because many people have the skills and knowledge necessary to assume this role. By contrast, an exporter based in South Africa or Mozambique has contacts and experience that are harder to replace. This person will have acquired expertise in buying, selling and moving the rhino horn off the African continent along convoluted and

changeable trade routes to its final destination Asia, using contacts built up over an extended period.

Until a few years ago penalties for being a criminal exporter were feeble. Recently enacted legislation has given the state the authority to impose harsher penalties on convicted exporters, including the seizure of assets such as houses, that it is generally agreed will be a much greater deterrent than simply imposing a fine. Some exporters, however, work for kingpins based in Asia who have the funds to pay for their release on bail. In practice this can mean that the accused person walks free from the court, as many cases involving traffickers drag on and on with no convictions, according to informants. This enables these important 'links in the chain' to continue their operations. Thus, despite harsher penalties, the exporters often get away with their crimes and go on to repeat them again and again, which is a huge disincentive to those on the frontline risking their lives in anti-poaching operations.

'There can be negligence in the storage of rhino horns'

In April 2014 thieves stole about 100 rhino horns from the offices of the Mpumalanga Tourism and Parks Agency (MTPA) near the southern part of Kruger. A forensic expert had warned the MTPA about its inadequate security in 2010, but appropriate action was not taken (Maclean 2014). Most of SANParks rhino horns are now stored in a recently constructed strongroom surrounded by massive security in one of its facilities. This is an expensive operation for SANParks; however, it has paid off as thus far there have been no thefts.



White rhinos sometimes sleep in the heat of the day, as seen here in Kruger.

'There are not enough trained dogs for Kruger'

Kruger staff consider that dogs play a vital role in detecting and deterring poachers. When a poaching gang is detected within the Park, tracker dogs are brought in quickly to follow the scent while it is still fresh in order to find the exact location of the poachers. Sometimes, these dogs are deployed from helicopters. The presence of dogs also acts as a strong deterrent to poachers entering the Park. Different breeds have their own strong points and, in Kruger, Belgian Malinois (Belgian Shepherd) dogs are preferred at the gates as detection or sniffer dogs.



More well-trained dogs, such as the Belgian Malinois, are needed in Kruger to impede poaching and smuggling.

One reason for the continuing need for more dogs is that more poachers have been entering the Park illegally by hiding in tourist vehicles at entrance gates or simply coming into the Park posing as genuine tourists. Kruger staff believed that perhaps 20–25% of the rhino poachers were entering the Park by this means in 2016. Park staff plan to have dogs at all gates, which would be a major deterrent to would-be poachers, although of course they cannot be on duty all the time.

The number of trained dogs increased from 12 in 2012 (Leslie, pers. comm., September 2016) to 50 in September 2016 (Snelling, pers. comm., September 2016). These included 40 tracker dogs and 10 detection dogs, 7 to locate explosives and 3 to find rhino horn and ivory. However, senior staff considered that this number was insufficient, since 8 of the Park's 22 sections were still without trained dogs (Leslie, pers. comm., February 2016). The cost of maintaining these dogs is the principal impediment to increasing the numbers on duty in the Park. Each trained dog costs between rand 35,000 and 50,000 (USD 2,500–3,570), excluding the trained handler's salary. The food costs rand 750 (USD 54) a month (Leslie, pers. comm., September 2016).

‘Information about rhino poachers and horn traders is not always thoroughly analysed or utilized’

Kruger staff involved in collecting information about potential poachers and traders rely upon a voluntary informer system. SANParks staff pay on an ad hoc basis for information, and only if it leads to an arrest or the confiscation of rifles or the seizure of rhino horn or other prohibited wildlife products. Kruger staff consider that reliable intelligence is generally the most effective strategy to reduce wildlife crime, since costs are low and the impact can be high. Detailed analysis, however, is required to convert information gathered into actionable intelligence that can be applied to catch poachers and prosecute them successfully in court. SANParks currently lacks sufficient analysts for this work (Knight, pers. comm., May 2018).

‘There are too few field rangers in Kruger to deter rhino poachers effectively’

In September 2016 there were 514 field rangers on the staff of Kruger National Park (Snelling, pers. comm., September 2016). At any one time, only about 400 are normally on duty patrolling in the Park, with others absent on leave, sick, or on training courses, etc. Thus, dividing the size of Kruger (19,500 km²) by the number of field rangers active at one time, the average area covered by one patroller is 49 km², a presence that is far too low to be effective in guarding rhinos (or elephants or other animals) from poachers.

In the early 1980s J Clarke calculated that the density of field staff required to protect wildlife effectively in Malawi was one per 50 km² (Bell 1984). In the late 1980s, a study on manpower required to protect large rhino and elephant populations in Luangwa Valley, Zambia found that, to be effective, staff needed to be deployed at a density of at least one person per 20 km² of protected area (Leader-Williams et al. 1990). However, since then poachers have acquired more sophisticated equipment; thus pressure from poaching has greatly increased and more field staff are required. More recently, the authors of this report, working together with Linus Kariuki in Kenya, Pierre du Preez in Namibia, and Richard Emslie and Mike Knight in South Africa, concluded that for large savannah areas one field ranger per 10 km² is generally adequate, while for small areas at least one field ranger per 5 km² is required (Martin and Vigne 2012a). The Rhino and Elephant Security Group also recommended one guard per 10 km² for large areas, but this is usually not affordable for very extensive areas, taking account of the need of staff housing and other expenses involved (Emslie, pers. comm., August 2018).

Some Kruger staff mentioned that more field rangers are especially needed during the rainy season when poaching pressure is at a peak (Maggs, pers.

comm., February 2016). An added complication in Kruger is the very long international boundary on its eastern border with Mozambique, where even more patrollers are required. Detection of poachers from Mozambique needs to be followed up by immediate arrests; otherwise poachers can easily slip back across the border, with South African rangers unable to follow them. Law enforcement has been stepped up along this boundary but, as mentioned above, there has been a shift in poaching to the western side.

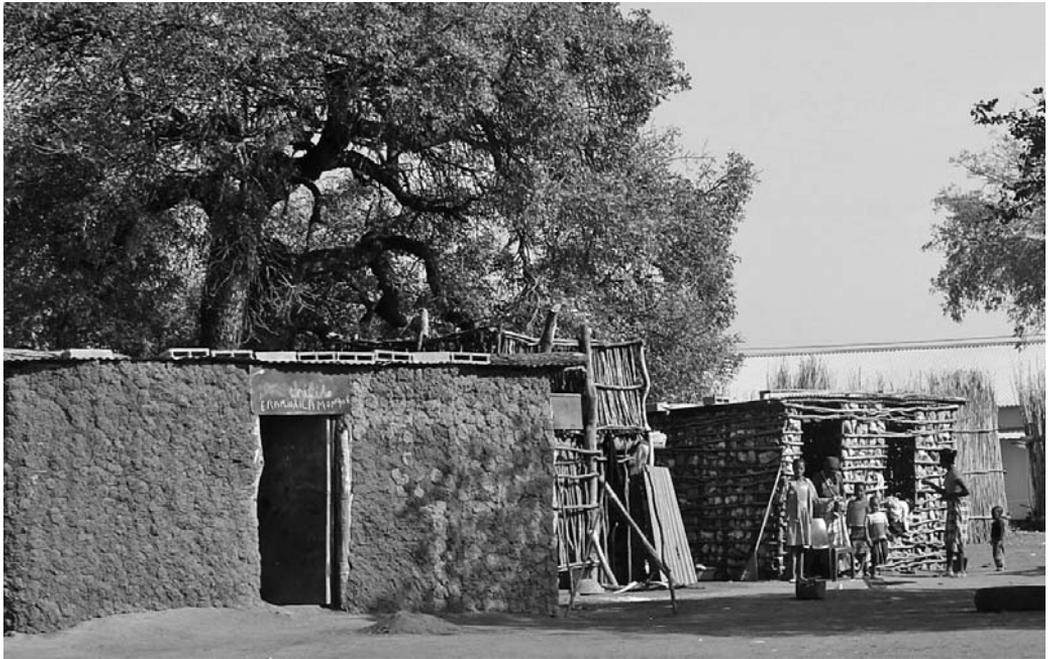
In 2014, an intensive protection zone (IPZ) was established in the southern region of Kruger where most of Kruger's rhinos are concentrated. This has helped to address the security challenges of protecting such a large area. With the help of funding from the Howard G Buffett Foundation, additional infrastructure and equipment for ground-based and aerial surveillance have been provided for use of Park staff in this area. As described above, the SANDF has also provided personnel to help patrol the border with Mozambique. These measures have started to pay off in Kruger, as shown by the reduction in known numbers of rhinos poached from 826 in 2015 to 504 in 2017 (Table 4). However, with the decline in poaching in Kruger, poaching has increased in other areas of South Africa. As described by Richard Emslie, "it is like a balloon. Push in one spot and the balloon bulges somewhere else" (pers. comm., August 2018).

'Inadequate law enforcement in Mozambique is a big threat to Kruger's rhinos'

As explained already in detail, Mozambique is heavily implicated in rhino poaching in Kruger. However, few Mozambicans who have poached rhinos in Kruger or traffickers are arrested in Mozambique. In addition to poor leadership and training within the police and the prosecution offices, law enforcement agencies and the judiciary in Mozambique are widely perceived to be corrupt (EIA 2016). Some police and customs officials have been arrested and suspended for assisting wildlife criminals, as described earlier. Rademeyer (2016b) summed up the situation: "Mozambique today [2016] is a country in crisis, paralyzed by rampant corruption, a weak judiciary, and an ineffectual and criminally compromised police force, and powerful criminal syndicates".

'Communities living around Kruger do not support wildlife conservation'

It is widely accepted that communities who gain some form of benefit from protected areas often show positive attitudes towards the wildlife they contain (Martin et al. 2013). When communities are supportive of wildlife,



This village is typical of poor communities close to Kruger National Park in Mozambique, where people have few job prospects and may be tempted to poach.

they can play a critical role in protecting animals from outsiders, acting as front-line guards on the edge of the Park. If, however, they feel they are poorly treated by Park staff, and at the same time well treated by criminal traders in wildlife products, they may be willing to help the traders and/or assist in poaching.

The SANParks vision is for a sustainable national park system connecting nature to society. In Kruger, there is growing recognition of the need to find non-violent solutions to rhino poaching, by promoting improved livelihoods, social cohesion and reconciliation with communities, so that instead of harbouring rhino poachers, they become partners in wildlife conservation (Annecke and Masubele 2016).

Community conservation does not do away with the need for law enforcement. As Mike Knight explains (pers. comm., June 2018), the two approaches need to go hand in hand. He points to successes in Zimbabwe with areas of about 3,000 km², where community development programmes are combined with strict law enforcement and good park border management. Similarly, General Jooste told us that in addition to curtailing the operations of poachers and criminal traders, it is important to “get the communities on our side” through measures to improve community welfare, such as provision of schools and job opportunities. By adopting this approach he hoped to reduce

rhino poaching, not only in Kruger, but for the whole of South Africa, by 10% a year (pers. comm., February 2016).

As discussed below, implementation of these approaches has made a positive contribution to rhino conservation in India and Nepal, where certain local communities benefit economically from having rhinos in neighbouring protected areas. In South Africa, however, community management of rhinos and other wildlife resources has been the exception rather than the rule. 'Fortress conservation' for rhinos, involving the forceful exclusion of local people, has been the fallback option. When this has to be supplemented by the adoption of a paramilitary approach it not only becomes a very expensive (Stiles 2013) but also runs the risk of further alienating local people. In the long term, an 'arms race' against the military presence could even occur, a possibility that invokes unhappy memories of the apartheid era in South Africa. As a community member complained recently, "the rhino has its own doctor, its own policeman, its own helicopter, its own land and there are rangers that protect it. We don't have these things. If the rhino goes extinct tomorrow, maybe we can finally get these things" (Hubschle with Shearing 2018).

In the past, there were forcible evictions of people living inside Kruger into less fertile areas with few job prospects (t' Sas-Rolfes 1996). Inadequate effort was made to compensate those who were evicted, for example by providing schools and clinics which could have eased the hardship caused by having to move their homes. Some of those who live today around the Park descend from the families of those evicted; they are not only poor but also feel hard done by, having lost their land to the National Park. In recognition of this injustice, SANParks has entered into an agreement with land claimants, whereby they will receive financial compensation as well as a percentage of income from live rhino sales (Knight, pers. comm., May 2018). Through agreements like this, land can remain under conservation while providing financial benefits to local people.

However, endemic poverty in communities surrounding the Park remains a major challenge. Many families who live around the Park suffer from scarcity of food and clean water and are frequently affected by sometimes long-lasting droughts. Security is usually inadequate and crime is common among unfulfilled, unemployed youth, particularly in overcrowded communities on the South African side of the Park. Property rights are sometimes unclear and some villagers feel jealous of those who have managed to make money, often by unlawful means, including of course from the wildlife trade. Park staff told us that if some of these social and economic problems in the area could be ameliorated there would be greater cooperation between the communities

living around Kruger and the Park staff, leading to better protection of rhinos (Ferreira, pers. comm., September 2016).

Some experiences of community conservation in government protected areas with rhino populations on the Indian subcontinent are briefly reviewed in the following section.

Comparison of Kruger with successful sites in Nepal and India

Although in very much smaller areas, Nepal and India have had encouraging success with anti-rhino poaching strategies in government protected areas in recent years. Some of these approaches have potential for replication in Kruger.

Chitwan National Park in Nepal is intensively patrolled (by both forest guards and army staff who live in the Park), with a density of one patroller per 1 km², for a Park of 930 km². In Chitwan NP the number of patrollers required is especially high as the world's tallest grasslands are found in this ecoregion, in which poachers can easily hide (Martin et al. 2009). The high density of patrols, combined with the outreach activities described below, have been effective in controlling poaching within the Park. Only four rhinos, out of a growing population of about 600, were officially recorded poached in Chitwan NP from January 2011 to June 2017. In fact the death of a male rhino in April 2017 was reported to have followed 1,071 days (almost 3 years) of 'zero rhino poaching'.



Numbers of the greater one-horned rhino in India and Nepal have been increasing in recent years.

In the even smaller Gorumara National Park (80 km²) and nearby Jaldapara National Park (217 km²), located in West Bengal in India, there is a patrol density of just over one guard per 1 km², again one of the highest figures in the world for a state-managed protected area containing rhinos (Martin and Vigne 2012b). In 2015, Gorumara and Jaldapara NPs had rhino populations of 50 and 200, respectively (Bibhab Talukdar, Chair, Asian Rhino Specialist Group, pers. comm., February 2016), and there has been hardly any rhino poaching in recent years. These protected areas also consist of tall grasses and, like Chitwan NP, are surrounded by densely populated areas.

These successes in India and Nepal have been all the more remarkable since the countries are geographically so close to China. The two Parks in West Bengal are located in region where there is considerable trade in other illegal wildlife products. Key to success has been a huge amount of central and state government financial support and, according to senior officials who we have interviewed over the years, the presence of generally honest, disciplined and motivated field staff working under committed leaders. Added to this is a tolerance of wild animals among the local population, rooted in long-standing cultural and religious beliefs. The poor local villagers, thanks to talks and encouragement from senior Park staff, generally accept the importance of



In West Bengal, the state government supports the people around Gorumara National Park, who benefit from projects such as ecotourism. This photo shows Lucy Vigne during her visit to the area with Esmond Martin in 2012.

protecting rhinos and feel great pride in their rhinos as an integral part of their rich natural heritage. They also appreciate the financial benefits they receive.

In comparison with these protected areas in Asia it is clear that the density in Kruger of 1 field ranger for every 49 km² is very low. Some senior staff, such as Glenn Philips (Head of Kruger National Park) and Sam Ferreira have made this known to the general public (Martin G. 2017). General Jooste told us in early 2016 that he wanted to increase the number of field rangers to 2,000, a four-fold increase on the current number of about 500. This would provide a ratio of 1 patroller per 12 km², which under good management would probably be sufficient to bring poaching under control (Martin and Vigne 2012a). Unlike in India and Nepal, however, Kruger is run as a self-sufficient financial operation with limited external support and does not have the funds to employ 2,000 rangers (Knight, pers. comm., June 2018). Thus it is unlikely that General Jooste will get the number of field rangers he needs. Even with the advanced technological equipment, such as helicopters, drones and night vision binoculars, some say there is no substitute for rangers patrolling on the ground, ideally with trained dogs, to deter poachers and protect rhinos.

Relations with the local villagers in protected areas in Nepal and India mentioned above are often excellent. In Nepal, support is provided for economic activities among poor local communities in the buffer zone around Chitwan NP, as an alternative to exploiting resources, including the rhinos, inside the Park. Projects in the buffer zone are financed from half the funds earned by the Park from tourism. The Department of National Parks and Wildlife Conservation provides the funds to the Buffer Zone Management Committee (consisting of local residents) which allocates money for a variety of enterprises such as conservation projects, construction of schools and roads, and income-generating schemes including pig and poultry farms. Residents in the buffer zone have reacted favourably, and on their own initiative, voluntarily patrol the boundary of the Park to prevent poachers from entering. They also arrest and detain any poachers or wildlife traders they find in the buffer zone. Furthermore, some act as informants to the Park authorities, enabling them to trap potential poachers trying to enter the Park (Martin et al. 2013).

In India, Gorumara NP provides a further example of long-standing good relations with local villagers. In 2017, this small national park (covering just 80 km²) had a rhino population of 51, up from 8 in 1986 (Basu 2017). Here again, a reason for this success is the West Bengal Forest Department's supportive attitude towards the large number of poor communities located around the

Park. From 1997, for example, 25% of the gross revenue earned by the Park has gone to meet local needs, identified in discussions with villagers, such as the construction of roads, culverts, wells, cottages for tourists and electric fences to protect the crops from wildlife (Martin and Vigne 2012b). As a result, from 1993 to 2011 not a single case of rhino poaching was reported in Gorumara NP (Martin and Vigne 2012b).

Chitwan NP is a mere one-twentieth, and Gorumara NP one two-hundredth the size of Kruger. Parks in South Africa, ranging from 230 km² to 1,600 km², have also experienced zero poaching. Controlling poaching in Kruger is much more challenging because of its long porous border with Mozambique and the lack of police support in fighting crime outside the Park (Knight, pers. comm., June 2018). There would undoubtedly be benefits from establishing a similar system to those operating at Chitwan NP and Gorumara NP (Box 5), but obviously this would need to be on a much larger scale. It is also important, in areas with community projects, to discourage outsiders who may be attracted by the better opportunities offered from settling in the area. An increase in population would exacerbate the pressure of development and with it the risk of pollution, thereby potentially negating the benefits of increased community support (Martin and Martin 2010; Martin et al. 2013).

Box 5

To the east of Kruger NP, a community-based natural resource management (CBNRM) project is now operating on privately managed land in Mozambique that aims to turn local people into custodians of wildlife. The project is based in the community of Mangalane, next to the privately owned Sabie Game Park, which borders Kruger NP. Several white and black rhinos are free to move between Kruger and the Game Park, where trophy hunting is the sole source of income.

The project got underway in 2014 and benefits about 300 households, who receive direct benefits in the form of cash dividends from the income of the Game Park. The project also employs community scouts and has set up village protection systems; by 2016, village police were providing information leading to arrests of poachers (Rodgers Lubilo, past secretary to Msoro community in Zambia, pers. comm., February 2016). The project has highlighted the importance of maintaining a good relationship between the scouts and other members of the community to ensure that the whole community identifies with anti-poaching efforts (Masse 2017).

Part 3: Eastern Asia

Methodology of fieldwork

Our observations on the retail trade in rhino horn in Asia were made during fieldwork mainly undertaken in China Vietnam, Laos and Myanmar from 2014 to 2017. While the principal focus during visits to these countries was the trade in ivory (for Save the Elephants and Wildlife Conservation Network's Elephant Crisis Fund), we also recorded all observations regarding the trade in rhino horn for this study. We carried out surveys in China in Shanghai and Beijing from 30 April to 28 May 2014; and from 9 October to 7 November 2015 we surveyed eight cities in eastern China: Beijing, Shenyang, Tianjin, Nanjing, Changzhou, Hangzhou, Suzhou and Shanghai (Vigne and Martin 2014; Vigne and Martin 2017a). We obtained information on the rhino horn trade in Vietnam during our visit there from 22 November to 14 December 2015 (Vigne and Martin 2016a). In Laos, LV surveyed the rhino horn and ivory trade from 15 to 25 March 2013 in Vientiane, Luang Prabang and Luang Nam Tha (Vigne 2013a,b) and returned to monitor the situation in Vientiane in December 2015. Then from 16 November to 12 December 2016 we carried out an extensive survey of the trade in ivory and rhino horn throughout Laos (Vigne and Martin 2017b). Our final fieldwork was undertaken in Myanmar from 19 November to 11 December 2017 (Vigne and Martin 2018).

Most of the information presented in the following sections is based on our personal observation. In Myanmar, the focus of our investigation on rhino horn was the town of Mong La, located in eastern Shan State on the border with China. Since the road from the nearest main city of Kyaingtong (Kengtung) to Mong La was closed for security reasons, we taught our guide how to carry out the survey and he brought the information to us back in Kyaingtong, where we discussed his findings. In the countries we surveyed, our investigations focused on retail outlets that may sell rhino horn, including antique shops, curio stores, jewellery shops, gold shops, jade outlets, gift/souvenir shops, religious outlets, Chinese shops specializing in teas and herbs, wood carving shops and shops specializing in ivory and/or other wildlife products. Many of the outlets we visited were in antique centres, flea markets, shopping malls, gold and jade markets, hotels, tourist areas, Chinese shopping areas, and shopping areas attached to casinos. We also visited traditional medicine shops and talked to traditional medicine practitioners to learn about medicinal demand. We kept records of everything we saw and heard, taking photographs, discretely, where this was possible. We noted names, numbers and locations of shops. We interviewed vendors and dealers if they were willing to talk, sometimes in English (in tourist

areas) or with the help of our interpreter. Rhino horn items on display for sale were identified and counted and their prices obtained where possible. We took notes and recorded everything we saw at the time and then each evening we typed up our findings and what we had learned.

Rhino horn items were not usually priced or labelled, nor were the leftover chips and shavings that were sometimes seen in these same shops for sale as medicine. But it was usually possible to obtain retail prices from the vendors. If the vendor did not speak English he would enter the price on his calculator or tell our interpreter if he was there to translate. The vendors were happy to confirm that recognizable items were indeed rhino horn, except where they had been hassled by “wildlife protectionists” as they called them, usually Western visitors like ourselves, which had made them suspicious. We were generally quoted prices in a mixture of US dollars and Asian currencies. Since exchange rates have fluctuated in recent years, all prices are shown in US dollars using the exchange rates at the time of our visits, as indicated in the corresponding tables for each country. We talked to vendors and customers, or our interpreter listened in to their conversations and reported them to us afterwards.

In addition to this fieldwork in retail outlets, we also studied background information and collected data on the rhino horn trade from past publications and from the internet. We interviewed experts to find out about trade from Africa and within Asia, and learned about legislation related to the rhino horn trade, as well as the current situation regarding law enforcement in each of the four countries.



Rhino horn shavings appear white and are sold for traditional Chinese medicine.

Background to the ivory trade in eastern Asia

Historical uses of rhino horn in the region

China has a long history of rhino horn consumption, both for traditional Chinese medicine and for expensive ornaments. Asian rhinos inhabited ancient China, with the Sumatran rhino being found in southern parts of the country. As a medicinal product, rhino horn was traditionally used to alleviate a variety of ailments such as hallucinations, fever, typhoid, snake bites, headaches and boils. It was widely and perhaps most commonly used to treat fevers in young children. These cures were described by the most famous Chinese pharmacist, Li Shih Chen, whose 50 volume work *Pen Ts'ao Kang Mu (Compendium of Materia Medica)*, written in the 16th century, included over 12,000 medicinal recipes (Martin 1979). Asian rhino horn was preferred, especially from the Sumatran rhino, whose small knob-like rear horn was considered the most potent as a remedy for serious illnesses and fever (Martin 1983). Among 36 medicinal products containing rhino horn, uses included treatment of constipation, chest pain, convulsion, coughs, diarrhoea, dizziness, epilepsy, fainting, limb pain, measles, mumps, numbness, paralysis, poor sight, running nose, sore throat, toothache and vomiting (Haibin Wang, rhino horn researcher, pers. comm., February 2016).

Rhino horns were also in demand in China for carving into libation cups, often ornate, for emperors and dignitaries. It was believed that these cups could detect poison as contact with the rhino horn would cause the poisoned liquid to fizz. In the Tang dynasty (AD 618–907) plain cups were made of polished Sumatran rhino horn. By the Ming dynasty (1368–1644) cups were also being made from imported honey-coloured African rhino horns, those with light and dark patterning being most desirable. In the Qing dynasty (1644–1911), as Asian horns became rarer, African horns started to dominate. These were often dyed mid-brown and later black, and cups became more ornate (Chapman 1999). A variety of other carved works of art were produced for the Chinese elite and dignitaries, with the horns from the larger greater one-horned rhino and African rhinos being preferred for intricate carving. These are still sought after by specialized antique collectors all over the world (Chapman 1999).

Rhino horn also has a spiritual significance in China. It is one of the eight immortal 'power tools' in Chinese mythology, revered by the Taoists, and as such believed to ward off evil and misfortune, and to give protection, blessings and good luck. *The Book of Songs*, written in 500 BC and attributed to Confucius, describes rhino horn cups filled with wine as libations for long life.

In Vietnam, rhino horns were used historically mainly for medicinal purposes. The country's forests were inhabited in the past by both the Javan and Sumatran rhino. During our visit to Hanoi in late 2015, a traditional Vietnamese medicine doctor told us that rhino horn had been used in Vietnam for a thousand years, principally to cool down the body, to eliminate poison and toxic agents in the body, and to alleviate pain such as headaches. The practice had been introduced by the Chinese, he explained. Other rhino products in Vietnam were also consumed, such as dried skin to draw out snake poison, dung for chronic joint pains, rhino gallstone to treat water retention, boils and tumours, and rhino blood for a variety of ailments (Milliken and Shaw 2012).

By contrast, in Laos, rhino horn was traditionally used for religious purposes. Both Sumatran and Javan rhinos lived in the Lao forests until only a few decades ago and their very small horns were long part of Lao traditional culture. A small rhino horn was mounted in a silver stand and placed on the family altar, where it was worshipped to induce prosperity (*kham khoum*). Its power could also protect people when travelling, save their house from catching fire, and prevent their farm animals from dying of disease epidemics. Many Lao people still believe that rhino horn brings *kham khoum* and small Asian rhino horns inherited from past generations are still worshiped by some families in Laos. It is believed to be very bad luck to sell such a family heirloom (Vigne 2013a).

Until a few decades ago, Myanmar was also home to both Javan and Sumatran rhinos. Rhino products were used by both resident Chinese and the Myanmar people for their respective traditional medicines until both species became locally extinct. As in China, Chinese in Myanmar preferred to use the horns of Sumatran rhinos for medicinal purposes, as well as the hide and hooves, to boil and drink as a tonic and as a cure for fever. This practice continued into the 1980s until supplies were exhausted (Martin 1993).

A little African rhino horn used to be available for traditional medicine in the main Chinese medicine shops of Myanmar before World War II (Martin 1983). The Myanmar people, however, only made use of their indigenous species, primarily the Sumatran rhino. The blood, meat (prepared as a curry) and the heart were consumed to help with 'weak blood', to cure lethargy and treat weak hearts. Rhino blood in particular, usually sold dried, was one of the most important items in Myanmar medicine. It was mixed with certain herbs by the medical practitioner and individually prescribed for the patient's needs. In 1981 local doctors still could obtain rhino blood from hunters who occasionally killed Sumatran rhinos in remote parts of the country where the species still survived. In the early 1980s, when two greater

one-horned rhinos were acquired by the zoo in former Rangoon, their urine became popular as a remedy for colds, congestion and asthma. The keepers would collect urine for local visitors, who sometimes queued up with bottles to collect it (Martin 1983).

Rising demand for African rhino horn in eastern Asia

Since Asia's three rhino species had been obliterated from most of their range during the 20th century, rising demand from eastern Asian countries in the 1970s was met by importing large quantities of African rhino horn. Demand for rhino horn for use in traditional medicine was strongest among those living in Japan, South Korea and Taiwan, countries that were experiencing rapid economic growth.

Throughout the 1970s and 1980s, China was also a major importer of rhino horn, much of it obtained as a by-product from North Yemen and used to manufacture patent medicines. Most of these packaged medicines, which included febrifugal tablets, laryngitis pills and night-sight pills, contained only small amounts of rhino horn among many other ingredients (Martin and Vigne 1987). They were usually prepared as small pills in government-run factories and bottled for export to the Chinese diaspora in Asia, providing a source of hard currency for the government. In the 1980s these rhino horn medicines were sometimes seen for sale in China, but extremely few Chinese living there earned enough money to buy them. In addition to rhino horn shavings imported from Yemen, these factories also used antique Chinese works of art made of rhino horn as the raw material for their medicinal products (Box 6).

Box 6

In 1990, EM visited TCM factory storerooms in Beijing, Guangzhou and Tianjin as a guest of the CITES Management Authority. There he saw crates and sacks of rhino horn chips and powder mixed with antique plates, cups, libation bowls, brush holders and figurines that had been carved for the ruling elite in China from African and Asian rhino horns. These had been collected by the government since the 1949 Revolution. The employees had no idea that the objects being ground down into powder as an ingredient in their pills were extremely valuable Ming and Qing dynasty works of art, made by master craftsmen working for past emperors (Martin 1990; Chapman 1999).

As a result of the collapse of rhino populations over much of Africa by the early 1990s, and following massive anti-poaching efforts to protect the survivors, as well as strict measures to curtail the illegal trade, there was

finally a lull in demand that lasted for nearly a decade into the early 2000s. Then, in the early 21st century, the economic boom in China and Vietnam reawakened a latent demand for rhino horn amongst people who had been unable to afford it before, triggering the current crisis.

By the mid-2000s, as China thrived economically and private companies flourished for the first time since the revolution, more people in China could afford to shop for items of their choosing. The growing ranks of the Chinese middle class in particular wanted to possess expensive items that previously only the rich elite could afford. Memories of the long-standing value and importance of rhino horn in Chinese culture encouraged a fast-growing demand for rhino horn both in the form of ornamental items and for TCM. Newly-rich Chinese businessmen sought rhino horn as a source of social kudos to impress their colleagues, to oil the wheels of business connections, and as presents for officials.

Developments in Vietnam mirrored those in China. In the early 1980s, Vietnam was one of the poorest countries in the world. With a radical change towards a free market economy from the late 1980s onwards, Vietnam became much richer, with the gross domestic product growing by over 7% each year. Cheap traditional Vietnamese medicine using local plants had long been important in the country, with traditional doctors prescribing an array of preparations for a variety of ailments. As in China, however, during the period of communist rule very few people could afford to buy rhino horn. With the shift towards a free-market economy demand for rhino horn grew rapidly, both for medicinal use and, increasingly, as a status symbol. Some businessmen in Vietnam began actively to promote sales of rhino horn for a range of purposes that went beyond its traditional uses, fuelling an increasingly profitable illegal business. In the 2000s, as the last remaining native Asian rhinos were being eliminated from Vietnam (Box 7), imports of horn from South African rhinos began escalating for local consumption.

Box 7

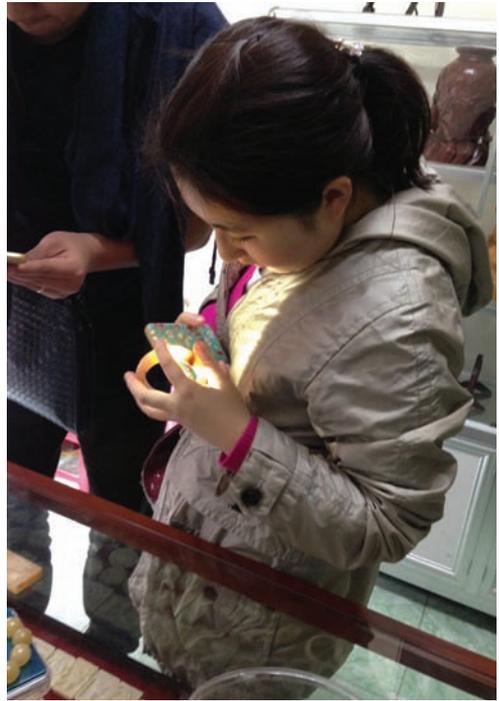
The field biologist George Schaller believed that Javan rhinos may have numbered in the low hundreds in Vietnam in the 1950s (Martin 1992a). In 1988 a Xtieng tribesman drew attention to their continued existence when he shot dead a female in what would become Cat Tien National Park. Schaller led an expedition to Vietnam in 1988 and confirmed from footprints and dung samples that there were still 10–15 of these extremely rare rhinos living in Vietnam. This was the last remaining population outside Java. But by 2010 the species was confirmed to be extinct in the country when, on 29 April, the carcass of the last surviving female was found, having been shot in the leg and its horns removed (Rademeyer 2012).



This antique rhino horn carving is on display in the Shenyang Imperial Palace museum in northeast China.

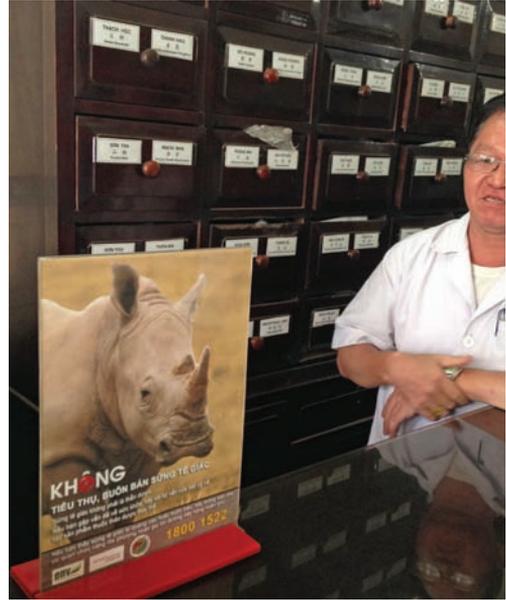


These pieces of rhino horn were openly on sale for traditional Chinese medicine in a jade shop in Tianjin.



Some artisanal villages in northern Vietnam sell processed rhino horn items, such as these bangles, bracelets, cups and oblong pendants, mainly to Chinese customers. In late 2015 they were openly on display but today the trade is more hidden.





The Museum of Traditional Vietnamese Medicine in Ho Chi Minh City displays medicines that were popular in the past (left). A poster in a contemporary traditional pharmacy explains that rhino horn is illegal today (right).



This rhino horn and rhino horn cup were on offer for sale online to Chinese buyers in early 2018. This illegal online trade in rhino horn has been rising.



Special plates became popular in the 2000s to grind rhino horn into a powder for rich Vietnamese to consume as a tonic to improve their health (left). In Laos, some rhino horn pendants on view for sale are protected in oil to prevent dessication (right) while others (below) are left unprotected, as seen in 2016.



In China, the existence of relatively tight controls made it more difficult to import rhino horn into the country directly. Vietnam and other countries in neighbouring Southeast Asia, however, provided convenient bases for the operations of the criminal networks that increasingly, controlled the trade. Negligent law enforcement meant smugglers could operate with impunity. At the same time increasing cross-border trade and movements of Chinese tourists provided ample opportunities for the transit of rhino horn smuggled from Africa across porous borders to final consumers in China.

As Laos, following China and Vietnam, moved towards a free-market economy, Chinese investment flowed into the country to finance the construction of roads and buildings. At the same time, growing numbers of tourists arrived from China and elsewhere, attracted by World Heritage Sites in the capital Vientiane and the former capital Luang Prabang. Chinese tourists and construction workers in Laos liked to shop for items to take back to China, taking advantage of the low prices in what was still a more economically backward country. Demand in Laos amongst resident Chinese and Vietnamese for African rhino horn for traditional medicine began growing noticeably from 2009 (Vigne 2013a) and antique Sumatran rhino horns disappeared from local markets soon afterwards (Box 8). From around 2014, there was an upsurge in the trade in new African rhino horn items, based around growing numbers of shops owned by and selling almost exclusively to the Chinese.

Box 8

As recently as 2012, a few antique Sumatran rhino horns could still be found for sale in the gold jewellery stalls of the Morning Market in Vientiane. In the early 2000s, as Laos opened up to visitors and tourism, wealthy Lao living abroad would sometimes buy these tiny horns to take home for traditional worship. As they were small and virtually impossible to distinguish with the naked eye from wood or buffalo horn copies, tourists could take them home in their luggage unnoticed. By early 2013 nearly all the genuine old Asian rhino horns in Vientiane's Morning Market had been bought and smuggled east across the border to Vietnam, in response to the growing demand, and sold there for a large profit. The main trader responsible for this has many connections and runs a well-protected illegal wildlife trafficking operation stretching from South Africa and Southeast Asia. This individual is said to be Vixay Keosavang of the Xaysavang Trading Export-Import Company Ltd. (Rademeyer 2012; Anon informants, pers. comm., 2013).

In northern Laos and also in Myanmar, the current boom in sales of rhino horn items is also driven by the presence of wealthy Chinese gamblers in



In this purpose-built Chinatown beside the Kings Romans casino complex in Laos rhino horn items can be found openly for retail sale.

casinos established in lawless border regions of the two countries: the Kings Romans casino complex in Laos and the town of Mong La in Myanmar (Jacobs 2014).

Legislation and law enforcement

International trade in rare and endangered wild animals and plants is governed by CITES, which, as noted above, prohibits the international trade in rhino horn from all five species. The four eastern Asian countries in this study are all parties to CITES. China joined in 1981, and Vietnam, Myanmar and Laos in 1994, 1997 and 2004, respectively.

Initially, CITES restrictions only applied to 'readily recognizable products'. Rhino horn chips and powder from North Yemen thus entered China unhindered after its accession to CITES in 1981 until North Yemen prohibited re-exports in 1986 (Martin et al. 1997). For the same reason, China's exports of medicines with rhino horn remained unhindered in the early 1980s, until CITES adopted a new definition in 1985 covering all items that included rhino horn as an ingredient. Henceforth, if the words 'rhino horn' were on the label of a product, the item was subject to CITES controls (Martin and Vigne 1987).

The main factor limiting the effectiveness of CITES today with regard to the ban on international trade in rhino products is the lack of workable mechanisms for transnational enforcement (Hubschle 2017b). While CITES lists recommendations on laws covering CITES-protected species, in most cases signing this international treaty does not oblige a country to enact domestic legislation; they can only be urged to do so. Moreover, verification can be difficult as record keeping is poor in many countries.

CITES does have the power to impose trade sanctions on a member state for not complying with the treaty rules (Reeve 2006). But such sanctions (restricting permitted trade in wild specimens listed on Appendices II and III) are very rarely applied. In practice, control of both international and internal trade in threatened species depends on political will. Lack of political commitment or ability among Parties to the Convention, as well as weak governance and corruption, are the main stumbling blocks to its effective implementation.

In China, recent attempts to control their trade in rhino horn date from December 1988 when the CITES Chinese Management Authority, under the Ministry of Forests, ordered all import/export corporations and drug manufacturing companies to register their rhino horn stocks. These were found to amount to 9,874.8 kg. At this time, about 650 kg of rhino horn a year were being used for manufacture of medicinal products in China (Martin 1990).

In October 1992 EM went to China on behalf of the United Nations Environment Programme (UNEP) as Special Envoy for Rhinos to encourage the government to consider a domestic ban on rhino horn. Then on 29 May 1993, following strong pressure from CITES, UNEP and the US government, the China State Council issued a notice making it illegal to import or export, buy, sell, transport, carry or mail rhino horn. This prohibition, ratified soon afterwards by the State Administration for Industry and Commerce, included a ban on the use of rhino horn for medicine, and required all domestic trade in medicinal products containing rhino horn to cease within six months.

When EM visited Beijing in 1993, officials complained that they lacked the resources to visit every store and seal up the stocks for storage in government offices, and that the government would suffer huge financial losses as a result of the ban. At a Rhino Donors' Conference held at UNEP in Nairobi in June 1993, China requested USD 1.6 million from the international community, to be matched by an equivalent Chinese contribution, to finance development and production of a rhino horn substitute by China's Ministry of Public Health; however, this never materialized. What happened to the 8,947 kg of rhino horn that had then (by September 1992) been registered, which included many antique cups and carvings of potentially great monetary and

cultural value, was never made public (Martin et al. 1993; Martin and Vigne 1994; Vigne and Martin 1994a).

The prohibition in China on trade in rhino horn was relaxed on 1 July 2003, when the State Administration of Cultural Heritage issued an ‘interim provision’ authorizing the sale at China’s auction houses of rhino horn carvings dated earlier than 1949, and their import and export (Wang, pers. comm., February 2016). However, while some dealers brought back rhino horn antiques legally from Western countries to auction in China, this legal market in antiques appears also to have provided cover for those trading illegally in non-antique rhino horn items (Gao et al. 2016). Sales of rhino horn products soared in the auction houses in 2010 and 2011. The fact that this coincided with a surge in rhino poaching in South Africa increased pressure on the Chinese government to close down this ‘grey market’, which it did on 15 December 2011 (Gao et al. 2016).

In 2014, as a further deterrent, the government introduced very strict penalties against the trade in rhino horn and other illegal wildlife products. Under Article 151 of the Criminal Law, those convicted of trafficking of rhino horn could be fined about RMB 1 million (about USD 150,000) and sentenced to more than five years in prison. The confiscation of property, life imprisonment or even the death penalty could be imposed for especially serious crimes involving illegal trade in valuable state-protected endangered species, including derivatives such as rhino horn. There are several examples of convictions under these new provisions of the law, especially for smuggling (Wang, pers. comm., February 2016; Crosta et al. 2017).

Despite these efforts by the Chinese government rhino horn continues to be traded on the grey and black market, facilitated by weak law enforcement along borders and, especially, in neighbouring countries. The growth also of online trading to meet Chinese demand for illegal wildlife is another major concern.

Although Vietnam became a signatory to CITES in 1994, until recently there was inadequate effort by government to apply the provisions of the treaty or protect endangered animals. In March 2014, however, in response to growing pressure from governments and international agencies, the Prime Minister issued a directive to enforce action to combat poaching and the trade in illegal wildlife products, including rhino horn (Nguyen and Willemsen 2015). The government has continued to strengthen legislation on wildlife crime. A second directive was issued in 2016 requiring all enforcement agencies to improve efforts to combat illegal wildlife trade (EIA 2016) and the new Penal Code 2017 has increased the maximum jail term for wildlife crime from 7 to 15 years (Education for Nature 2018).



Recent efforts to raise public awareness, as seen in this mural in Ho Chi Minh City in 2015, were too late for the Vietnamese subspecies of the Javan rhino, declared extinct in 2010.

Public awareness efforts aimed at reducing Vietnamese demand for rhino horn have also increased, with NGOs playing an active role in supporting the government and initiating their own campaigns, especially aimed at the young. However, according to Nguyen Manh Ha, former CITES officer in Vietnam (pers. comm., February 2016), there is no national strategic approach towards raising public awareness of wildlife crime, due to poor coordination and collaboration among government departments. At the Conference on Illegal Wildlife Trade held in Hanoi on 17–18 November 2016 and attended by representatives of 40 governments, Vietnam pledged to monitor domestic markets strictly and eradicate wildlife trade points, recognizing illegal wildlife trade as a serious crime (TRAFFIC 2016). However, rhino horn continues to be smuggled in, much of it from Mozambique, well concealed in shipments together with ivory and pangolin scales (EIA 2018a).

In Laos, trade in endangered species is regulated by Decree No. 185/CCM, issued by the Laotian Council of Ministers in 1986. Article 1 of this Decree states: “All kinds of wildlife trade, trade in animal articles, trophies, live or dead specimens of wild animals will be prohibited”. Under Category 1, the Decree lists native Lao animals in which trade is banned. In 1989 a further decree (No. 118/CCM) prohibited hunting of ‘totally protected animals’ and the import and export of ‘wildlife and aquatic animals, (living or dead)’ without official permission. Despite their strong wording, these

measures contain exemptions and leave a number of legal loopholes that have enabled trade in illegal wildlife products to continue. Moreover, these decrees only apply to native species, while non-native CITES-listed species are not mentioned. Compliance with CITES regulations with respect to international trade in endangered species is still very weak and this absence of controls has made Laos an attractive base for crime syndicates engaged in the illegal trade in rhino horn. So far the government has been unable to deal with the problem. There are few or no controls at ports and airports, and illegal wildlife products of non-native animals, including rhino horn, are traded openly once they have been successfully smuggled into the country. Corruption is endemic and, in the few cases where a wildlife criminal is arrested, payment of a small bribe is usually enough to secure their release, according to informants.

Similarly in Myanmar, although the protection of wildlife goes back to the Burma Wildlife Protection Act of 1936, with various updates since then (Vigne and Martin 2018), domestic legislation does not cover non-native CITES-listed species. Thus there is no restriction on domestic trade in rhino horn from Africa, or from neighbouring India. Implementation of the CITES ban on imports and exports of rhino horn through occasional border seizures, notably of Indian rhino horn (Emslie et al. 2016), is at present the only action taken by the government to restrict trade in these species. Moreover, legislation covering trade in native species appears to include an exemption that allows trade in medicinal products prepared from part of a protected wild animal or plant.

Trading conditions in eastern Asia

Wholesale prices

In 1987, the average price for a full raw African rhino horn in China was about USD 3,805 (Martin 1989). A similar price was reported to us by a traditional Vietnamese medicine doctor who sold a whole 1-kg African rhino horn in Hanoi for USD 5,000 in 1989 (Table 6). At this time, small Asian rhino horns could occasionally be offered for sale in the region. In 1990 in Laos, EM saw eight such rhino horns in four jewellery shops in the capital, Vientiane's Morning Market, including one with a Buddha carving on it. These very small horns from Sumatran and Javan rhinos (from Laos or Cambodia) were on sale for an average retail price of USD 16,549/kg (Martin 1992b). Bought mostly by Chinese from Thailand, they were about 30% cheaper than in Bangkok at the time (Martin 1992b). In 1993, one African rhino horn weighing 750 g was sold at a wholesale price of USD 6,000 (USD 8,000/kg) to a trader in Laos, who sold it very quickly to a Chinese customer for USD 10,000 (USD

13,300/kg) (Vigne 2013a). Generally in eastern Asia around this time Asian rhino horn was ten times the price per kilo of African horn in Southeast Asia, especially if both were equally available for sale (Stiles and Martin 1994).

Instigated by the economic boom in China and Vietnam in the early 2000s, wholesale prices for rhino horn rose rapidly across the region. By 2010 the wholesale price of raw rhino horn in Hanoi was USD 20,000/kg (Ammann 2013). Prices peaked across the region in 2012–13. By this time the wholesale price in China had risen to USD 60,000/kg with a top price of USD 65,000/kg, and prices of USD 65,000/kg were also reported in Vietnam and Laos (Ammann, pers. comms., 2017; Vigne and Martin 2016a).

By 2015, wholesale prices for raw rhino horn were generally about 50% lower than in 2012–13. They had fallen to USD 30,000/kg in China, between USD 29,000 and USD 35,100/kg in Vietnam, between USD 20,500 and 30,500/kg in Laos (Ammann, pers. comm., January 2016), and to USD 35,000/kg in Mong La in Myanmar. Prices continued to fall in 2016 and 2017. In Vietnam, the price was USD 26,000/kg in late 2016, while in 2017 prices ranged between USD 19,000 and USD 28,000/kg (Table 6). The latter was similar to the price of USD 26,500/kg recorded in China in early 2017 (Crosta et al. 2017). In Laos the price was USD 20,000/kg during our visit in late 2016 and as low as USD 19,000/kg in late 2017 (Karl Ammann, film maker, pers. comm., December 2017). In Myanmar prices in late 2017 ranged from USD 20,000 to 25,000/kg, depending on quality (Table 6).

Movements of rhino horn

With few exceptions (Box 9), the vast majority of raw rhino horns arriving in eastern Asia since 2012 have been from rhinos killed by poachers or acquired by other illegal means. Seizure data indicate that most of these rhino horns are destined for China or Vietnam. The Air Seizure Database maintained by the NGO Center for Advanced Defense Studies (C4ADS) recorded 85 seizures of rhino horn between January 2009 and August 2016, with most by

Box 9

Since 2012, small amounts of rhino horn continue to enter eastern Asia legally, taking advantage of a loophole in CITES that allows exports of listed species for taxidermy. In 2014 we saw a stuffed white rhino with two large horns on display in a prosperous Beijing antique centre. The two owners told us they had just imported it from Zimbabwe with all the correct CITES documentation. However, on a subsequent visit we saw that the horns had been removed from the rhino, which was no longer on display (Vigne and Martin 2016b).

weight (25 seizures weighing a total of 548 kg) headed for China. Evidence from official seizures suggests that smugglers often take roundabout routes through airports with weak security checks (Utermohlen and Baine 2017).

Since rhino horns are small objects compared with ivory they can be transported in numerous ways disguised and hidden amongst other goods. Some rhino horn is smuggled out of Africa by independent traders or opportunists returning from a visit to Africa. These travellers are sometimes arrested at airports with small amounts of rhino horn hidden in their suitcases. The larger-scale organized trade is controlled by kingpins who may have couriers on flights or may arrange for rhino horn to be transported in a shipping container along with legal wildlife products such as horns of other animals. Thus rhino horn is concealed in these legal shipments that have proper export documents. These kingpins, usually based in Asia, are well connected and very hard to catch. Rhino horns can change hands several times before reaching the final purchaser, making it difficult to break the supply chain. Law-enforcement efforts are being stepped up in the region, leading to seizures of rhino horn bound for Vietnam and, in some cases, the arrest of those involved (Box 10). Arrests of high-level traders, however, remain rare.

Some of the illegal trade routes from South Africa to Indochina and China, often via various and varying transit countries to confuse customs officials, were well documented by Julian Rademeyer (2012) after a two-year investigation. Rhino horn may be sent directly to ports in Vietnam or via ports in Thailand and Laos, and then overland to Vietnam. Once in Vietnam, the horn is transported to the northern part of the country that has easy access to China.

Rhino horn (and other illegal wildlife products) can be smuggled from Vietnam to China with relatively little hindrance, using bribery at control points when necessary. Some rhino horn moves from Vietnam into China's Yunnan Province through Jinghong or via Hekou Port to Kunming, often carried by Vietnamese smugglers to the Yunnan capital, Kunming, where it is clandestinely available for sale. Most is taken across the border to neighbouring Guangxi Zhuang Autonomous Region, often by local Vietnamese carriers who are paid a small fee for the risk of transporting it. Common routes are via tracks across mountains and hills travelling on motorbikes and on foot, or using boats for river crossings to reach the Chinese towns of Dongxing, Fangchenggang, Qinzhou and Tongzong. Scouts use smartphones to advise smugglers when routes are clear (Crosta et al. 2017). From these border towns the rhino horn is transported onwards to the Guangxi capital, Nanning. Dealers in Nanning prefer to place orders with suppliers in Vietnam to

Box 10

A number of seizures and arrests of Vietnamese rhino horn smugglers have been made at international airports. In March 2017, 46 rhino horns were seized at Hanoi's Noi Bai International Airport in two suitcases on a flight from Kenya. A month later Malaysian customs seized 18 rhino horns on a flight from Mozambique to Doha. In February 2018, Singapore authorities imposed a jail sentence of 15 months on a Vietnamese traveller who had been caught trying to smuggle eight pieces of cut rhino horn and a bag of shavings on a flight from Dubai to Laos. In July 2018, a Vietnamese man was stopped at Ho Chi Minh City's Tan Son Nhat International Airport attempting to smuggle in 12 rhino horns from Angola. On 13 August 2018 authorities seized 50 rhino horns in Kuala Lumpur International Airport destined for Hanoi. It is not clear how long they had been in storage (TRAFFIC 2018a)..

Rhino horn is also sometimes seized while being transported overland. In April 2017 alleged members of a wildlife trafficking ring were arrested at Hanoi Railway station called Tin Tuc with 33 kg of rhino horn which had been brought from Africa by air via Malaysia, Thailand and Cambodia and then by ship and train to Vietnam. Police subsequently found another 3 kg of rhino horn at the house of a suspected kingpin, Nguyen Mau Chien, along with other endangered wildlife products (Anon. 2017e). Another big seizure occurred in January 2018 when Thai police arrested a major Vietnamese rhino horn kingpin, Boonchai Bach, travelling with rhino horns from Ethiopia via Thailand en route to Vietnam. He and his family supplied rhino horns to major dealers in Laos, Vietnam and China, according to the Freeland Foundation, so this action by the Thai police was a big breakthrough (Phillips 2018). He was sentenced two years in prison in May 2018 (Associated Press 2018a).

meet orders from their clients elsewhere in China, rather than risk keeping a large stock (Crosta et al. 2017). Some rhino horn reaches Fujian Province or Guangdong Province, both famous for carving. Here, according to dealers we spoke to, it is processed and sold on to purchasers in large cities such as in Beijing and Shanghai.

Within China, processed rhino horn is distributed through a very secretive and closed trading network with sales taking place only to trusted customers. New products are, however, increasingly marketed online. The rhino horn is displayed on sale to members of exclusive social media groups on platforms such as WeChat that are joined by invitation only, with dealers using platforms such as Alipay to process payments (Crosta et al. 2017).

Many Chinese shoppers, both wholesalers and retailers, come to Vietnam themselves to buy rhino horn, especially hand-made goods that are on sale in villages in the north of the country. They often enter via land border crossings on China's southern border at Lao Cai, Lang Son, Huu Nghi, or further east

at Mong Cai. Typically, they cross the border by bus and then Vietnamese guides transport them by car to and from the border. Alternatively, for their return journey, trains and buses operate from Hanoi to Pingxiang on the Chinese side of the border, or to Nanning, and there are many flights from airports in Vietnam to the major cities in China. Small items of rhino horn they have purchased such as the common bead bracelets and bangles usually attract little attention and, if necessary, customs officials can be bribed to allow returning visitors to take their purchases into China. Shop owners can advise customers on easy border crossings or, alternatively, will organise delivery of any rhino horn items to several towns in China. There is so much cross-border trade that controls are too weak to check everything. In 2015 an investigator carried a 20-cm fake rhino horn in his hand luggage that was scanned twice by customs at the border crossing at Youyi Guan but no-one showed any concern (Liu 2015).

In recent years, Laos has played an increasingly important role in the rhino horn trade, both as an operational base for wildlife crime kingpins (Box 11) and as a retail outlet to growing numbers of Chinese tourists and business people in the country.

Box 11

In November 2012, some traders acting for a prominent Lao trader were arrested and sentenced in South Africa for their involvement in illegal rhino horn. The main trader arrested was a Thai named Chumlong Lemtongthai who operated as part of a sophisticated syndicate (Rademeyer 2012). Then in March 2013 the Lao kingpin Vixay Keosavang was exposed on the front page of the The International Herald Tribune for his involvement in wildlife trade and smuggling activities run by the same syndicate (Rademeyer 2012; Fuller 2013). This story was run during the CITES Conference in Bangkok where the Lao desk often remained unoccupied with the Lao officials keeping a very low profile. In 2013, the US State Department offered a hefty reward of USD 1 million for information leading to the arrest and prosecution of Vixay Keosavang. However, he remains at large in Laos and is still actively involved in the wildlife trade, managing a wild animal farm which also provides cover for trade in other endangered wildlife products (Parry 2018).

Rhino horn enters and leaves Laos by a number of routes. For example, an illegal shipment from Africa may arrive in a container destined for Thailand's Laem Chabang port. There, if necessary, the trader's agents can bribe customs officials to turn a blind eye, allowing the container with illegal items to be transported overland by lorry through Laos to Vietnam. Here it is opened and the illegal items are removed to be dispersed in smaller quantities back



In the Golden Triangle region, the Mekong River forms the boundary between Laos to the east and Thailand and Myanmar to the west. This photo was taken in northern Laos looking across the river to Thailand.

to Laos. This way, if illegal items are found, the official documents that must declare the country of origin, transit countries and destination country do not name Laos as the destination. There are many routes that can be used by traders to bring small quantities of processed rhino horn into Laos from Vietnam as the countries share a very long and porous border. Here again customs officials can be bribed if need be, or small items can be transported across minor border crossings in the hills that are not official border posts.

Rhino horn can also enter Laos from Thailand at points along the Mekong River, which forms a long border running from north to south between the two countries. Small quantities of rhino horn (as well as pangolin scales and other illegal wildlife products) can be transported across the river by boat or carried across one of the 'Friendship Bridges' that link the two countries. Traders often ask young boys to act as couriers across these bridges. If the police catch them, they are apparently reluctant to arrest them as they do not want to ruin their young lives with a police record—and they realize they will not get a bribe—so they prefer to send them off with a warning.

For onward transport from Laos to China small border crossings may be preferred as they do not have scanners. For example, illegal items can be smuggled along a lorry route for cattle via the small border crossing of Pakha in the northern Lao Province of Phongsali that also has a main road connecting Laos to Vietnam. The Chinese 'enclave' of Boten has a scanner, but is a major crossing route from Thailand via Laos to China.

The Golden Triangle area, where the borders of Thailand, Laos, and Myanmar meet at the confluence of the Ruak and Mekong Rivers, was famous in the past for opium growing and smuggling and has also long been notorious as a centre for illegal wildlife trade. Rhino horns and processed new rhino horn items are transported into the Golden Triangle area along the Mekong River between Thailand and Laos. In Laos, illegal wildlife sales take place in the gambling resort owned by the Kings Romans Group located in Laos in the so-called Golden Triangle Special Economic Zone. Rhino horn can be transported onward through the Golden Triangle area overland through Myanmar to the town of Mong La on the border with China. Mong La is popular with Chinese visitors and there is virtually no policing to control what goes on there, so Chinese retail buyers can easily smuggle rhino horn items across the border to take back home.

Patterns of rhino horn consumption since 2000

BACKGROUND

We were offered genuine rhino horn on display for sale in retail shops in all four countries visited during our studies, with least seen on view in the retail outlets of China. Nevertheless the Chinese are the principal consumers of rhino horn in the region (in part simply because the population of China is so large). As noted above, rhino horn was traditionally used in China for medicinal purposes, as well as for carving works of art. Results of recent questionnaires in China confirm that rhino horn is increasingly purchased by rich Chinese consumers as a luxury item, for prestige, and as an investment (Kennaugh 2016; Susie Offord-Woolley, Save the Rhino International, pers. comm., February 2016). Our experiences talking to Chinese traders in the region and watching Chinese customers shopping agree with these findings.

Demand for rhino horn is also increasing among newly-rich Vietnamese, both as a status symbol and for medicinal use. However, according to traders in Vietnam who we spoke to in 2016, the Chinese are the main purchasers of rhino horn items, with perhaps only 10% bought by Vietnamese customers (Nguyen Manh Ha, pers. comm., February 2016).

By contrast people of Laos and Myanmar have no interest in African rhino horn, nor can they afford to buy it. Dealers in Laos repeatedly told us that only the Vietnamese and Chinese purchase African rhino horn. In Myanmar we were told that only the mainland Chinese there buy rhino horn. As noted above, the Lao traditionally revered their own rhino horns as a source of good fortune, but African rhino horns are not wanted for this purpose as these do not originate in Laos and cannot appease the Lao spirits. The Lao

also have no interest in rhino horn decorative items; those with a little money to spare prefer to buy gold, which is considered a safer investment. Lao traditional pharmacists have no interest in rhino horn, although those we spoke to knew about the importance of rhino horn in traditional Chinese and Vietnamese medicine. Chinese and Vietnamese men may be seen in coffee shops in Laos with a little piece of rhino horn, ground into powder and put fresh in their coffee for medicinal purposes. The Lao generally find these practices distasteful (Vigne 2013a,b).

TRADITIONAL MEDICINE

In China, traditional Chinese medicine was encouraged during the Cultural Revolution and, as our guide and translator explained to us, it is still common for Chinese people to take a combination of traditional and Western medicines, often preferring traditional medicines that have fewer side effects. A detailed questionnaire survey conducted in 2014 in Beijing, Shanghai, Guangzhou, Kunming and Harbin showed that 48.3% of the respondents thought that rhino horn was primarily medicinal, while only 12.2% mentioned that it was used for luxury goods (Kennaugh 2016). Most buyers of the more expensive medicinal products are in urban areas, but a latent demand for these remains in rural areas amongst those with less money, who would buy rhino horn for medicinal use if they could afford it. In the mega-cities of Beijing and Shanghai, more people are aware that rhino horn is banned and, based on the results of the questionnaire, this appears to have reduced demand compared with other cities such as Guangzhou, Harbin and Kunming (Kennaugh 2016).



Traditional medicines containing rhino horn such as these were produced by government factories in China until 1993.

ANTIQUES

In China it was the growth of interest in rhino horn antique carvings in the early 2000s that reignited the trade in expensive rhino horn artefacts in China. As previously mentioned, auctions of rhino horn were permitted from 2003 to 2011. Sales of these artefacts shot up from 2005 and grew exponentially from 2009 to 2011 with thousands of pieces sold, although it was not clear how many were fakes or newer items. Old rhino horn cups and carvings were increasingly sought after by collectors and investors as a hedge against inflation and to diversify portfolios (Gao et al. 2016), until this grey market was closed down on 15 December 2011. Antique rhino horn objects are sometimes still sold at private collectors' exhibitions that require a special pass to enter. We visited one such showroom displaying many antiques in Beijing in May 2014 but saw only fake Asian horn and fake antique libation cups (although the vendors thought they were real). A few Chinese would bring antique trophy horns from the US (with proper CITES documentation) into China (Stiles, pers. comm., September 2018). Some antique dealers we spoke to in Beijing told us they had bought antique works of art in Western countries, to bring home legally to China to reclaim their national heritage and sell to discerning collectors. But less experienced buyers may be tricked into buying fakes.



For centuries in China, rhino horn was carved into works of art such as this cup.

In our surveys, we found no evidence of consumer interest in modern hand-carved rhino horn works of art. Some Vietnamese have skills equal to those of many Chinese carvers, due to historical Chinese artistic influence, and they would be able to produce intricate carvings of Chinese design. But Chinese carvers told us that most modern Chinese consumers buy plain and machine processed rhino horn items as a status symbol and are not interested in works of art.

TROPHIES

Some wealthy Chinese and Vietnamese like to display rhino horns mounted on their walls, sometimes together with mounted horns of other species. There are villages near Hanoi where local craftsmen specialize in mounting and selling legally acquired horns, especially from the impressive ankole cow, as well as kudu, oryx and impala horns from Africa and reindeer antlers from Russia. Some artisans, if requested, will mount rhino horns in the style of trophies. These are popular among some consumers in China and Vietnam who believe that trophies of strong animals on their walls give them power and protection in their houses and offices.

ACCESSORIES

The main recent development affecting patterns of consumption has been a huge increase in the production of expensive accessories, mainly jewellery and utilitarian items. Demand for these objects, which can be produced quickly and cheaply and require no carving skills, has soared among the newly rich, who simply want what is new and in vogue and to show off their wealth. A notable feature of the jewellery items on sale is that many of them are large sizes, designed to be worn by men. Nobody could have anticipated this new demand or predicted that it would have such an impact on the demand for rhino horn, in Vietnam and subsequently across the region.

These items were first produced by Vietnamese artisans working in villages around Hanoi who also made similar wood and horn accessories. The new rhino horn accessories, they told us, were principally for Chinese consumers. By 2012/2013 they could not keep up with demand for rhino horn items. They were processing several horns and selling hundreds of bangles every week, sometimes to customers who would buy ten at a time to resell in China (Ammann 2013). During our survey work, the most commonly sold items were plain bangles, big bead bracelets, and large pendants. All the items on sale could be produced quickly using simple machines. This allowed a fast turnover of these illegal and expensive objects, fuelling the trade even more. Most were sold plain and buyers had the option to choose a design, which could be added in a few days following payment of a deposit at little

additional cost. Traders told us most purchasers would rather just have a simple plain item made of rhino horn. Then, the buyer could easily re-sell the item if he needed the money or, if he needed emergency ‘medicine’, he could shave a piece off an item to drink in tea, doubling up its use.

In Laos, the number of Chinese-owned retail outlets selling rhino horn accessories increased noticeably from 2014 to 2016 (Vigne and Martin 2017b) with Chinese in Laos starting to make their own machine-made items for sale (Box 12). In 2017, similar products were seen on sale in Mong La in Myanmar.

Box 12

In 2016 whole rhino horns were becoming more available in Laos. Chinese traders were purchasing these horns to make their own accessories using sophisticated computer-run machines imported from China and costing about USD 30,000. In 2016, we watched the production of a machine-made item on a Chinese vendor’s smartphone, observing the long white shavings of rhino horn spilling off the item as it spun around on the machine. Leftovers from machine- and hand-made items are sold in Laos to the Chinese for traditional medicinal use, the vendors explained, for example to make a special tea for children to reduce fever.

For Chinese traders it is faster and easier to make their own rhino horn items than having them made in Vietnam, where artisans are expecting higher wages as the economy grows. The Lao, unlike the Vietnamese, have no tradition in carving items of Chinese style and are rarely involved in the process.

NEW MEDICINAL USES

Rhino horn is now used ‘medicinally’ for purposes that go far beyond its uses in TCM and traditional Vietnamese medicine (TVM). These new practices appeared to have originated in Vietnam and have now proliferated in the region.

Between 2002 and 2007, at least five Vietnamese language pharmacopoeias were published with sections describing rhino horn as a Vietnamese medicine (Milliken and Shaw 2012). Rhino horn is considered to ‘detoxify’ the body and has become popular among rich businessmen, to be taken after the consumption of too much rich food and alcohol, especially as a hangover cure. Diners at business dinners sometimes use special plates, with a rough surface, to grind the rhino horn into powder to put into their tea at the end of the meal. These plates were originally made in the village of Bat Trang near Hanoi (Rademeyer 2012), and they could be seen for sale in traditional

medicine streets of Hanoi. Karl Ammann brought one to the 2013 CITES conference in Bangkok to show delegates what was happening to rhino horn in Vietnam (Martin and Vigne 2013).

In recent years the belief has grown that rhino horn can be used to treat cancer (Box 13). It appears this idea spread rapidly in Vietnam from around 2006 when a senior Vietnamese Communist Party official recovered from his cancer apparently thanks to taking rhino horn (Rademeyer 2012).

Box 13

In late 2015 we visited a cancer hospital in Hanoi where the doctors treat patients with Western drugs; the doctors we spoke to were aware that patients would try anything to get better, including rhino horn. During the same visit, an educated woman working at a museum in Hanoi said that 19 years earlier her father had lung cancer and a friend had told her that rhino horn was good for cancer. She obtained some from a friend hoping it might work, but he died the same year. In 2008 she bought another small 3–4 cm piece from a friend in Hanoi who had been in Africa. She ground up some of it to drink in water for good health and kept it at home for when she might need it. Her mother also kept a small piece of rhino horn and believed it was mostly used to reduce a hangover. They had no thought about it being illegal or about rhinos being poached.

A traditional Vietnamese medicine doctor we spoke to admitted that the curative effects of rhino horn were much weaker than people think, and to stop pain it was better to take a paracetamol. Moreover, he reiterated that rhino horn was not used traditionally as a treatment for cancer. He was aware that the traditional Vietnamese medicine association at state level had told people not to buy rhino horn for medicine. But he explained that the Vietnamese, especially older people, will try anything if it is rumoured to work, even though not supported by official advice. There is a Vietnamese saying, 'Co benh vaitu Phuong', meaning 'when you have a disease you will try anything to cure it,' and many Vietnamese continue to think expensive medicines are more likely to work. This attitude is mocked in another saying, 'Tien mat tat mang!', meaning 'your money has gone but the problem/disease is still there!'

Rhino horn is now also marketed in Vietnam as an aphrodisiac (Hsu 2017). This is a new development as rhino horn is not used for this purpose in TCM or TVM. Historically, this belief was confined to a group of Gujaratis living near Mumbai, India, where practitioners of Unani traditional medicine prescribed rhino horn as an aphrodisiac. This information may have been communicated to early European explorers in Africa by Gujarati Indians

living in Zanzibar (Vigne and Martin 1987), thus giving rise to the much publicized ‘Western myth’, that rhino horn was considered an aphrodisiac in the Far East. Ironically this Western myth about traditional Chinese belief has inspired a modern ‘genuine’ belief that is now proliferating in Vietnam and elsewhere in the region.

Results of surveys of retail outlets

China

In our surveys in China in 2014 and 2015 we visited many antique and curio shops in 10 major cities and did not see genuine antique rhino horn cups displayed. Aware that as Westerners we would not buy rhino horn, nobody tried to sell us these even from photos on their smartphones, as sometimes happened with ivory. Traditional medicine shops we visited did not display rhino horn, and traditional pharmacists we spoke to were adamant they did not sell it as it was strictly banned.

In 2014, the only genuine rhino horn item we saw on display was an old dagger handle, measuring 12 × 4 cm in a curio shop in one of Beijing’s large antique centres, on sale for the equivalent of USD 10.62/g. The vendor wanted to prove it was rhino horn by using a torch to display the typical amber glow, with hair-like strands clearly visible. A vendor in Beijing in 2014 tried to sell us what looked like an old Asian (greater-one horned) rhino horn that was priced at the equivalent of USD 188/g retail, but it turned out to be fake.

In late 2015, the only time we spotted genuine rhino horn on display for sale was in an expensive jade shop in a tourist area of Tianjin, where four pieces of raw horn, looking fresh and pale in colour, were in clear view amongst some jade bangles in a glass display cabinet. We were told they were for medicinal use. They were wrapped cleanly in new cellophane and weighed 55, 53.4, 8.1 and 8 g, according to the hand-written labels.

Regarding prices, evidence from the auction market show they shot up from the early 2000s onwards, peaking in 2011 (Wang, pers. comm., February 2016). Auction prices in 2011 (before the government shut down the auction houses in December 2011) ranged from USD 72/g for uncarved horns to USD 490/g for prized antique works of Chinese art (Gao et al. 2016). The pieces of raw rhino horn in the jade shop in Tianjin in 2015 were on retail sale for the highest price we saw, at USD 248/g on average, after a discount, while a rhino horn bangle on sale in Beijing in the same year was selling at only USD 73/g (Crosta et al. 2017). According to Karl Ammann, the usual retail price for worked rhino horn in 2014 and 2015 was USD 120/g (Vigne and Martin 2016a).

Prices of rhino horn items on sale in China in 2016 and 2017 were also very variable. As elsewhere nowadays, prices were higher for darker coloured items, which dealers told us is preferred to 'yellow or white' horn. The core of a rhino horn tends to contain melanin as well as calcium deposits making it stronger (Britt 2006). Some believe the darkness relates to dark blood colouring in the horn indicating it was taken from an animal that was alive or fresh. Mottled dark spots around the core make it even more expensive as this so-called 'roe or caviar' patterning shows clearly that it is rhino horn, since this is not seen in other horns and is difficult to mimic. Crosta et al. (2017) report



Dark rhino horn is the most expensive.

the results of undercover work in several towns and cities in southern China, where there is more rhino horn for sale due to the proximity of Vietnam. Retail prices for new rhino horn were generally quoted at USD 73/g for pale items and USD 117–140/g for high quality 'black' items, including some with the preferred 'roe' spots. Most items offered for sale were large bead bracelets and large pendant discs (also called plates). One dealer explained he could cut one horn into 20 pieces plus the tip. Prices of plain items depended on size, quality and colour, while an additional sum of USD 73–87 would be charged to carve an item, which would take 1.5 days. Offcut scrap pieces sold for USD 26–50/g while grounded powder was 15–30/g. Customers can either visit outlets and examine the items on display or make a deal on WeChat and pay via Alipay, and then the dealer will ship the products to them via courier (Crosta et al. 2017).

Dealers rarely offer Sumatran rhino horn, saying it is no longer available. However, in response to inquiries by undercover investigators, one vendor in Guangdong Province produced an 18-g piece of Sumatran horn from a box at the bottom of a glass display case, on sale for USD 244/g; another in Kunming quoted prices of USD 584–730/g for Asian rhino horn pendants and USD 260/g for Asian rhino horn for medicinal use (Crosta et al. 2017). These prices are about ten times those of African rhino horn.

Vietnam

On our visit in late 2015 we saw no rhino horn on display in shops in Ho Chi Minh City or Hanoi. The presence of Westerners had led to better law enforcement in these cities and police had warned shopkeepers not to sell rhino horn products. In one traditional medicine shop in Ho Chi Minh City, the vendor displayed a sign in Vietnamese saying 'don't buy rhino horn' with a picture of a white rhino to inform and warn customers. In the town of Buon Ma Thuot we did see a 1-cm piece of genuine rhino horn on display in a small souvenir shop for sale for USD 44 or 15/g. The vendor explained it was used by the Vietnamese and should be ground into a powder and added to water to drink. Its effect, he said, was to keep the body in general good health.

Only by going out to villages around Hanoi, where Western tourists rarely go, was it possible to find genuine rhino horn products on open display for sale, both as medicine and as accessories (Vigne and Martin 2016a). Villages specializing in selling animal horns and producing wooden handicrafts had adapted their skills, mostly using the same old-fashioned mechanical contraptions to process beaded bracelets, bangles and other items made of rhino horn that they freely admitted was from South Africa. The villages are only 150 km away from the Chinese border and are thus easily accessible to Chinese visitors, who are attracted by the low prices of handicrafts on sale directly at the point of production. On our visits to these villages we saw Chinese visitors shopping, and vendors confirmed the Chinese were their principal customers. One vendor explained that the Chinese buy most of everything, stating "only a few of the richest Vietnamese buy anything in our village". Some Vietnamese vendors have learned Mandarin to communicate with their main customers. In some villages we saw expensive new houses constructed, presumably, with profits from the rhino horn trade.

In one main village with retail outlets we counted six shops displaying rhino horn items on its two main streets, alongside ivory and wood items and a few other endangered wildlife products. In late 2015 we itemized 58 rhino horn items for sale in these six shops (9.6 items per shop), including 20 pendants, 7 large bead bracelets, 4 bangles, 4 tiny cups, 3 whole rhino horns, and 1 beaded necklace, as well as 9 large raw rhino horn pieces and 10 large packets of shavings for medicine (Table 7). Other shops in this village also offered rhino horn, unprocessed and processed, but not on display. Much was hidden in back rooms and on sale only to trusted buyers.

Table 7. Number and types of rhino horn items on display for retail sale in 6 shops in a village in Vietnam, late 2015

Item	No. counted	Prices obtained per item (USD)
Bangle, big	4	1,961, 2,197
Cup	4	1,573
Bracelet, big beads	7	3,233
Necklace, small beads	1	–
Pendant	20	1,590
Rhino horn large pieces (medicine)	9	13 (per gram)
Rhino horn shavings (medicine)	10	–
Whole African rhino horn	3	–
Total	58	–

Source: Survey by the authors; – unavailable

In these villages the rough raw outer part of a white rhino horn from South Africa was on sale for medicinal use at only USD 13/g for large pieces weighing up to 236 g. These were the outer scraps from bangles and cups made from the central part of the horn. This price was significantly lower than in Hanoi, where a traditional medicine practitioner told us that the retail price for a piece of raw rhino horn was equivalent to USD 39/g.

Most rhino horn items of jewellery we saw were sold by weight, as they had no artistic value. The village shops have calipers to measure items and small electronic digital scales on their counters, as well as torches to check an item's authenticity and quality. Prices for these processed items were around USD 53/g. For example, a 30-g pale beige pendant was USD 1,590. A small 29-g plain Chinese cup was USD 1,573, a 37-g pale bangle was USD 1,961 and a 61-g beaded bracelet was USD 3,233. In a nearby shop there was a 19.8-g bangle in a red box with pale blue satin lining selling for the equivalent of USD 2,197 or USD 111/g, which was more expensive than other items. The retail prices we recorded were higher than those found in the same village by another investigator earlier in 2015, when they ranged from USD 16.50 to 30.60/g (Liu 2015). Nevertheless, prices in our survey were substantially lower than those recorded in 2012/2013, when vendors could not keep up with demand from Chinese customers, who were buying up the best bangles to resell in China (Ammann 2013). The artisans we spoke to confirmed that, by 2015, they had reduced retail prices for their main customers by about half compared with 2012/2013, reflecting the fall in the wholesale price of raw horn.

In the past, law enforcement in these northern villages around Hanoi was poor and, when we were there, it seemed the villagers were free to make and sell whatever they wanted. The government supported the artisans in order to encourage them to stay in their villages. However in 2016, a year after our visit, representatives of the Hague-based NGO Wildlife Justice Commission met senior members of Vietnam’s law enforcement agencies, who subsequently attempted to clamp down on these open displays of rhino horn (and other illegal wildlife products). An ongoing law enforcement effort aims to dismantle the organizations of high-level traffickers involved (Wildlife Justice Commission 2017). According to informants, vendors in the villages with rhino horn around Hanoi now generally keep it in back rooms and show it only to known and trusted customers. Foreigners are no longer welcome into the shops, as vendors fear they may be investigators. As in China, with improved law enforcement, the illegal trade appears to have gone further underground. Vietnamese crime syndicates, however, continue to smuggle new rhino horn into Vietnam to meet demand in mainland China (EIA 2018a).



In this bowl of ivory crosses a small piece of rhino horn was openly on sale for use in traditional Vietnamese medicine in Buon Ma Thuot.

Laos

In contrast to China and Vietnam, on our visit to Laos in late 2016 we saw new rhino horn items openly on sale in several well-known locations across the country, i.e. Vientiane, Luang Prabang, Oudom Xay and also the casino resort of the Kings Romans Group in the so-called Laos Golden Triangle Special Economic Zone. Customers we saw on our visits to Laos were nearly all Chinese, plus a very few South Koreans. Vendors were also nearly all Chinese, although a few vendors and middlemen/women were Vietnamese who had links to rhino horn traders in Vietnam. Some businesses in Laos are run by married couples of mixed nationality, Chinese and Vietnamese, or Chinese and Lao. Generally Lao people prefer to deal with the Vietnamese rather than the Chinese, while the Chinese prefer to deal with other Chinese, or with Vietnamese. Factors influencing these preferences include ease of communication, cultural differences and past histories.

Vendors in Laos entice prospective customers by remarking that it is difficult to find rhino horn items in the shops. “Even if you have money, you have to be lucky”, one vendor said. Shop owners are fully aware that rhino horn products are illegal and, if Westerners start to look at them, the vendor will generally usher them out of the shop to avoid difficult questions, or simply say the item is made of buffalo horn or bone. However, if the vendors believe they are speaking to a possible buyer, they become more relaxed and will remove items from the safety of the glass display cabinets to be examined. One vendor in Luang Prabang explained the high price of the item by pointing to her nose with a curved gesture to create the shape of a rhino horn, as she did not know the English name of the animal.

Vendors in Laos just want to sell their items and it does not concern them that it is illegal to take out of the country, even though they know that most customers come from abroad. As was the case for ivory, everyone we spoke to agreed that it was no problem to take small items abroad and, they said, it was especially easy to carry them across the border.

In late 2016 we found 10 shops in the capital, Vientiane selling rhino horn items. These were all Chinese shops that sold ivory items as well. Five were in luxury hotels for mainly Chinese clientele, four were in the large Chinese-run Sanjiang market (where most new ivory items were for sale), and one was a Chinese shop selling rosewood furniture. There were a total of 56 items on sale (5.6 per shop), including 26 medicinal items (packets of chips and shavings), and 30 ornamental items. The latter comprised 9 bead bracelets, 6 large pendants, 4 bangles, 4 tiny cups, three packets of toothpicks, 2 pendant bead-necklaces, a small teapot, and one full Asian rhino horn (Table 8). All appeared to be recently made from African rhino horn and no antiques were seen.

Table 8. Number and types of rhino horn display items for sale in the main areas of Laos, late 2016

Item	Number of rhino horn items and medicines counted			
	Vientiane (10 shops)	Luang Prabang (4 shops)	Kings Romans (2 shops)	Totals (16 shops)
Bangle, big	4	4	11	19
Bracelet, big beads	9	4	13	26
Cup, bowl	4		16	20
Necklace, small beads	2	3	3	22
Pendant/disc	6	7	17	30
Teapot, small	1	–	1	2
Toothpick packets	3			3
Rhino horn chips/shavings (medicine)	26	10	14	46
Rhino horn tip, carved	–	–	1	1
Whole African rhino horn	–		1	1
Whole Asian rhino horn	1	2	–	3
Total	56	30	77	163

Source: Survey by the authors; – items were not on display

Rhino horn items most commonly seen in the retail outlets were large pendants, i.e. cross-sectional slices of rhino horn in the form of a disc or an oval. Those with a dark core in the shape of a heart were especially in demand, we were told, as the shape resembles the leaf of the sacred Bodhi Tree (*Ficus religiosa*) under which the Buddha is said to have found enlightenment. The largest pieces with extensive mottling were also particularly sought after and more expensive. Usually items had been freshly made and were covered in oil to protect them (one vendor remarked they used Johnson’s Baby Oil). Some were wrapped in cellophane or kept in plastic bags or plastic Petri dishes. This treatment keeps the rhino horn from cracking or losing weight from desiccation, and is especially needed for fresh horn, that contains more moisture.

Rhino horn pendants on display were usually plain, unlike the far more numerous ivory pendants which are nearly always ready carved. This allows the customer to choose a relief carving and, for the vendor, avoids the risk of having this rarer item in stock that a customer may not want. One young Chinese vendor in a Vientiane hotel shop consulted her father on her smartphone before telling us it would take a week to get

the disc carved and we would have to leave a USD 100 deposit. Some very low-relief carved items, that looked mass produced, were also seen on display. These had apparently been introduced as an experiment to attract customers. Prices for these depended largely on weight and colour, vendors told us, and were often the same as for plain items on sale.

One Chinese shop selling ivory items in Vientiane had a 2-litre jar of rhino horn leftover shavings stored under the counter for those asking for it as medicine. The young vendor explained that it was his father's shop and the shavings were leftovers from the production of the rhino horn items his father had ordered. He kept a small stock of rhino horn accessories made by the same artisans who produced his ivory accessories, mostly in the same styles. The vendor said he only sold pure 100% rhino horn. His father added to their display before the Chinese New Year when people buy gifts and demand is highest.

The historic town of Luang Prabang is increasingly popular with Chinese tourists. Numerous Chinese souvenir shops now line the famous main street attracting Chinese tourists. These Chinese-owned shops are squeezing out the traditional Lao shopkeepers, to their dismay. Some of the Chinese shops display a few rhino horn items alongside more numerous ivory items and handicrafts. During our survey in late 2016, there were 4 retail shops seen with 30 rhino horn items on sale (7.5 per shop). All were in Chinese-owned and Chinese-run shops selling souvenirs, jewellery and wood. No antique shops, which were usually Lao owned, had antique rhino horn objects on display. Rhino horn items on sale included 10 containers of powder and chips for medicinal use and 18 jewellery items, comprising 7 large pendants, 4 bangles, 4 large bead bracelets, and 3 bead necklaces. There were also 2 small horns that vendors claimed were from Asian rhinos on sale for the same price (per gram) as African horn. The vendors remarked that Chinese buyers today prefer large horns as they are more versatile for making big accessories; while, for the dealer, they provide more discarded chips and shavings to sell as TCM (Table 8).

The town of Oudom Xay in northern Laos is located at an important road junction for vehicles travelling between Vietnam and China. Here we saw a recently-built Chinese shop selling woods and teas where there was one large packet of rhino horn shavings on sale, as well an unusual necklace with alternating beads of rhino horn and agarwood (*Lignum aquila*, also known as eagle-wood). This is the most valuable wood for jewellery and a favourite with the Chinese. It was interesting to see this example of a new type of jewellery combining various materials, made presumably with the aim of attracting new Chinese buyers.

The largest number of rhino horn items on display in Laos was seen at the Kings Romans casino complex. This resort is in the recently developed Golden Triangle Special Economic Zone, tucked away in Bokeo Province in the northwest of the country, and strategically located on the eastern bank of the Mekong River opposite Thailand and close to Myanmar. The 3,000 hectare site was sold in 2007 by the Lao government to the Chinese-owned company, the Kings Romans Group on a 99-year lease. The Kings Romans Group has an 80% shareholding in the business and the Lao government owns the remaining 20% (EIA 2015). The casino caters mainly to Chinese gamblers, as gambling is prohibited in China, and is effectively a Chinese 'enclave' in Laos, with its own policing, running on Beijing time (an hour ahead of the rest of Laos) and using Chinese currency yuan/renminbi) for all transactions. The staff are mainly Chinese, with some low-level employees from Myanmar, but hardly any Lao people are present in the resort.

This casino resort has been referred to as Sin City, where anything goes (EIA 2015). It is frequented by rich Chinese gamblers, who indulge in lavish banquets, prostitution and general excess. Its location is ideal for cross-border trade in illegal and endangered wildlife products, which are particularly sought after among some of the richer visitors there. Some of the guests consume products made from tigers and bears, mostly sourced from captive animals at the resort's 'zoo'. Next to the huge casino complex and hotel is a purpose-built 'traditional' Chinatown offering products and services to visitors. Here, in two shops selling mostly ivory, 77 rhino horn objects were on view (38.5 per shop) alongside other endangered wildlife products. One shop had 10 medicinal items (all rough outer rhino horn pieces) and 48 processed items, and the other shop had 4 medicinal items (packets of shavings) and 15 processed items. These were all on display on the top shelves of glass counters, and included (in total) 17 large pendants, 16 cups and bowls, 13 bead bracelets, 11 big bangles, 3 bead necklaces with pendants, a small teapot, a carved Buddha rhino horn tip, and one whole rhino horn, partly carved (Table 8). During our visit some shops were closed to restock for Chinese New Year, when they are busy with shoppers buying special luxury items as presents for friends, colleagues and family members. People who visited the resort two weeks after our survey told us that that they had seen more shops with even more rhino horn items on display.

Vendors at the Kings Romans resort stated that the rhino horn on sale was from Africa and had been processed by Chinese living in Vientiane. They would not buy from people they did not know who might be selling fake rhino horn. We saw some of the largest items for sale in Laos in this resort, where rich Chinese gamblers like to buy expensive objects to show off their considerable wealth or celebrate their winnings at the gaming tables. A big



Several Chinese shops in Luang Prabang's main street display rhino horn items for sale to Chinese visitors.

and dark item is more expensive to buy per gram, as a larger and better rhino horn is needed, so these are the most sought after items, vendors explained. The price of a large pendant with low-relief decoration was the same as for a plain one. It was simply the material one was paying for, the vendors explained. We saw the biggest 'plates' of rhino horn here (still listed as 'pendants' in the tables), some cut from the widest circumference of the horn. As elsewhere in Laos, we saw no small charms (which are often seen made of ivory), as customers prefer large items that are more readily recognizable as rhino horn.

Retail prices were similar in Vientiane and Luang Prabang, where they averaged USD 77 and USD 75/g respectively. In Vientiane, in an expensive hotel gift shop popular with the Chinese, rhino horn items were sold by weight at USD 87/g. In another, rhino horn discs cost USD 40–120/g, some lightly engraved with religious motifs at no additional cost. In the Sanjiang market, a plain disc pendant, was on sale for USD 60/g.

In Luang Prabang a beige-coloured rhino horn bangle in a jewellery shop in the main tourist area was selling in an airtight Petri dish container for USD 4,344; the bangle was marked as weighing 39.6 g so the price was USD 109/g.

A bead bracelet with 12 beads labelled 54.6 g cost USD 4,320 (USD 79/g). In a Chinese shop selling wood items in a quiet area less visited by tourists, the owner had recently bought rhino horn items to sell for the first time. Here a rhino horn necklace with 108 (a sacred Buddhist number) beads weighing 70.6 g was on sale for USD 2,559.26 or USD 36/g. The vendor said he charged the same price per gram for his other rhino horn items.

Prices for processed items were highest in the Kings Romans complex, where they averaged USD 130/g and ranged from USD 104/g for pale items to USD 155/g for an item made from the darkest part of the horn, which was the highest price seen in Laos and anywhere during our investigations (Table 9). Most of the darkest, rarest, biggest and thus best items we saw in Laos were here in this affluent gambling complex.

Table 9. Retail price range (USD per gram) for rhino horn objects seen on view for sale in shops in Vietnam, Laos and Myanmar, 2015-2017

Country/date of survey	Items	Medicine
Vietnam 2015	53–111	13–22
Laos 2016	36–155	10–33
Myanmar 2017	100–133	–

Source: Surveys by the authors; – unavailable

In Laos rhino horn scrap (chips and shavings) was on sale for prices ranging from USD 10 to 33/g (Table 9). In Vientiane, the price for powder in a glass bottle in a Chinese hotel shop was USD 20/g. In a shop in the Sanjiang market chips and shavings were packaged in 10-g bags and priced at USD 230 each (USD 23/g). In Luang Prabang the price of chips and powder varied according to a customer’s bargaining skills. A small screw-lid glass bottle containing 9.2 g of rhino horn powder was priced at USD 93, or just over USD 10/g. This price was also recorded by Karl Ammann, who saw a bottle containing 7.5 g of rhino horn powder priced at USD 75 (Ammann 2018a). The previous year (late 2015) 2-g and 3-g pieces were seen on sale for USD 20/g and USA 16.6/g respectively, but in late 2016 bottles containing cheaper powder were more in evidence. In the Kings Romans complex, prices of rhino horn scrap were higher than elsewhere, for example USD 100 for a small rough outer piece of horn weighing 3 grams (USD 33/g).

In our 2016 survey, a shopkeeper selling curios in Luang Prabang told us that a Vietnamese man had recently offered to sell him a whole African rhino horn. He had declined to buy it, he said, but added it was likely more horns were being offered to Chinese shop owners in the centre of town, where most Chinese tourists go, for sale from ‘under the counter’. This dealer said

it was not a good time to buy rhino horn. The speed at which the price had fallen, from USD 60,000/kg in 2013 to USD 20,000 in 2016, made him think it might continue to fall, so it didn't seem a good investment. The situation was similar for ivory: the price of raw ivory in Luang Prabang had been USD 2,000/kg four years previously and by late 2016 had fallen to USD 714/kg. One dealer expressed the hope that reduced prices would help stimulate consumer demand. However it appeared that most vendors were keeping their same retail prices for rhino horn items as before, waiting for sales to improve, and those with newly-acquired items were hoping for more of a profit.

Myanmar

In late 2017, no rhino horn items were seen in Yangon, Mandalay or Tachileik, where there were many ivory items for sale. (There is a small ivory carving industry in the country due to the presence of over 5,000 captive elephants, the largest number in the world; Vigne and Martin 2018). Rhino horn accessories in Myanmar were seen openly on sale only in the Chinese 'enclave' of Mong La in eastern Shan State. The area is inhabited by the Shan people (a Tai ethnic group of Southeast Asia) who mainly live in small rural villages where they farm subsistence and cash crops. Like the Kings Romans casino complex in Laos, Mong La was originally developed for casino-goers from China (where gambling is prohibited). It became known as a centre of gambling and prostitution and was considered a den of iniquity. In January 2005, the Chinese government sent troops across the border into Myanmar, reportedly to close down the casinos in the town. However, by 2007, more casinos had been built further away from the border and out of sight. Today there are at least 28 casinos in operation (Rose 2015). Many Chinese continue to come to gamble in these casinos, impervious to Chinese government efforts to stop them.

The Myanmar government also has little control of illicit activities in this far-eastern border area of the country, which is known as Special Region 4. It is run by the ethnic Shan National Democratic Alliance Army (NDAA) led by the Shan-Chinese businessman Sai Lin. Like the Kings Romans casino resort, Mong La operates on Beijing time (90 minutes ahead of Myanmar time), and traders there only accept Chinese currency. Mong La has also been called 'Sin City' by journalists, and is renowned as a place where people with money can do as they wish without any interference by the Myanmar government (Rose 2015). As in Laos, much of the illegal wildlife trade here appears to be enabled by well-connected kingpins who are immune from law enforcement (Box 14).

Box 14

One of the key players initially in Mong La was Zhao Wei, a Chinese casino developer who moved to Mong La from Macau in 2001 to operate one of the town's biggest casinos. When the Chinese government took action against the casinos in Mong La in 2005, he and his wife Su Guikin switched their attention to Laos, where they found an area to set up the Golden Triangle Special Economic Zone and developed a casino resort there, owned and managed by their company, the Kings Romans Group. Zhao Wei still has direct links with Mong La and his powerful contacts are believed to include highly-placed members of the United Wa State Army, who operate in Special Region 2, an area on the border with China that is 'out of bounds' but where, with connections, anything can be traded. The US government is especially concerned about Zhao Wei's possible links to trade in drugs and illegal wildlife (he strongly disputes these claims) and 'blacklisted' him in January 2018 (Parry 2018). Transport of wildlife products through the Golden Triangle area to Mong La, destined for the Chinese market, continues.

In Mong La, Chinese investment and expansion continues. Chinese businessmen are taking out leases on land for development, and constructing new apartment blocks to house the numbers of Chinese residents who are expected to come and take advantage of the opportunity to make money in the region.

A number of shops in the town sell expensive illegal wildlife products. In 2006 and 2007 rhino horns could already be seen on display in these shops (Ammann, pers. comm., March 2018). In 2014 and 2015, investigators saw two rhino horns, a horn tip, small discs (pendants) from the horn core, horn bangles and horn powder (Shepherd et al. 2018). In December 2017, 10 shops that were open when our investigator visited the town were displaying ivory and five of these also displayed rhino horn items for sale, mainly the usual plain jewellery accessories also seen in Vietnam and Laos. A total of 27 rhino horn objects were counted in the display counters of these shops, in full view of customers. These included 10 large bead bracelets, 10 big pendants, 6 large bangles, and one whole large (front) African rhino horn. The pendants were plain or lightly machine carved and very similar to those on display in Laos and available clandestinely in China: usually oval, some with the big dark centre that is preferred by customers. One vendor had a modern machine (a CNC router) to process ivory jewellery in view of the customers. The machine could also be used to process rhino horn, the vendor told our informant.

The number of rhino horn items (5.4 per shop) was low compared with the profuse displays of ivory items in the same shops. As rhino horn is scarce



In the border town of Mong La in Myanmar, several Chinese shops sell African rhino horn objects to Chinese customers, who smuggle them back home.





Large fake African rhino horn trophies were commonly for sale in Laos to tourists in 2013 (above), while fake knobbed rhino horns are sometimes seen for sale in curio shops in Vietnam (below left). In China's curio markets, an array of styles of imitation rhino horns can sometimes be found.



and so much more expensive than ivory, shopkeepers do not keep too much in stock at one time, but do replace items sold, they said. Rhino horn items in Mong La were on sale for USD 100–133/g (Table 9).

Chinese gamblers in Mong La like to buy rhino horn chips and powder, our informant explained, which they consume to remove toxins from the body after bouts of excessive eating and drinking. In 2011 the material was selling in Mong La for 700 yuan or about USD 100 for a small teaspoonful.

Substitutes

A number of substitutes or alternatives to rhino horn are offered for sale in eastern Asia. ‘Fake’ rhino horns or rhino horn products are made to resemble rhino horn and either sold as imitations or passed off as the real thing (sometimes unintentionally, when the seller himself is unaware that it is fake). This is not new. Emperor Rudolf II of Germany collected antique rhino horn Chinese drinking cups, but some have since proved to be water buffalo horn imitations (Chapman 1999).

Fake entire rhino horns are made in certain locations in China and also in northern Vietnam, often from water buffalo horn, which can be shaped on grinders to resemble a rhino horn and has a similar dark colour. Some make quite good copies, especially those that only represent the tips. However dealers would not sell fake horns to important clients (Ammann 2011).

In China, fake rhino horn and carvings resembling whole horns or antique so-called libation cups are also sometimes seen for sale in curio shops. In January 2011, we had seen a shop in Guangzhou’s jade market specializing in rhino horns, all fake, with photos on the shop walls of anaesthetized southern African rhinos being dehorned to suggest the items in the shop were genuine (Martin and Vigne 2011). The taste for rhino horn was just starting to reach a wider clientele, and customers who were not sure what the real item looked like, were being duped into buying these cheaper fakes.

Some items made of cow horn can look like rhino horn. In China resin and horse hair may be combined to resemble rhino horn (Crosta et al. 2017) and may have tiny bubbles that look like threads. Nowadays, however, most vendors of fake rhino horn readily admit they are imitation. In 2015 we visited a shop in Yunnan Gardens, a famous tourist area in Shanghai that specialized in substitute rhino horns. The vendor freely admitted they were copies so there could be no prosecution. A few stores in antique centres and curio/jade markets also sell imitation rhino horns, fake plain bowls and copy antiques. These are bought, vendors told us, as decoration for homes and

offices by followers of *feng shui* (a Chinese pseudoscience that uses energy forces to harmonize individuals with their environment).

Fake horns may also sometimes be seen in antique shops in Ho Chi Minh City. Some of these fakes are obviously not rhino horn (with knobby bases that no real rhino horn has). Some cow and water buffalo horns used to be mounted in pairs to look like rhino horn trophies. In 2013 these were commonly seen in markets in Laos for tourists. Few are seen today (Box 15).

Box 15

In the mid-2000s, fake African rhino horns began to appear on the markets in Laos as souvenirs for tourists. Made in Vietnam, these fake horns were brought overland through eastern Laos across the Plain of Jars to sell in the jewellery and souvenir shops in Vientiane and Luang Prabang. From around 2010, Hmong tribal people who sell traditional Hmong medicines in Vientiane's Morning Market and at street stalls began offering these impressive copies of life-size African rhino horn pairs on fake skin for about USD 50. Fakes horns resembling the three Asian rhino species, were on sale for USD 20. A survey conducted in March 2013 found 323 of these fake trophies for sale in 91 retail outlets in Vientiane and Luang Prabang (Vigne 2013a,b). By 2015 and 2016 there were very few on display as the government had effectively clamped down on their sale. In late 2016, the only ones we saw were two in Luang Nam Tha in the north of the country, where they were on sale in the market in for 500,000 kip (USD 60) per 'trophy'. A few fake African horn trophies (with two horns) could still be seen on display in the markets but these were generally not for sale. When we tried to take a photograph of them, the market vendors hurriedly moved them away, saying they could not sell them anymore. Another two such 'trophies', clearly labelled as fake rhino horn, could be seen in a cabinet at Wattay International Airport in Vientiane along with various genuine wildlife products, as part of a display to warn passengers not to carry them. Presumably fake rhino horns were used in the display to resemble the real thing because the authorities were worried that real ones might be stolen.

In contrast to cheap 'fakes', alternative expensive animal products may be seen for sale along with rhino horn, especially if they share some of the characteristics of rhino horn. They cater to the same superstitious beliefs of power and protection, as well as sharing the 'exclusivity' associated with being the products of endangered species, and thus being attractive to collectors.

Ivory is an example. Until 31 December 2017 when China ended the licensed production of ivory carvings and banned sales of ivory (TRAFFIC 2018b), elephant ivory was openly available in licensed outlets in China as a luxury collectable item that was less expensive than rhino horn. Another is mammoth

ivory, which can still be traded legally in China and can be found in specialty outlets in some of the main cities. Jades and woods such as agarwood are further popular legal alternatives to rhino horn, especially for pendants and bangles.

Helmeted hornbill (*Rhinoplax vigil*) casques are today one of the rarest and most valuable alternatives to rhino horn. The trade, as for rhino horn, is an ancient one, dating back to China's Tang Dynasty (618–907 AD) (Krishnasamy et al. 2016). Helmeted hornbills are found in Southeast Asia. The species has been classified as Critically Endangered on the IUCN Red List since 2015 and is listed on Appendix I of CITES. The casque (that accounts for 11% of the male bird's 3-kg weight) is made of keratin like rhino horn and can be carved, but it is less versatile than rhino horn as it is so small. In 2016, in Laos, we saw hornbill casques and sometimes their beaks, carved or plain available on display for sale as luxury collectable items in certain Chinese shops in Vientiane and the Kings Romans casino complex. In 2016, we saw a whole plain helmeted hornbill casque wrapped up in cellophane to keep it fresh on sale in a luxury hotel in Vientiane, for example, for USD 2,700, but they can be more expensive (Krishnasamy et al. 2016). In China, one may see young Chinese men with tattoos and leather jackets and money to spare hovering around flea market shops where such items are being sold. Vendors we spoke to explained that these young men consider that wearing ornaments made of this rare, valuable, and illegal material will enhance their power and help ward off evil spirits. Similarly, pendants made of tiger, bear, and leopard teeth and claws—and rhino horn—are all considered to give protection, as well as signifying the wearer's status and wealth. In Laos, for example we saw a Chinese trader buying two tiger teeth from a Lao dealer in a small shop near the gold market in Huay Xai, a border town in Laos on the Mekong River opposite Thailand and close to Myanmar. He agreed on a price of USD 500 per tooth, after having brought in an expert to examine them close-up with torchlight to verify them as authentic.

For medicinal purposes, horn from the common domestic water buffalo (*Bubalus bubalis*) can be legitimately prescribed as an affordable substitute for rhino horn. Water buffalo horn was being used to manufacture traditional Chinese medicines in government-run factories in China as early as 1978 (Wang, pers. comm., February 2016) and its use increased after the domestic trade in rhino horn was banned in 1993. In Vietnam, according to research conducted by Karl Ammann, 90% of the 'rhino horn' pieces for sale as medicine in Hanoi that he sampled as early as 2010 were not rhino horn, but instead usually water buffalo horn (Ammann 2012; Wardlow 2014; Patton and Ammann 2016). Water buffalo horns can often be seen for sale in TVM shops in Ho Chi Minh City.

The horn from the male saiga antelope (*Saiga tatarica*) is considered to be a fever reducing agent in TCM and TVM. In 2015, we saw products made of saiga antelope horn for sale in several traditional medicine shops of Ho Chi Minh City. The species is classified as Critically Endangered on the IUCN Red List and listed on Appendix II of CITES. The horns are sourced from Central Asia. The species used to exist in China, but was wiped out in the country long ago (Potenza 2018).

Pangolin (*Manis* spp.) scales are a further alternative to rhino horn for medicinal use. Pangolin scales are made of keratin, like rhino horn, and are used in TCM for treating a variety of ailments. They were often seen during our surveys in Vietnam, Laos and Mong La in Myanmar. All pangolin species, four in Asia and four in Africa, are now listed on Appendix I of CITES, but the illegal trade in pangolin scale continues to boom. These were initially obtained from Asia but large consignments are now increasingly being smuggled out of Africa (Patton 2017).

Jade pendants and other accessories may be worn for healing, and are considered to confer powerful energy on the wearer. Jade is cherished as a talisman in China. Both are considered luxury items that can be worn for protection, but jade is far more common than rhino horn. There is a significant demand for jade in China, but this does not appear to negate the demand amongst certain Chinese for rhino horn and other rare wildlife products, despite the efforts to prohibit their sale



Saiga antelope horn is used as a substitute for rhino horn in traditional Chinese and Vietnamese medicine.

Part 4: Discussion and conclusions

Discussion

This study gives a broad overview of a complex illegal trade in rhino horn, connecting the main source today—South Africa, most notably Kruger—with user countries on opposite sides of the globe. Conservation and law enforcement agencies need continuous help in order to shut down the illegal trade in rhino horn and curb the continuing onslaught of poaching, especially in the world’s biggest rhino stronghold, Kruger National Park.

Overall it is clear that demand for new rhino horn remains strong, especially nowadays for the Chinese market, with newer forms of consumption being deliberately marketed by illegal traders to attract consumers. Coordinated measures to disrupt the illegal supply chain are essential and, in order to address the many challenges involved, it is vital to understand the nature of the trade and the drivers of current developments (Milliken and Shaw 2012; Conrad 2012).

On the supply side there is some evidence that recent investment aimed at improving law enforcement in Kruger is beginning to pay off. In South Africa on 25 January 2018 the Minister of Environmental Affairs Edna Molewa issued a media statement that provided a valuable update on the state of rhino management in the country. According to Minister Molewa, 220 weapons were seized in Kruger in rhino-related incidents in 2017 (Molewa 2018). Kruger staff have strengthened their protection efforts considerably and measures to expand and integrate anti-poaching operations, especially in the IPZ, have borne fruit. More poacher incursions are being intercepted and the number of rhinos killed in Kruger fell from the peak in of 827 in 2014 to 504 in 2017. From 1 January to 30 August 2018, 292 rhinos were poached in Kruger, down from 333 for the same period the previous year (Republic of South Africa 2018). Rhino poaching has, however, increased in some other areas, and elephant poaching has also risen in Kruger, with 46 animals killed in 2016 and 67 in 2017. Elephant poaching in Kruger started in May 2014, according to Minister Molewa, following a 10-year period with no confirmed elephant poaching in the Park (Anon. 2017f).

In 2017, 446 alleged poachers were arrested in Kruger, including 189 arrests inside and 257 adjacent to the Park. In South Africa as a whole, Minister Molewa reported some successes in detecting and arresting high-level traders. From 1 April to 31 December 2017 the Hawks (the Directorate of Priority Crime Investigations, DPCI) arrested 16 ‘Level 3 and 4’ traders (i.e. the final middleman and exporter) in possession of 16,848 kg of rhino horn.

Notably, two Taiwanese were sentenced to 29 years' imprisonment and also ordered to pay compensation for three rhinos killed in South Africa and one rhino killed in Swaziland, or receive a further four-year sentence.

However, as rhino protection improves so do the tactics of the poaching gangs and middlemen, making it important to keep ahead of the game. Traffickers keep finding new ways to smuggle rhino horn. According to Minister Molewa, of particular concern is new evidence that some rhino horns poached in South Africa are now being processed into items before being smuggled out of the country. Processing the rhino horn in Africa would allow items, such as plain jewellery, to be more easily smuggled undetected off the continent and into Asian nations (Moneron et al. 2017).

It is unclear what if any impact recent improvements in efforts to reduce the supply of rhino horn will have on trading conditions in Asia. One of the most notable aspects of the trade in recent years has been the volatility in the wholesale price of rhino horn. There was a sudden spike as wholesale prices in the region rose from USD 20,000/kg (in Vietnam) in 2010 to USD 45,000–65,000/kg in 2012 and 60,000–65,000/kg in 2013. From this peak, prices in the region fell to around 20,500–35,100/kg in 2015 and 19,000–27,000/kg in 2017 (Table 6). A likely explanation for this price fall is that there was a sudden increase in the supply of rhino horn relative to demand in a constricted time-frame, deflating the price bubble to (still high) prices similar to those of a few years earlier.

The number of rhino horns on the market rose dramatically towards the middle of the present decade. From October 2012 to the end of 2015 an estimated 8,691 rhino horns were smuggled out of South Africa. It is likely that most of these horns came from rhinos poached from Kruger and elsewhere in southern Africa, with smaller numbers originating from rhinos dying of natural mortality, from animals killed by pseudo trophy hunters, and from thefts (Emslie et al. 2016). Of these 8,691 horns, 2,111 were seized by the authorities. We can assume that the remaining 6,580 horns entered the illegal market, amounting to approximately 20 tonnes of rhino horn in three years. This is double the quantity reported to CITES in the previous three-year period (Emslie et al. 2016).

At the same time as the supply of rhino horn was rising, rhino horn was becoming more attractive to collectors and as a long-term investment. Demand for rhino horn had risen following the economic crash of 2008–2009, as an alternative (others included gold and ivory) to investing on the stock market. But confidence in the stock market returned and has been booming again, especially in the last few years. Demand from investors may also have been affected by the recent relative slowdown in the Chinese economy.

Buyers and sellers of rhino horn in Vietnam and Laos told us that one explanation for the price drop was that the Chinese government had become more cautious about giving loans or advances for large construction projects. Thus unscrupulous business people who had used some of this ready cash to make money on the side by trading in rhino horn (for example, buying from Vietnamese dealers to sell in China) could no longer do so.

Demand may also have been reduced by the Chinese government's crackdown on corruption and gifting to government officials. Improved efforts at law enforcement have made illegal trading riskier, pushing it further underground and dissuading some would-be purchasers of rhino horn. Collectors and investors of legal antiques have also been discouraged by the restrictions placed on the trade.

As prices began to fall, this may have induced some of those who had bought rhino horn in bulk to offload stock, leading to further price drops. It has also been suggested that announcements on the internet that biofabricated rhino horn would soon become widely available made dealers fearful of the effects of competition from this substitute product (Chen 2017; Markus, pers. comm., April 2018).

The wholesale price drop from 2014 for raw rhino horn caused some retail prices of rhino horn items (including leftover shavings for medicine) to fall, for example in the producer villages in Vietnam; but elsewhere, as in retail outlets such as in Laos, they remained relatively stable. This means that anyone buying new rhino horn to make into items for retail sale in their



A vendor in Mong La uses torchlight to examine her best quality dark rhino horn beads.

shops today can expect to make a bigger profit margin on items that they sell.

Retail prices of course vary from place to place depending on proximity to the source of production, availability and the types of shops. Prices in towns in China closer to Vietnam were generally lower than those further away (Crosta et al. 2017). In Laos, retail outlets with low overheads charged less than those in luxury hotels, and the highest prices were for items sold to rich gamblers in Kings Romans casino resort in Laos and in Mong La in Myanmar. In most of the region prices of items are usually set with Chinese consumers in mind as they are the principal buyers of worked rhino horn on the retail market. It may thus be assumed that relatively stable retail prices since 2015, despite the continuing fall in wholesale prices, reflects continued optimism amongst many traders that Chinese demand for rhino horn will remain buoyant.



This large leftover piece of rhino horn was for sale in northern Vietnam for traditional medicine.

Despite a recent slowdown in China's economy (relative to previous years) that has affected sales of all highly-priced luxury goods, larger numbers of Chinese consumers have more money to spend than ever before: disposable income has still been rising by a healthy 7 to 8% year-on-year, one of the highest rates in the world (Petersen 2016). While shops in China are generally too nervous to display rhino horn openly for sale in the main cities, our findings show that the number of Chinese-owned shops displaying rhino horn products for sale to Chinese customers in the region has been rising, particularly where law enforcement is weakest, currently in Laos and the Chinese 'enclave' of Mong La in Myanmar. In addition to these retail outlets, there is growing evidence that illegal rhino horn objects are now readily – and increasingly – available online (Ammann 2018a,b), in far bigger quantities than in counter-top displays.

A key observation of this study is that the retail trade in China, Vietnam, Laos and Myanmar has been supply driven as well as demand driven. The increased availability of poached rhino horn from South Africa has served to both meet existing demand and fuel demand by encouraging opportunistic traders to develop new products and new markets in order to offload their stocks. All the outlets we saw selling rhino horn items were offering mainly similar merchandise: plain bangles, beaded bracelets and large pendants or discs. These were originally developed in Vietnam to appeal to Chinese newly-rich middle class consumers who are not involved in the elite world of arts and antiquities. Chinese traders in the region continue to innovate in order to encourage sales and further expand the market. For example, in late 2016, we saw Chinese shop owners in Laos marketing new styles of pendants with light relief carvings on them, and these are also available in China and online (Crosta et al. 2017; Ammann 2018a,b). Another innovative product we saw was the necklace in Oudom Xay in northern Laos made of alternating beads of rhino horn and agarwood. To keep buyers keen, vendors mark up prices of ‘special’ and ‘rare’ items, such as those from dark rhino horn, as well as very large items that cannot be made from other horns, such as bowls. These require no special carving skill, but have rarity and investment value because they can only be made from the largest African rhino horns. These strategies are designed to appeal to Chinese customers, who like to seek out what is rarest and—in their view—best, particularly as an investment.

Similar strategies were applied to develop ‘new’ medicinal products from leftovers, designed to appeal to the newly wealthy (hangover cures and aphrodisiacs) as well as those desperate for a cure (cancer sufferers), particularly in Vietnam.

Although measures have been taken—in China and, more recently, Vietnam—to clamp down on sales, shops in the region still display rhino horn items on view for sale, notably in Vientiane, Luang Prabang and Kings Romans casino resort in Laos, and in Mong La in Myanmar, as well as in back rooms of certain shops in China and artisanal villages around Hanoi. These places are visited by Chinese able to afford rhino horn. It would be a relatively simple matter to close these sales outlets down through regular checks and confiscations, while at the same time imposing more effective inspections at border crossings to dissuade buyers from trying to smuggle rhino horn items into China. However, although regular confiscations would act as a deterrent and put off shopkeepers from displaying items and customers from buying, this might simply force the trade further underground and stimulate online sales (Ammann, pers. comm. March 2018). While some Chinese consumers may not wish to buy illegal products, others want rare items regardless of their legality, and some even enjoy the challenge of thwarting the law, which

enhances their prestige through ownership of a rare illegal item. This was confirmed by our observations and those of Ammann (2018b) that some buyers in shops appeared to prefer items from 'under the counter'.

Rhino horn items in shops on view today indicate where markets are establishing and active, but they are only the tip of the iceberg. There is growing awareness amongst researchers and law enforcement agencies, including in China, that measures are urgently required, to curtail the fast-growing illegal online trade. Collaboration is growing among law enforcement officers and independent researchers, in order to identify and check the expansion of trading platforms offering rhino horn items on sale online (together with other endangered wildlife products, often on the same sites). Nevertheless, these and other measures, notably efforts to limit demand through education, will take time to work and meanwhile rhinos continue to be poached to supply the illegal market.

On the supply side, law enforcement efforts such as those outlined by Minister Molewa in her statement in January 2018 are undoubtedly a key element in any strategy to close down the trade in rhino horn and put an end to rhino poaching. As explained in our discussions with staff in Kruger National Park, these efforts are hampered by a range of problems, including inadequate manpower, poor inter-agency coordination, distrust among local populations, and corruption.

This study has identified a number of measures that could be taken or improved to address these problems. Innovative methods of detection are now being developed to help with investigations, including DNA sampling from confiscated rhino horns. DNA sample data continues to be analysed to expand the RhODIS (Rhino DNA Index System) database in Pretoria. Systems are being developed for information sharing, including the Integrated Smart Parks Programme designed to consolidate data collected on the ground, which will provide valuable support for anti-poaching efforts, where technological training is adequate.

Minister Molewa also commented in her January 2018 media statement that eight villages abutting Kruger have been resettled and she identified this as 'most probably one of the main contributing factors' to reduced rhino poaching in the Park. Strategies that may be more effective in the long term are also being developed to bring on board rural communities living near the Park and integrate them into anti-poaching efforts. Currently the presence of kingpins in villages around the Park is what brings in money to the communities. These kingpins are seen by poor villagers in a positive light and sometimes even cast in the role of 'Robin Hood' (Annette Hubschle, social and political economist, pers. comm., April 2018). Alternatives that

generate direct economic benefits to local people from wildlife, without poaching, are now being considered. These approaches will provide the basis for improving communication between local people on the edge of the Park and building good relations and a shared sustainable wildlife ethos.

People near protected wildlife areas can also play a key role in preventing and combating wildlife crime, particularly through participation in intelligence gathering. Wayne Lotter (South African conservationist and founder of the PAMS Foundation, who was murdered in Tanzania in August 2017) told us that poachers spend 95% of their time outside the Park. It is thus important to make friends with the community as a basis for enhancing intelligence operations, with all levels working together (pers. comm., October 2016). As discussed in Part 2, this approach has been successfully adopted elsewhere, for example around Chitwan National Park in Nepal. The recent launch of a similar project involving communities near Kruger is an encouraging development (Box 16).

Box 16

In July 2017, WWF South Africa and WWF Mozambique, together with USAID, launched a new project in the Great Limpopo Transfrontier Conservation Area that extends north and east from Kruger National Park to encompass Limpopo National Park in Mozambique and Gonarezou National Park in Zimbabwe. Supported by the South African and Mozambique governments, the project is due to continue until 2022 and aims to assist poor communities in finding viable economic alternatives to illegal wildlife trade, give them a voice in strategy development, and elicit their collaboration in making new strategies work. The project is called 'Khetha' which means 'choose' in the Zulu language (WWF South Africa 2018) and appears in the Zulu Bible, Proverbs 22:1: "If you have to choose between a good reputation and great wealth, choose a good reputation". By generating economic benefits from wildlife the project hopes to help the youth, in particular, to see the benefits of rhino and elephant conservation in particular and to improve cooperation between local people and protected areas management (http://www.wwf.org.za/our_work/initiatives/khetha.cfm) (Knight, pers. comm., June 2018).

The success of these and other conservation efforts is dependent on the presence of honest and trustworthy intelligence and law enforcement officers and court officials. At present rhino poaching is too often an 'inside job' involving staff members and sometimes senior officials who appear to have immunity from prosecution (Leithead 2018). And in the rare events that leading traffickers are imprisoned, magistrates may release them early, as occurred on 11 September 2018 in South Africa in the case of a Thai rhino

horn trader called Chumlong Lemtongthai, who worked with the notorious Xaysavang network in Laos (Rademeyer 2012; Bloch 2018).

Corruption was one of the key problems identified by Kruger staff. According to Ofir Drori of Eagle Network, a civil society anti-corruption initiative that now works in several African countries “greater law enforcement is possible, we just need more teams doing our sort of work. People don’t need to reinvent the wheel. It is so simple: corruption, corruption, corruption. This is the reason the criminals get off and why poachers and traders always seem to be one step ahead of the authorities ... and this can be resolved” (pers. comm., May 2018). Tackling corruption along the entire supply chain is an essential precondition for effective coordination among law enforcement agencies.

While corruption allows the illegal trade to flourish, the results of this study suggest that the sudden surge in rhino poaching in South Africa has been driven by a range of factors that interact in complex ways to affect supply and demand in the illegal trade in rhino horn. In general terms our conclusions coincide with those of Sam Ferreira, who states:

Long histories of wildlife trade, inelastic demands for animal products, and the high profit potential of these products are some of the global drivers of rhino poaching. Authorities, however, have only local rules, often accompanied by poor law enforcement, with which to combat poaching. The rigid demand for a profitable animal product, such as rhino horn, in an unlawful milieu of blurred wildlife property rights provides a lucrative business horizon for transnational organized crime. Organized crime and poaching thus surge, eased by local views that only an elite few profit from conservation—a legacy left by unclear property rights and human–wildlife conflict for people living next to protected areas. (Ferreira 2016).

Much of the trade in rhino horn, as for ivory, is now recognized to be controlled by transnational organized crime networks, with turnovers of billions of dollars and often bound up with other criminal activities, including the drugs trade. Wildlife crime is now much more than simply a conservation issue and has become a global security issue. There is growing recognition of the need for support and commitment from the highest levels of governments and other stakeholders, especially in source, transit and consumer countries, to quell what could otherwise become a rampant threat to more wildlife species, a danger highlighted by the recent surge in pangolin trafficking from Africa.

CITES provides a legal framework for international collaboration to help control illegal wildlife crime; Parties can impose sanctions on an offending

member state, in the form of embargos on international trade in the country's legally tradable wild fauna and flora (Sand 2018). These and other sanctions that can be imposed on countries involved in illegal wildlife trade, such as under the little-known US Pelly Amendment (Box 17), are very rarely applied. Most action against transnational trade in illegal wildlife products relies principally on voluntary cooperation among countries involved, underpinned by their shared commitments under CITES. The head of the China TRAFFIC office, Zhou Fei, recently stated, "we need to address all of the parts in the puzzle: international pressure, behaviour change, government leadership, capacity building in law enforcement, and revision of existing laws" (Platt 2015). The changes required in China in dealing with law enforcement and reducing Chinese demand need to be made by the Chinese themselves, he said. Greater cooperation between China and the international bodies is also important to foster cross-cultural understanding and devise measures to change consumer behaviour and reduce demand for rare wildlife items as 'investments' (Gao et al. 2016).

Box 17

The US government can threaten sanctions by invoking the rarely used 'Pelly Amendment', originally passed in 1978, which authorizes the US President to embargo wildlife products of a foreign country certified as being involved in actions that diminish the effectiveness of an international programme for the conservation of endangered species to which the US is a Party. The amendment was modified in 1993 to allow the President to impose trade penalties on offending countries, up to and including total prohibition on importation of goods (Washington Post, 10 June 1993). In 1993, the Pelly Amendment was used to certify China and Taiwan due to their continued roles in the rhino horn trade at a time of a dramatic drop in rhino numbers across Africa. Both countries responded by stopping their trade (Kenworthy 1993; USFWS 1996). The US has recently voiced concerns about the involvement of traders in Laos in transnational crime and threatened the country with sanctions unless it takes action against these individuals (Associated Press 2018b; EIA 2018b).

Collaboration among law enforcement agencies is indeed vital to deter and apprehend criminals along all stages of the chain from poaching at the source, through export and transit and finally to the consumer market in illicit goods, as set out in depth in South Africa's National Integrated Strategy to Combat Wildlife Trafficking (Republic of South Africa 2017). At present, most prosecutions focus on poachers and low-level middlemen rather than

the bigger players higher up the criminal networks. Improved legislation, including in transit countries, could change this, by compelling import-export agents, shippers and brokers to follow the rules of ‘know your customer’ and carry out the same checks as banks must for financial transactions to root out illegal wildlife trade (Jayanathan 2018).

Given the transnational nature of this trade, Interpol also has a role to play (Stiles, pers. comm., June 2018). To this end, new approaches are required to catch the kingpins and put them out of the business, such as by following their lucrative trade through undercover financial investigations, followed by seizures of bank accounts and assets when they are caught. The seizure of assets has been shown to be an effective deterrent (Associated Press 2017); assets seized could then be used to fund further law enforcement.



The growing sale of illegal rhino horn on online sites, as seen here, is a major challenge for law enforcement.

Conclusions

South Africa is to be congratulated for the spectacular success of its rhino conservation efforts in recent decades, particularly in the Kruger National Park, which is now home to the largest number of rhinos in the world. At a time when populations of rhinos were plummeting in many countries in Africa in the 1970s and 1980s, the numbers of both the white and black rhino species in South Africa grew both in government parks and on private land. As documented in this report, however, this success began to unravel around 2008 as rhino poaching in South Africa rose dramatically to meet a growing demand for new rhino horn from eastern Asia.

Kruger NP has suffered most and continues to sustain the greatest losses today. In addition to financial losses, and the impact on rhino populations, it is important to emphasize the cost of rhino poaching in terms of loss of human life, especially the lives of poachers and rangers. By contrast, middlemen, exporters, importers and others involved in illegal wildlife trade are making huge sums of money with relatively little risk to themselves.

The growth of the illegal rhino horn trade has been driven by Asian kingpins, notably from China, Laos, Thailand and Vietnam, who have close connections with corrupt officials, some at high levels, and businessmen in Africa. Mismanagement, bribery and corruption, and a lack of transnational coordination amongst agencies have enabled traffickers of rhino horn to consolidate and expand their operations to meet soaring demand. Traders in Asia are actively stimulating this demand by developing and marketing new products for consumption and investment. Most rhino horn is now being processed into luxury items, mainly accessories, designed to appeal to newly-rich consumers in China and Vietnam.

At present, the kingpins involved in smuggling rhino horn continue to outmanoeuvre efforts to close their criminal networks down. In Kruger NP, despite massive injections of funds, manpower and equipment for anti-poaching operations, alarming numbers of rhinos are still being poached. There have been commendable improvements since 2016, especially in Kruger's Intensive Protection Zone. However, ever more manpower and technology appears to be needed, without providing any immediate prospect of winning the so-called 'war on poaching'.

As the costs of protecting South Africa's rhino populations soar and demand for rhino horn in Asia appears unquenchable, some, especially in southern Africa, are saying it is time to consider some form of legal and regulated trade. They believe that sustainable utilization of rhino horn may be the best long-

term solution, by providing funds for rhino protection, increasing economic incentives to conserve rhinos, and diverting funds away from the criminal networks. Others fear that legalizing trade could make the situation worse by increasing demand and sabotaging efforts to change cultural attitudes in consumer countries, notably China and Vietnam. The question of whether to trade or not to trade, in whatever way or form, is not the focus of this report. We have highlighted the urgent issues and measures that can be taken in the current policy and legislative environment to combat the growing illegal international trade in rhino horn.

In South Africa, in addition to continued law enforcement efforts, there is pressing need to enhance the lives of communities neighbouring Kruger NP and other areas with rhinos. Local people need to be given economic incentives not to poach rhinos, so they can see a value in supporting wildlife conservation. In this sense there are important lessons to be learned from certain government protected areas in Nepal and India, where some communities have been successfully integrated into rhino conservation initiatives.

On the international level, implementation of the CITES ban on the trade in rhino horn from all five species that came into force in 1977 remains the principal policy objective. Over the years, this ban has been only partially effective. There have been periods of successes for some species and subspecies of rhinoceros. Population numbers have risen in the wild in some places, while continuing to fall in others. Demand has fallen substantially in some countries, such as Japan, that were formerly major consumers of



White rhino

rhino horn. There is now increasing recognition in China and elsewhere of the urgent need to work together globally to protect endangered wildlife from illegal trade by increasing awareness and improving law enforcement.

More measures are required to close down the illegal rhino horn trade in Asia, especially with the collaboration of the China, Vietnam Laos and Myanmar governments. Of high priority also is to shut down online trading platforms to put an end to the sale of illegal rhino horn.

The illegal trade in rhino horn undermines the wider rule of law in both source and consumer countries, notably through money laundering and links to transnational trade in other illegal items. As such it poses a growing threat to national and international security. Improved systems are needed, not only to detect smuggled rhino horn and track supply chains, but also to monitor the actions of law enforcement agencies and provide an effective deterrent against bribery and corruption. Dismantling the criminal networks that control the trade will require collaboration among international agencies and commitment from governments at the highest level.

By bringing together the results of extensive fieldwork at key locations in the supply chain, from Kruger National Park in South Africa to retail outlets in China, Vietnam, Laos and Myanmar, this report aims to contribute to a greater understanding of the illegal rhino horn trade, and to support international efforts by policy makers and stakeholders to end the rhino poaching crisis in South Africa and to prevent it from spreading elsewhere.



Black rhino

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The future of these white rhino orphans in Kruger National Park will depend on political will and collaboration among many countries to combat the illegal rhino horn trade.

The authors

Esmond Martin was born in New York City and completed a PhD in Geography from Liverpool University. He started his studies on the rhino horn trade for WWF in the 1970s. He visited the key countries in Asia and compiled the first comprehensive study on the subject. As a result of this research into trade routes and the uses of rhino products, he produced two books entitled *The International Trade in Rhinoceros Products* (1979) and *Rhino Exploitation* (1983). Together with his wife, Chryssee, they wrote a general overview of rhinos and the rhino horn trade in *Run Rhino Run* (1982). He was a leading authority on the traditional uses of rhino products in Asia.

Lucy Vigne was born in Cape Town and read Zoology at Oxford University. She has lived in Kenya since 1983, initially working as executive officer for the IUCN African Elephant and Rhino Specialist Group with David Western as chair and Esmond Martin as vice chair. From 1985 to the early 1990s, Esmond Martin and Lucy Vigne worked for WWF International on a project to tackle the international trade in rhino products and the rampant poaching that was decimating rhinos in most of their range in Africa over this period.

On visits to North Yemen, later Yemen, the main market in the 1970s and 1980s for rhino horn for jambiya handles, they worked to combat this trade that had wiped out so many rhinos in Africa so quickly. Esmond Martin was appointed the UN Special Envoy for Rhinos in 1992 and 1993. He met heads of state and top government officials in Africa and Asia to discuss the plight of the rhino to help curtail the illegal trade in rhino horn at that time.

Esmond Martin and Lucy Vigne continued to work together monitoring the illegal trade in rhino horn and ivory. In Yemen, they assisted with law enforcement and creating awareness about rhinos in schools and public forums until 2012, when the civil war made access too difficult. They also visited protected areas in the Indian subcontinent, discussing rhino conservation with field staff, and supported these areas by helping to increase awareness and global support. Together they carried out extensive field research on the rhino horn and ivory trade during numerous visits to towns and cities in Asia and Africa. Their final research visit was to Myanmar in late 2017 and this report, sadly mostly written after Esmond's death, is their last major co-authored publication.

Tribute

In memory of Esmond Bradley Martin who was murdered on the afternoon of Sunday, 4 February 2018 at his house in Nairobi, Kenya. As a geographer, he dedicated his career to studying the rhino horn and ivory trade in meticulous detail with perseverance and commitment. He pioneered fieldwork studies in the illegal wildlife trade, surveying markets in many countries. He was an inspiration to so many, and most of all to me after many years of working together.





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