African and Asian Rhinoceroses – Status, Conservation and Trade

A report from the IUCN Species Survival Commission (IUCN SSC) African and Asian Rhino Specialist Groups and TRAFFIC to the CITES Secretariat pursuant to Resolution Conf. 9.14 (Rev. CoP15)

Richard H Emslie[1,2] , Tom Milliken [3,1] Bibhab Talukdar [2,1] Susie Ellis [2,1], Keryn Adcock[1], and Michael H Knight[1] (compilers)
[1] IUCN SSC African Rhino Specialist Group (AfRSG)
[2] IUCN SSC Asian Rhino Specialist Group (AsRSG)
[3] TRAFFIC

1. Introduction

The CITES Parties, through *Resolution Conf 9.14 (Rev. CoP15)*, have mandated IUCN SSC's African Rhino Specialist Group (AfRSG), Asian Rhino Specialist Group (AsRSG) and TRAFFIC to prepare a comprehensive report for the 17th meeting of the Conference of the Parties (CoP17) on the conservation status of African and Asian rhinoceros species, trade in specimens, stocks and stock management, illegal killing, enforcement issues, conservation actions and management strategies and measures by implicated States to end illegal use and consumption of rhino parts and derivatives. This report primarily deals with developments since CoP16.

2. African Rhinos

2.1 Status and trends

Table 1: Estimated numbers of African rhino species by country in 2015 with revised totals for 2012* (AfRSG data in collaboration with range States).

	White Rhino *Ceratotherium simum*			Black Rhino *Diceros bicornis*				Both Species	Both Species
Estimates as of 31 Dec 2015	Southern	Northern	Total White & Trend	Eastern	Southern-central	South-western	**Total Black & Trend**	Total 2015	% of Continental Rhino
	C.s.simum	*C.s.cottoni*	*C.simum*	*D.b.michaeli*	*D.b.minor*	*D.b.bicornis*	*D.bicornis*		
Botswana	239		239 ▲		48		48 ▲	287	1.12%
Kenya	441	3	444 ▲	678			678 ▲	1,122	4.38%
Malawi					26		26 ►	26	0.10%
Mozambique	29		29 ▲?		2		2 ▲	31	0.12%
Namibia	822		822 ▲			1,946	1,946 ▲	2,768	10.80%
South Africa	18,413		18,413▼?	79	1,560	254	1,893▲	20,306	79.23%
Swaziland	76		76▼		20		20 ▲	96	0.37%
Tanzania				129	4		133 ▲	133	0.52%
Uganda	15		15▲					15	0.06%
Zambia	10		10 ►		32		32 ▲	42	0.16%
Zimbabwe	330		330 ▲		472		472 ▲	802	3.13%
2015 Total	**20,375**	**3**	**20,378**	**886**	**2,164**	**2,200**	**5,250**	**25,628**	
2012 Total	20,604	4	20,608	799	2,061	1,959	4.819	25,427	
Diff 2012-15	-229	-1	-230	87	103	241	431	201	
Average % change/yr 2012-15	-0.4%		-0.4	+3.5	+1.6	+3.9	+2.9	+0.3	

▲ = Increase; ► = Stable; ▼ = Decline ? = Degree of uncertainty as to signficance of suspected trend * = in light of additional new information

Ninety percent confidence levels around 2015 continental rhino numbers given in Table 1 indicate 19,666-21,085 white and 5,040-5,458 black rhino. Figure 1 shows a rapid increase in continental (Near

Threatened) white rhino numbers from 1992 to 2010 (averaging +7.1% growth per year) followed by a levelling off coinciding with escalating poaching. The apparent decline in white rhino numbers from 2012 to 2015 of -0.4%/year was not statistically significant (Table 1). Critically Endangered Black rhino numbers dropped to a low of 2,408 in 1995, but following improved protection and biological management, numbers doubled by 2010 (averaging +3.8%/year growth over this 15-year period) (Figure 1); thereafter, growth in black rhino numbers slowed from 2012 to 2015 to +2.9%/year (Table 1). The majority of Africa's black and white rhinos (97.5%) continue to be conserved by four range States: South Africa, Namibia, Kenya and Zimbabwe.

2.2 Poaching and Illegal Killing

Figure 1: **Reported numbers of African rhino poached 2006-2015 (left) with trends in estimated numbers of both species since 1992 (right)** (AfRSG, TRAFFIC and CITES Rhino Working Group data in collaboration with range States)**.**

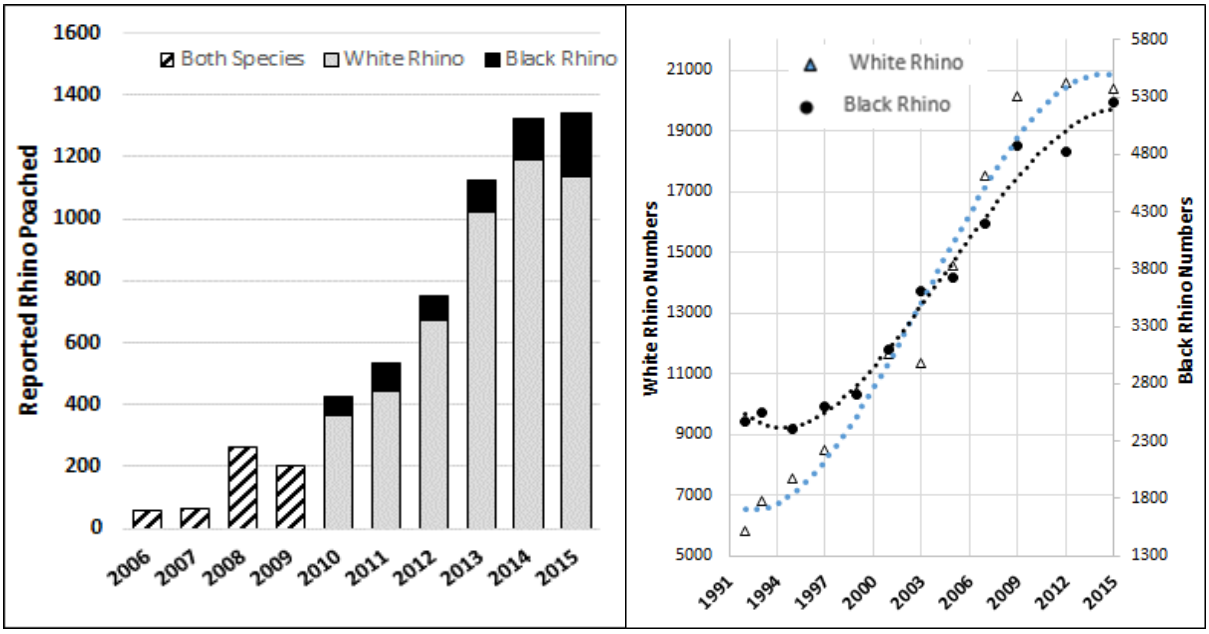


Table 2: **Reported African rhino poaching mortalities 2006-2015** (AfRSG, TRAFFIC and CITES Rhino Working Group data in collaboration with range States).

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2006-15 Total	2008-12	2013-15
Botswana	-	-	-	-	-	-	2	2	-	-	4	0.1%	0.1%
DR Congo	-	-	2	2							4	0.2%	0.0%
Kenya	3	1	6	21	22	27	29	59	35	11	214	4.8%	2.8%
Malawi	-	-	-	-	-	-	2	1	2	1	6	0.1%	0.1%
Mozambique	-	9	5	15	16	10	16	15	19	13	118	2.9%	1.2%
Namibia	-	-	-	2	2	1	1	4	30	90	130	0.3%	3.3%
South Africa	36	13	83	122	333	448	668	1,004	1,215	1,175	5,097	76.2%	89.6%
Swaziland	-	-	-	-	-	2	-	-	1	-	3	0.1%	0.0%
Tanzania	-	-	2	-	1	2	2	-	2	2	11	0.3%	0.1%
Uganda	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%
Zambia	-	1	-	-	-	-	-	-	-	-	1	0.0%	0.0%
Zimbabwe	21	38	164	39	52	42	31	38	20	50	495	15.1%	2.9%
Total	**60**	**62**	**262**	**201**	**426**	**532**	**751**	**1,123**	**1,324**	**1,342**	**6,083**	**2,172**	**3,789**
Poached/day	0.16	0.17	0.72	0.55	1.17	1.46	2.05	3.08	3.63	3.68			

The number of rhinos reported poached in Africa has increased for the sixth year to 1,342 rhinos in 2015, the highest level since poaching began to escalate in 2008 (Table 2, Figure 1). These figures represent minimum numbers as some carcasses may have gone undetected. Poaching in 2015 represents 5.0% of African rhino numbers (5.3% for white rhino and 3.8% for black rhino). These levels are now approaching the average continental growth rates that white and black rhino achieved from 1995 through 2007 of 7.2% and 4.7%, respectively. Poaching of black rhino has more than doubled from 2013 through 2015 due to increased losses in Namibia, Zimbabwe and South Africa (Figure 1).

For rhino numbers to grow, net population growth (natural births minus deaths) needs to exceed poaching levels. Thus, rhino populations cannot sustain poaching rates much above current levels. Good biological management of populations to maintain or increase rhino productivity is essential in the face of high poaching levels.

Whilst the *rate of increase* in total rhino poaching has recently slowed to nearly halt in 2015, the *number of losses* are at the highest level in nearly two decades (Figure 1; Table 2). Reported rhino poaching declined in Kenya over the last two years and, in 2015, in South Africa for the first time since 2008. South Africa currently conserves 79% of Africa's rhinos but has suffered 88% of the poaching since 2010 and data for the first four months of 2016 suggest the slight reduction in rhino poaching rate has continued. Poaching in Kruger National Park, with Africa's largest rhino population, has been severe. Ferreira *et al.* (2015) and AfRSG calculations for 2012-2015 conclude that both species in the Park are most likely declining. The geographical shift in poaching to Namibia over the last two years is worrying, as was the situation in Zimbabwe in 2015. The AfRSG hopes to provide a partial 2016 poaching update at CoP17.

2.3 Trade

Table 3: Estimated number of African rhino horns by source going into illegal trade, October 2012–December 2015 (TRAFFIC, AfRSG)

Description of source or recovery of horns	Number of horns	Breakdown
Source of African rhino horns for illegal markets		
Horns on all recorded poached rhinos	7,875	90.6%
Horns stolen from natural mortalities (estimate)	149	1.7%
Thefts from government stockpiles	148	1.7%
Other thefts in Africa (private stocks, museums etc.)	241	2.8%
Horns illegally sold from private stocks (estimate)	78	0.9%
White rhino horns obtained from legal trophy hunts (estimate)	200	2.3%
Source Total	***8,691***	***100.0%***
Recovery of illegally obtained African rhino horns by government enforcement agencies		
Confiscations/seizures in Africa	387	4.5%
Recoveries in the field of horns from illegally killed rhino (estimate)	1,221	14.1%
Horns recovered in seizures outside of Africa	503	5.8%
Horns from Africa going into illegal trade	**6,580**	**75.7%**

*Percentage of horns leaving Africa but seized outside of Africa is 7.1%

A rapid increase in illegal acquisition of rhino horns has been documented since CoP14 (Milledge 2007; Milliken *et al*. 2009; Emslie *et al.* 2012), now reaching the highest levels in over two decades (Tables 3 & 4). The illegal sourcing of horns from poaching, natural mortality, stockpile thefts, pseudo-hunting and private sector sales suggests that an estimated 8,691 (2,674/yr) rhino horns were obtained from October 2012 through 2015 (Table 3). Of these, some 2,111 horns were either recovered in the field or interdicted in Africa or elsewhere, leaving an estimated 6,580 rhino horns moving into illegal trade. Most of these horns (~90%) originate in South Africa. Table 4 shows that the annual number of horns acquired for illegal trade purposes has more than doubled since CoP16. This represents an estimated 20 tonnes of rhino horn moving out of Africa for illegal trade, an increase over the estimated 12.6 tonnes that left Africa during the previous reporting period (Emslie *et al.* 2012).

Table 4 Approximate average number of horns annually sourced in Africa for illegal markets (Milledge, 2007; Milliken *et al*., 2009; Emslie *et al.* 2012, this report).

Jan 00-Dec 05 Pre-CoP14	Jan 06-Sep 09 Pre-CoP15	Jan 09-Sep 12 Pre-CoP16	Oct 12-Dec 15 Pre-CoP17
106	408	1,140	2,674

Seizures – Data from a total of 307 global rhino horn seizures (1,413 horn or horn pieces, 3,046 kg) from 2010 through 2015 are summarised in Figure 2 below. These data were mostly obtained through open-source records, under represent Africa and have not been adjusted for bias in terms of seizure and reporting rates. While total weight of global seizures has increased since CoP16, available data

indicate fewer seizures were made in Africa than in transit or destination countries in Asia and elsewhere. Whether this reflects a drop in law enforcement effectiveness or poorer reporting of seizures needs to ascertained; this latter issue would benefit from a more formal reporting mechanism under CITES beyond what is called for in Decision 16.84

Figure 2: **Estimated weight and number of horns/horn pieces of global seizures (left) and place of seizure for African horns (right), 2010–2015** (TRAFFIC rhino horn seizures [RHS] database)

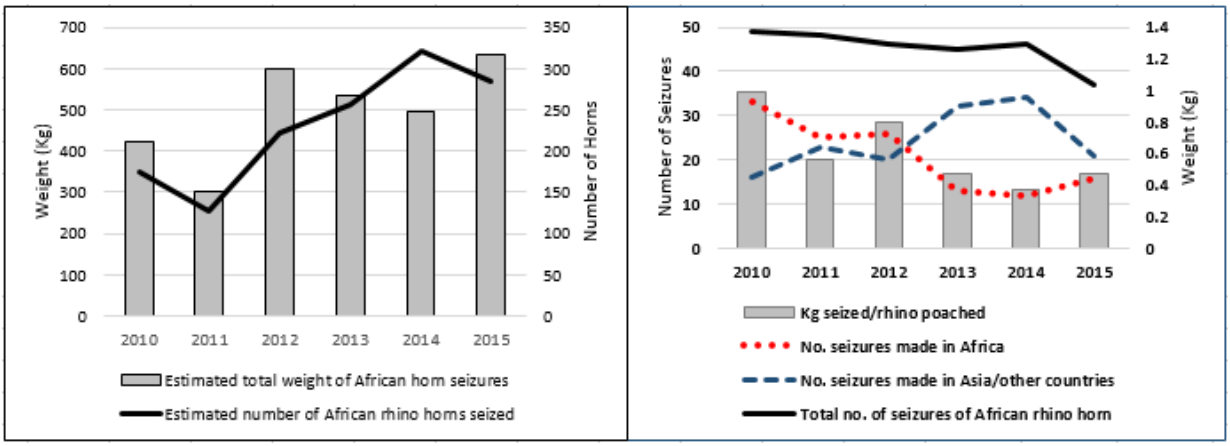


Table 5: **Global rhino horn trade flows evident in rhino horn seizure data, 2010–2015** (TRAFFIC rhino horn seizures [RHS] database)

Country/ Territory	Total 2010-2015			Country/ Territory	Total 2010-2015		
	No. of Seizures Made by / Implicated in	Weight (kg) of Seizures	No. of Horns or Horn Pieces		No. of Seizures Made by / Implicated in	Weight (kg) of Seizures	No. of Horns or Horn Pieces
South Africa	89 / 17	1,109.01	491	**Singapore**	2 / 1	65.98	32
Viet Nam	27 / 48	1,069.46	458	**Malawi**	0 / 1	53.30	11
China	80 / 20	859.74	413	**Tanzania**	1 / 0	53.30	11
Mozambique	17 / 15	797.78	307	**France**	1 / 7	53.22	41
Hong Kong SAR	11 / 3	184.99	83	**Zimbabwe**	6 / 0	47.76	18
Thailand	9 / 2	147.86	84	**Namibia**	2 / 1	47.41	18
Kenya	6 / 4	121.74	46	**Cambodia**	3 / 1	43.02	15
Czech Republic	5 / 1	119.43	43	**U.K.**	2 / 1	37.31	14
U.S.A.	1 / 2	107.78	40	**Botswana**	1 / 1	23.06	6
Malaysia	1 / 3	76.16	36	**India**	28 / 0	22.77	31
Nigeria	0 / 4	71.03	28	**Others***	13 / 22	211.64	104
Uganda	2 / 2	69.48	46	**Total**	**307 / 156**	**5,393.23**	**2,376**

*23 other countries: Belgium, Central African Republic, Côte d'Ivoire, Democratic Republic of the Congo, Denmark, Egypt, Ethiopia, Germany, Guinea, Ireland, Japan, Lao PDR, Myanmar, Nepal, Netherlands, Philippines, Portugal, Qatar, Slovakia, Taiwan (province of China), Togo, United Arab Emirates, Zambia

Priority Trade Flows - Countries most heavily involved in rhino horn trade transactions are identified through an analysis of rhino horn seizure data (Table 5), with seizure data which a country made itself (*Made by*) being combined with that from seizures which took place elsewhere but implicate that same country in terms of origin, export, transit or destination (*Implicated in*). The weights and number of pieces/horns represent the total trade flow for each country. Four countries -- South Africa, Vietnam, China and Mozambique -- accounted for some 70% of the total over the six-year period and become priorities of concern.

Assessment of Priority Countries – Although South Africa ranks first in Table 5, only 21% of the horns/horn pieces were identified as originating there, indicating that the origin of large quantities of horn is lost as it moves into illegal trade. (Increased forensic testing could increase sourcing knowledge if such information were to become publicly available). Mozambique, fourth globally, is second most prominent in Africa, accounting for 13% of seizures by horns/horn pieces and 15% by horn weight. Law enforcement has historically been very poor in Mozambique, but more than half of the rhino horn seizures made there occurred in 2015 indicating some recent improvement. Rhino horns are frequently leaving Mozambique, most typically through international airports in Maputo, Nampula and Pemba (TRAFFIC RHS database). In South Africa and Mozambique, Asian criminal networks are heavily involved, with at least 59 nationals of Asian countries arrested since 2010, including 35 Vietnamese, 21 Chinese, two Thais and one Malaysian. The largest documented rhino horn seizure concerns 65 horns/124 kg seized in May 2015 (with 1,160 kg of ivory) from two Chinese citizens in Mozambique; between 12 and 28 of these horns were reportedly stolen from police custody, whilst the rest were incinerated by the government in a contentious public event (TRAFFIC, 2015). The two arrested suspects are no longer in custody, but whether they, or the police officers arrested for the related theft, were ever prosecuted remains unclear. At the time, Mozambique law treated rhino horn trafficking as a misdemeanour, not a criminal offense, prescribing only monetary fines, with no option of imprisonment. The lack of effective legal sanctions for wildlife trade crime and the shared border with Kruger National Park has made Mozambique a leading centre of rhino horn trafficking. Kenya, Namibia, Nigeria, Uganda and Zimbabwe have made, or been implicated in, numerous rhino horn seizures over this period, whilst eight other countries have also been implicated (Table 5). None of the West or Central African countries involved in trafficking are rhino range States, so trade routes to and from these countries remain largely undocumented but possibly link to immigrant communities resident in South Africa. At least ten seizure cases have been in conjunction with large ivory shipments from Kenya, Uganda, Nigeria and Togo. Four seizures made in Botswana, Kenya and Namibia since 2011 resulted in the arrest of one Vietnamese and seven Chinese citizens.

In Asia, Viet Nam continues to be the leading country of import, accounting for some 20% of the rhino horns by weight or number (Table 5). Two-thirds of the seizures made by Viet Nam involved African rhino horns arriving at international airports in Ha Noi and Ho Chi Minh City. In 2015, 44 rhino horns (with >500 kg of ivory) were also seized at Da Nang from a shipping container, whilst three other horns were seized crossing the land border with Cambodia. At least 19 related arrests were made, most involving Vietnamese nationals coming from Africa. Another one-third of Viet Nam's seizures occurred within the country and led to at least 12 arrests. In most cases sentencing is unknown. China ranks second to Viet Nam as a destination, and together with Hong Kong SAR (a Special Administrative Region in China), nearly equals Viet Nam in terms of weight of the horns seized (nearly 19%), but actually surpasses Viet Nam in terms of the number of cases and rhino horns/horn pieces seized (more than 20%) (Table 5). To some degree Viet Nam functions as a supplier of rhino horn to China, with at least nine seizure cases made in China since 2010 noting Viet Nam as the source, while market surveys have shown Chinese citizens as major buyers of rhino products in Vietnamese markets (Liu, 2015). Most seizures in other Asian countries involve rhino horns in transit to Viet Nam and China. Likewise, in Europe (including Belgium, Czech Republic, France, Germany, the Netherlands, Slovakia and United Kingdom) and the United States, most rhino trade crime involves Vietnamese or Chinese nationals, indicating the global reach and linkages of criminal networks (TRAFFIC RHS database).

Available seizure data are a strong indication that China is making greater law enforcement effort than Viet Nam (Table 5). Since 2013, Viet Nam has been implicated in more than twice as many rhino horn seizure cases than it is making itself, suggesting that national-level law enforcement strategies are not commensurate with the scale of the problem. Viet Nam's revised penal code was to come into effect on 01 July 2016, but has been postponed. As written, the new code mandates fines between US$22,500-90,000 or a prison term of one to five years for minor offenses and from 10-15 years imprisonment for major offenses, but these penalties do not apply to individuals found "*illegally storing, transporting,* [or] *trading*" less than 50 grams of rhino horn (or 2 kg of ivory) (Penal Code No. 100/2015/QH13); such infractions would be subject to lesser punitive measures in accordance with other existing regulations but these have done little to reduce wildlife crime in Viet Nam to date. By way of contrast, Chinese law is already well developed and penalties for minor offenses include up to five years imprisonment and a fine, whilst major offenses can result in a life sentence and property confiscation (Articles 151 and 341 of the Criminal Law of the People's Republic of China). There have been a number of successful prosecutions for rhino crimes in China with significant sentences (TRAFFIC (2015).

Corruption remains a serious issue all along the trade chain with at least three of the South African seizure cases in 2015 resulting in the arrest of five police officers. One case involved a Jozini Crime Intelligence Warrant Officer whose trial and subsequent acquittal in the courts provoked allegations of systemic corruption with a media statement from the KwaZulu-Natal South African Police charging that *"poaching syndicates appear to have infiltrated the country's judicial system,'* and *'speaks of endemic corruption"* (Joseph 2016). In Mozambique, in January 2014, seven high-ranking police officers and officials in Massingir, which abuts Kruger and Limpopo National Parks, were arrested for armed robbery and trafficking in rhino horn, but all were subsequently released on bail (Mabunda 2014). Further, a Vietnamese national initially arrested at Maputo's international airport going to Kenya with seven rhino horns in May 2012, was then detected one week later at Bangkok's international airport in transit from Kenya to Ha Noi with seven rhino horns. In October 2013, a Vietnamese national arrested at Nairobi's international airport with five rhino horns from Mozambique was convicted, fined KSH20,000 (US$235) and then released (P. Kahumbu *in litt.* 08 January 2014). Interviews with arrested rhino horn smugglers in Viet Nam have raised allegations that Customs authorities, on occasion, seize rhino horns but then work to release suspects on lesser charges, but keep the horns; one person claimed "*I was released so quickly with a small fine and I even got my passport back immediately*" (Anon. 2014).

Rhino horn as a medical ingredient has been banned in China for more than two decades. In 1993, the pharmaceutical standard permitting rhino horn usage as a traditional medicinal ingredient was abolished. Since 2003, rhino horn carvings that predated 1949 and antique horn carvings imported from abroad were allowed to be traded (Kennaugh 2016), with most such products sold through fine art auctions in China. The State Forestry Administration (SFA) moved to curb this trade in 2011 by issuing a 'letter of concern' to the China Association of Auctioneers, noting the *Wildlife Protection Act*, the 1993 ban on rhino horn and the fact that contraband substances need formal government approval before offer for sale. Recent attitudinal surveys suggest some degree of rhino horn consumption, especially in southern and northeastern parts of the country. A stratified study in five cities (Beijing, Shanghai, Guangzhou, Kunming and Harbin) with 2,121 respondents to a questionnaire was conducted in May-June 2014, using a stated preference technique in direct interview situations (Kennaugh 2016). The survey indicated two distinct markets for rhino horn in China, one for medicine and one for luxury products, with users behaving differently in each market. A relatively large number of respondents claimed they "*knew someone who had bought rhino horn*", especially in Harbin and Kunming, where many more respondents indicated that rhino horn as medicine had been purchased than as luxury carvings (Kennaugh 2016). The main reason given for buying rhino horn as a luxury good was "*to give it as a gift*" because it was "*rare*", "*unique*", and ownership conferred "*prestige*"; price increases for rhino horn as medicine served to deter potential buyers, but for luxury product buyers, once price reached a certain threshold, further increases failed to dissuade most potential buyers (Kennaugh 2016). Further, the study found that about a quarter of all respondents claimed to not know that the purchase of rhino horn constituted illegal trade.

Unpublished research conducted in China in 2013 for TRAFFIC, which targeted 1,800 consumers across middle- and higher-income groups in Beijing, Shanghai, Guangzhou and Chengdu, found that 11% of the respondents, who represented either lapsed wildlife buyers or potential new buyers of wildlife products, reported interest in acquiring rhino horn carvings for 'investment' purposes. This preliminary finding requires further study, but a number of recent studies have suggested the potential use of ivory for speculative investment purposes in end-use markets, including on a commercial (not just individual) scale (Gao & Clark 2014; CITES 2015; Stiles 2015; UNODC 2016). Rhino horn, a high-value storable good, could hold investment value for those with access to illicit circles of consumption. Low interest rates, uncertainty and volatility in more traditional asset markets (for example, stocks and real estate) and possible expectations of ability to sell in future (liquidity) may be spurring diversification in investment portfolios. Thus, the potential use of rhino horn for investment purposes by individuals is another probable motivation for trade. It is also worth noting that the start of the upward spike in rhino poaching coincided with the global financial crisis in 2007-2008.

Physical market surveys in China yield sparse evidence of rhino horn trade. In April/May 2014, a limited TRAFFIC survey of some 28,000 curio and medicinal shops restricted to Beijing, Tianjin, Shanghai, Guangzhou, Nanning, Dongxing, Kunming and Xiamen only found one rhino horn, one rhino horn piece and three horn tips, approximately 52 carvings, one packet of beads, three packets plus 37 grams of horn shavings and 20 grams of rhino toenails (TRAFFIC unpublished data); follow-on government law enforcement action against some of these vendors subsequently transpired. Internet surveys by TRAFFIC (conducted in March-May 2014) targeting 25 websites regularly trading in wildlife products found 114 advertisements for alleged rhino horn products, mostly carvings (83%, 94/114), but some

manufactured medicine (*An Gong Niu Huang Wan*) and horn powder. To curb illegal internet trading, private sector service providers in China, working with the government and NGO monitors such as TRAFFIC, have instigated a policy to block offers of listed endangered species, including rhino horn, resulting in a significant and sustained drop in online trafficking (Xiao & Wang, 2015). Since then, the trade appears to have shifted to exclusive social media platforms that function on an invitation-only basis; more than 77 rhino horns/horn pieces or manufactured rhino products were observed for sale on a single social media platform that was regularly monitored over a one-month period in 2014 (Xiao & Wang 2015). This suggests that the rhino horn trade in China is moving deeper underground into covert use of social media forums that are harder to police effectively. Finally, evidence of rhino horn processing in China was revealed in 2013 when a Chinese antique dealer was convicted in the United States of smuggling 30 raw rhino horns to factories in China where they were carved into "fake antiques known as *zuo jiu* (Madarin for 'to make old')" (Huebschle 2016).

Unlike China, much more visible and robust markets for rhino horn trade have emerged in Viet Nam. In three villages near Hanoi, an active cross-border tourist trade with China in wildlife products, including rhino horn, has developed utilizing sophisticated networks of Chinese-speaking tourist guides, professional middlemen, wholesalers, retailers and transnational logistics companies (Ammann 2012, 2016; Liu 2015). Rhino horns and their products (drinking cups, beads, rings and Buddha figurines) are openly displayed, sold or, at additional cost, delivered into China with release following confirmation of on-line payment (Liu 2015). Similarly, cross-border physical markets for rhino horns and worked products have been observed in Mong La, Myanmar and the Golden Triangle Special Economic Zone (GT SEZ) in Bokeo Province, Lao PDR, and at more distant locations in Laos such as Vientiane and Luang Prabang (EIA 2015; Nijman & Shepherd 2014; Krishnasamy in prep.).

In Viet Nam, research conducted with 720 consumers in Hanoi and Ho Chi Minh City found that rhino horn is mainly used as a luxury product to reinforce social bonds and affirm status but also to promote wellness and treat illness (TRAFFIC 2013). The belief that rhino horn can treat cancer is unfounded and not supported by medical evidence (Nowell 2012). Those who consume rhino horn conspicuously as an overt way of displaying stature, power and wealth, tend to do so amongst colleagues, peers, family members or friends in social settings. Examples of consumptive behaviours include ingestion to embody the power of the rhino in achieving strength, vitality, sexual virility or simply a hangover cure, or by providing a gift to reaffirm a social bond and signify the importance of the relationship with something "*rare*" and "*exclusive*" (TRAFFIC 2013). The fact that rhino horn is difficult to acquire and comes from far away reinforces this perception, enabling consumers to shirk personal responsibility as they neither 'pulled the trigger' nor would be personally affected by species extinction (TRAFFIC 2013). The typical user is a 30-55 year old, middle-class, urban male, whilst buyers tend to be older women, who like to ensure they have rhino horn in the house to care for loved ones. Some users are part of elite Vietnamese society, highly educated and influential (TRAFFIC 2013). Purchase of rhino horns for investment purposes cannot be discounted.

Trophy hunting - Rhino sport hunting under CITES has only taken place in South Africa and Namibia. The numbers hunted have been sustainable with hunting offtake in 2015 representing only 0.34% and 0.05% of the white and black rhino populations in these two countries (Figure 3). As white rhino numbers have increased, hunting represents a smaller percentage of the total population than when hunting first started in South Africa in 1968 with 1,800 rhinos. Since then white rhino have increased ten-fold (Figure 3) in South Africa with nearly 2,000 more white rhino (that can trace ancestry back to South African founder stock) now conserved in eight other countries. Namibia also hunts small numbers of white rhino and has an increasing population. In 2004, CITES Parties approved hunting quotas of five black rhino males each for these two nations; and since then estimated numbers have increased by 67% with only 47 black rhino (43%) out of a potential maximum quota of 110 hunted from 2005 to 2015 (Figure 4).

Whilst legal hunting offtake has not been detrimental to rhino recovery (Figure 3), abuse of trophy hunting policy in South Africa emerged as a serious issue in 2006. Pseudo-hunting -- where rhinos are hunted to acquire horns for illegal trade purposes -- ultimately accounted for nearly one-fifth of all illicit horn leaving Africa (Milliken *et al.* 1999; Emslie *et al.* 2012; Milliken & Shaw 2012). Pseudo-hunting peaked in 2011, with Vietnamese, Thai and Czech Republic nationals dominating the industry (Figure 5), displacing hunters from other countries until South Africa took measures to curb abuse in 2012 (Emslie *et al.* 2012). Figure 5 shows that applications from Viet Nam, Thailand and the Czech Republic decreased markedly as a result. From 2013 through 2015, stricter scrutiny under the new policy has

resulted in the refusal of at least 17 hunting applications from the Czech Republic, Ukraine, Vietnam, China, Bulgaria, Canada and Slovakia, and at least 24 other hunts were cancelled (Table 6).

Figure 3: **Estimated white rhino numbers in South Africa (left) and black rhino numbers in South Africa and Namibia (right) before and after sport hunting started (↑) in 1968 and 2005, respectively** (SADC RMG & AfRSG).

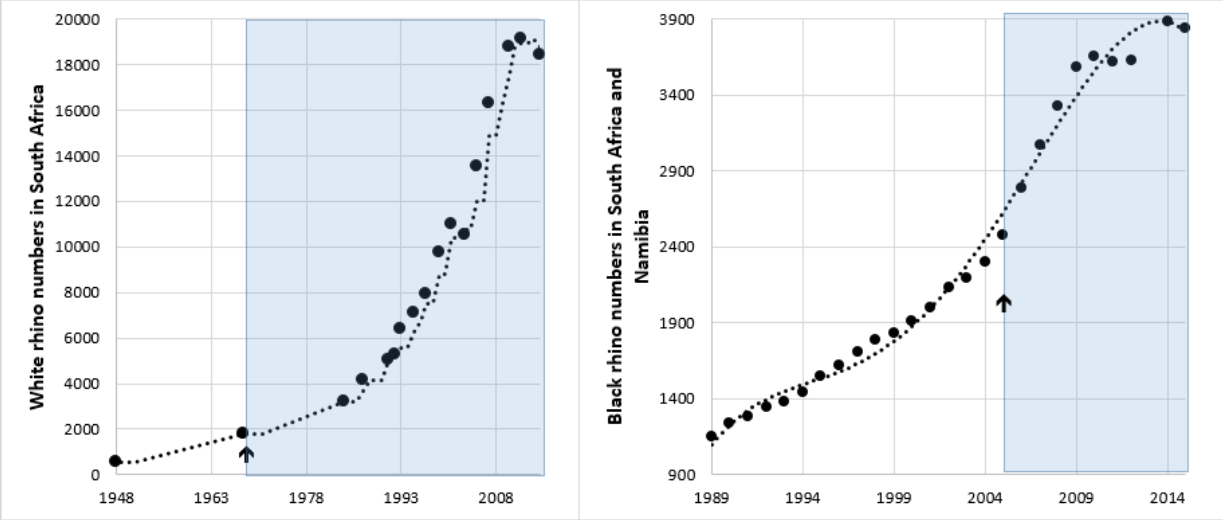
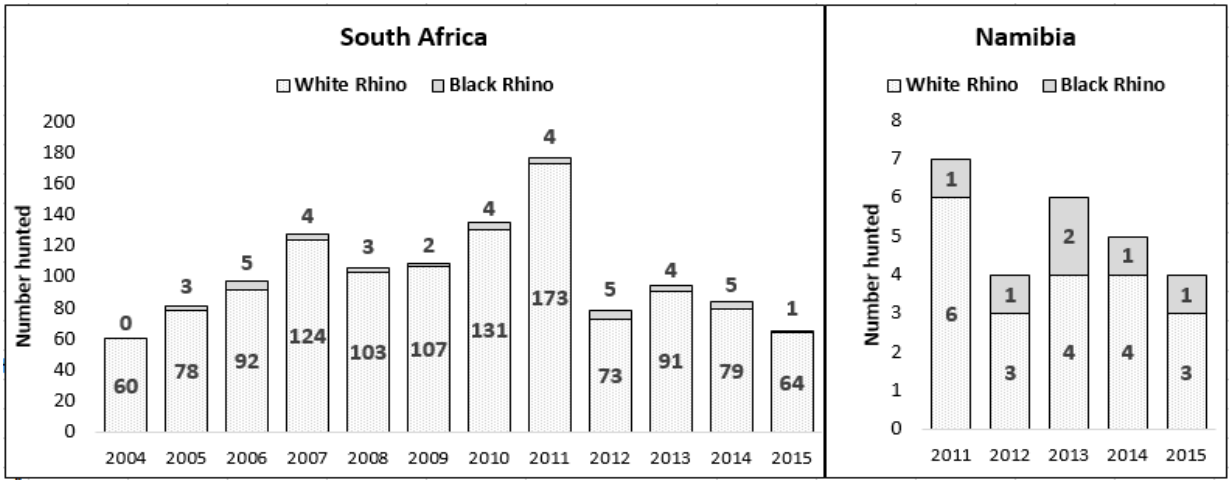


Figure 4 **Number of white rhino (hunted without quotas) and black rhino (hunted under CITES quotas) in South Africa 2004-2015 and Namibia 2011-2015** (Hall-Martin *et al.* 2008; Milliken & Shaw 2012; South African DEA data; Namibian MET data).



Note: Status of eight 2014 South African white rhino hunting applications still to be confirmed and so 2014 total could be up to eight higher. Namibia has only hunted one other black rhino in 2009.

Poaching and pseudo-hunting increased concurrently in South Africa up to 2012, but poaching grew at a faster rate and is more damaging demographically as breeding females and calves are also killed. Whilst poaching kept increasing after 2012, there has been a clear reduction in pseudo-hunting following South Africa's regulatory clampdown; numbers of trophy hunts have declined to levels previously seen in 2004-2006. Table 6 also shows a marked reduction in applications to hunt white rhino by nationals from confirmed pseudo-hunting countries. To address information management shortcomings in the control of legal rhino hunts, in 2015, South Africa's Department of Environmental Affairs (DEA) began, in collaboration with provincial authorities, a national database to track hunting applications with actual hunts that have occurred since 2009. Records from 2015 to the present are now up-to-date, and 2014 and 2013 are nearly complete, but retroactive input of data back to 2009 may take some time. The database could be enhanced to track CITES export permits for rhino trophies, their endorsement at approved ports of exits, and liaison with importing countries to ensure importation.

Figure 5: **Comparison of average number of rhino hunting applications/year by country of hunter, 2009-2011 and 2012-2015** (South African DEA rhino hunt database data).

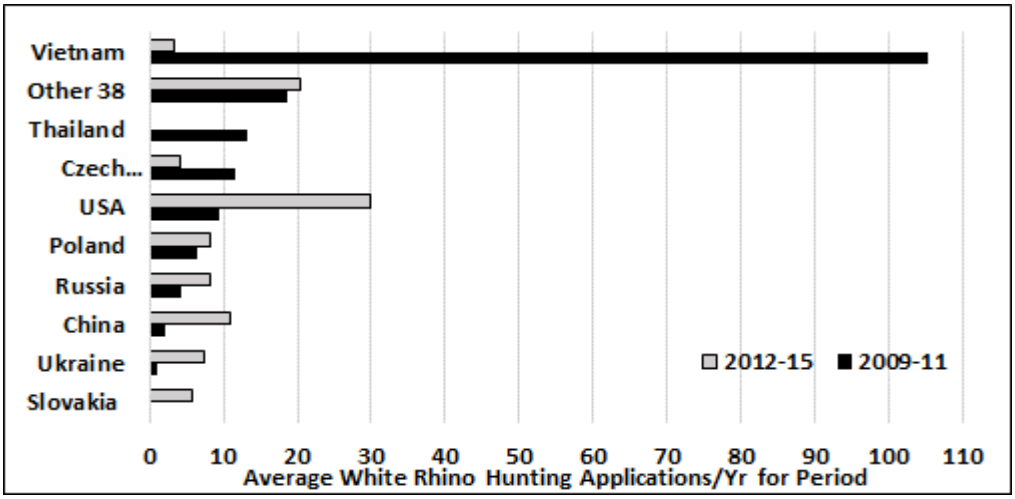


Table 6: **Breakdown of outcome of South African white rhino hunting applications for the period 2013-2015** (South African DEA rhino hunt database data)**.**

	Confirmed WR hunted				WR hunting applications Declined				WR hunts Cancelled or Withdrawn				Still to be confirmed by DEA			
Country	2013	2014	2015	Total	2013	2014	2015	Total	2013	2014	2015	Total	2013	2014	2015	Total
USA	20	32	32	**84**	0	0	0	**0**	0	2	4	**6**	7	3	0	**10**
China	3	8	11	**22**	0	3	0	**3**	0	4	4	**8**	5	4	0	**9**
Poland	5	8	5	**18**	0	0	0	**0**	0	0	1	**1**	5	1	0	**6**
Russia	6	8	3	**17**	0	0	0	**0**	1	1	0	**2**	0	0	0	**0**
Ukraine	8	9	0	**17**	4	0	0	**4**	0	2	0	**2**	0	0	0	**0**
Slovakia	9	1	2	**12**	0	1	0	**1**	0	0	1	**1**	3	0	0	**3**
Czech Republic	2	0	0	**2**	0	4	0	**4**	3	0	0	**3**	0	0	0	**0**
Vietnam	0	0	0	**0**	0	3	0	**3**	0	0	0	**0**	2	0	0	**2**
Thailand	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**	0	0	0	**0**
Other Countries	16	13	11	**40**	0	1	1	**2**	0	0	1	**1**	12	0	0	**12**
	9 countries	10 countries	7 countries			1 country	1 country				1 country		9 countries			
Total	**69**	**79**	**64**	**212**	**4**	**12**	**1**	**17**	**4**	**9**	**11**	**24**	**34**	**8**	**0**	**42**

Although marketing has historically focused on the USA, DEA reports recent promotion of white rhino hunts in Europe. Hunting, not just for rhino but for many other species, is also becoming popular with Chinese nationals (Huebschle 2016). These developments may partly explain recent increases in rhino hunting applications from citizens of Poland, Ukraine, Slovakia, Hungary and China (Figure 9; Table 6), but the shift in hunting patterns also raises concerns that adaptive responses by criminal operatives may be a result of the clampdown on nationals from known pseudo-hunting countries. Thus, it is suspected that some pseudo-hunting has continued since CoP16, although at a lower level because of improved regulation and with fewer white rhino hunts taking place. Whilst some 20% of the rhino horn leaving Africa for illegal markets was from pseudo-hunting several years ago, currently only an estimated 2.8% of horns are coming from this source (Table 3); and in most cases the horn is directed to Viet Nam.

Assessing the *modus operandi* of past pseudo-hunting provides useful insight for understanding recent developments. Since CoP16, two major investigations of pseudo-hunting in the Czech Republic, most of which occurred before 2012, have resulted in 19 individual arrests (including eight Vietnamese or Czech citizens of Vietnamese origin) and concluded that nearly three-quarters of the hunts resulted in illegal rhino horn trade. Czech pseudo-hunters typically surrendered their horns to South African sponsors who then applied for, and received, South African export permits for the trophies to be exported to the Czech Republic on the basis of forged signatures. The trophies, however, were redirected to Viet Nam, until two such shipments were interdicted in 2011; thereafter, the horns were first sent to Europe for onward smuggling to Viet Nam. Czech-based Vietnamese perpetrators modified scam practices in response to law enforcement actions, and were prepared to deal ruthlessly with anyone testifying against them as investigations unfolded (Czech Republic CITES MA, 2015). Slovakian hunters were also found to be complicit in pseudo-hunting and suspicions were raised concerning Polish hunters. The European Union (E.U.) has subsequently imposed stricter measures to require a CITES import permit before any rhino trophy can enter the E.U. (Regulation EU 2015/870, in force since 05 February 2015).

Table 7: Comparison of reported South African exports of rhino horn trophies with reported imports, 2010-2012 and 2013-2014 (CITES Trade Data)

Country / Territory	2010-2012			2013-2014			Total Discrepancy (More horns exported than imported)	Comments on Pseudo-hunting
	No. of rhino horns exported by South Africa	No. of rhino horns imported	Difference	No. of rhino horns exported by South Africa	No. of rhino horns imported	Difference		
Viet Nam	289	116	173	0	12	-12	*161*	**Confirmed**
Thailand	54	26	28	-	-	-	*28*	**Confirmed**
Lao PDR*	12	0	12	-	-	-	*12*	**Confirmed**
Czech Republic	90	20	70	16	8	8	*78*	**Confirmed**
Slovakia	4	12	-8	44	26	18	*10*	**Confirmed**
Russia	102	0	102	102	0	102	*204*	**Suspected**
United States	146	93	53	224	106	118	*171*	**Suspected**
Poland	44	22	22	67	23	44	*66*	**Suspected**
Germany	26	8	18	22	8	14	*32*	**Suspected**
Italy	21	0	21	10	0	10	*31*	**Suspected**
Spain	36	20	16	26	16	10	*26*	**Suspected**
Hungary	7	0	7	14	0	14	*21*	**Suspected**
China	20	2	18	14	12	2	*20*	**Suspected**
Ukraine	4	2	2	22	4	18	*20*	**Suspected**
Canada	4	0	4	13	0	13	*17*	**Suspected**
26 other countries	141	100	41	78	50	28	69	**Track**
Total	**1,000**	**421**	**579**	**652**	**265**	**387**	**966**	

Argentina, Austria, Belgium, Bulgaria, Denmark, France, Gambia*, Hong Kong SAR*, Iceland*, Kazakhstan, Libya, Lithuania, Lebanon, Luxembourg*, Mexico, Namibia*, Norway, Pakistan, Portugal*, Romania, Sweden, Switzerland, United Kingdom, UAE, Unknown, Zimbabwe *Countries/territories from which no rhino sport hunting applications were made in South Africa from 2009 through 2015, according to available data.

With knowledge of how pseudo-hunting operated in the past, worrying discrepancies were found in the UNEP-WCMC CITES Trade Data concerning trade in rhino horn trophies, with reported exports by South Africa being far greater than declared imports by the countries to where they were directed (Table7). Other discrepancies are apparent when the CITES data are compared to the DEA data on rhino hunts. For example, South Africa reports exporting 102 horns (from 51 rhinos) to Russia in 2013-2014, but none are reported as imports by Russia; further, DEA's data indicate only 14 white rhino hunts (28 horns) were legally conducted by Russian nationals during these two years with two approved hunts subsequently cancelled (Tables 5 & 6), suggesting that the horns of an additional 37 rhino were exported for which no legal hunts appear to be acknowledged. There could be some legitimate explanations for such discrepancies (e.g. exports were based on permits issued rather than permits used; rhino trophies obtained in one calendar year were exported in another; personal effects of emigrating residents were also listed; importing countries failed to report imports; etc.). White rhino trophies from South Africa are treated as Appendix II specimens and import permits are not a requirement unless stricter domestic measures by the importing State are in effect, which may contribute to under-reporting of imports. Whilst there may be plausible explanations in many cases, overall 58% of South Africa's declared exports were not reported as imports, and for many countries the discrepancies involve large numbers of horns and continue to increase with the passage of time (Table 7). In confirmed pseudo-hunting countries, the general pattern was many more horns being exported by South Africa than were reported as imports. For example, trade to the Czech Republic, where many horns were deliberately diverted to Viet Nam at the point of export from South Africa in contravention of the permit, a discrepancy of 78 rhino horns (39 rhino hunts) is noted. Similar discrepancies are also

found with respect to rhino horn exports to (in order of magnitude) Russia, the United States, Poland, Germany, Italy, Spain, Hungary, China, Ukraine and Canada (Table 7).

Documented internet advertisements of "South African rhino horns" for sale in Ukraine are of concern (V.Crook, TRAFFIC in litt. 04 February 2015). However, four Ukrainian hunting applications were turned down by South Africa in 2013 and there were no applications in 2015. In the U.S., two South Africans were indicted in October 2014 by the Department of Justice for allegedly selling rhino hunts without trophies to American hunters at cheaper rates so the horns could be sold to Asian buyers (Anon. 2015). In some countries, such as Poland, current law does not allow inspection without probable cause to confirm the presence of imported trophies, inhibiting investigation and control of potential pseudo-hunting. Finally, trade in some 44 rhino horns to Gambia, Hong Kong SAR, Iceland, Lao PDR, Luxembourg, Namibia and Portugal apparently transpired, but DEA data show that nationals from these places have not applied for any rhino hunts since at least 2009. These issues point to the need for investigation.

Despite these issues, hunting continues to play an important role in white rhino conservation as recognised by IUCN World Conservation Congress (2012) and national rhino management plans in two range States. In some reserves, hunting continues to fund a major portion of operational expenses. For example, in one South African private reserve that conserves nearly 200 white rhino, only 18% of operational expenditure was generated from tourism over an eleven-year period, while trophy hunting of wildlife, including white rhino, generated 63% of total income. Over the last eight years, seven (or <1% of the population annually) male white rhino were hunted, generating inflation-adjusted revenue of US$617,000; with live sales of another 47 white rhino over the period bringing in an additional US$973,000. All of the proceeds have gone towards rhino protection and conservation management costs in this reserve.

Live rhino sales - South Africa's private sector now conserves one-third of the national white rhino total (6,140), more than all other rhino throughout Africa combined, but escalating poaching has greatly increased security costs and risks to rhinos and staff with some private owners divesting of rhino completely or moving them to neighbouring countries between 2012-2014 (Balfour *et al*. 2016). However some others have acquired additional animals and overall numbers continue to increase on private land. Live rhino sale rhino turnover for conservation parastatals (SANParks and Ezemvelo-KZN-Wildlife) declined from 2007-2012 by nearly US$3.8 million primarily as there were fewer surplus animals to sell due to poaching (Emslie & Knight 2014). Monitoring trends of white rhino sales and prices is increasingly difficult, as more and more sales take place out of the public eye for security or other reasons.

Rhino horn sales – In November 2015, a South Africa court overturned the government's February 2009 moratorium prohibiting internal sales of rhino horns and derivatives to curb illegal undocumented private sector sales (Milliken & Shaw, 2012). The legal challenge by two rhino owners, based on non-compliance with the consultative processes prescribed under the country's law, was immediately appealed by DEA, but in January 2016, the High Court dismissed the government's appeal against lifting the ban. DEA again appealed the ruling and the case is now with the Supreme Court. There is no documented market for rhino horn in South Africa so the intent of the lawsuit is decidedly unclear.

Horn thefts – Rhino horn thefts from government custody have occurred in Botswana, Mozambique, South Africa, including 112 horns in Mpumalanga in 2014. Such thefts point to inside corruption. Twenty-seven horn theft incidents, totalling 369 kg, from private rhino owners in South Africa occurred in 2012-2014 (Balfour *et al.* 2016), but the true figure is likely to be higher and, in some cases, may mask illegal sales to criminal networks (Huebschle 2016). Lack of trust in certain provinces has resulted in a reluctance of some owners to register rhino horn stocks even though it is a legal requirement.

Rhino horn thefts in Europe decreased markedly following coordinated law enforcement action there and in the U.S. to take down the Rathkeale Rovers, an Ireland-based criminal group responsible for the crime wave reported to CoP16. The case reportedly involved a China-based Australian operative moving between France, Spain, Portugal and Asia and eventually led to the arrest of some 30 individuals before rhino horn thefts in Europe effectively halted (Higginbotham 2014). In the Czech Republic, two more individuals were independently convicted and jailed for three years (Czech Republic CITES Management Authority 2015). Increased security for publicly exhibited rhino horns has resulted in most being withdrawn into storage or replaced with fake substitutes throughout Europe.

2.4 Major conservation actions and field activities

As a report to CITES which primarily focuses on trade issues, the many conservation activities being undertaken by range States can only be very briefly described in text box below.

In-situ Conservation Management
► Monitoring and routine translocations continue to be essential for maintaining productivity of established populations and creating additional populations with good prospects for growth. ► Stocking rate management of competing species and supplementary feeding in response to severe drought in parts of southern Africa. Some drought related mortalities. ►Public/Private/NGO conservation partnerships continue to be important, including private and community custodianship of rhinos, co-management agreements and facilitation of international translocations.
Community Conservation
► Namibia continues to be a leader in community-based programmes but rhino poaching in conservancies is having a negative impact on attitudes and income generation. ► Increasing recognition of the need for greater community empowerment and improved relations as long-term support for conservation depends upon support from citizens; unfortunately, rhino poaching currently offers a way out of poverty for some in poor rural communities with few opportunities.
Law Enforcement and Protection
► Increased investment with law enforcement staff being deployed at increased densities, and greater use of dogs, technology and aerial support in some areas. ► Fenced sanctuaries, Intensive Protection Zones (e.g. Kruger) and extensive semi-natural captive breeding operations (allowing for more concentrated law enforcement effort) becoming more common. ► Enhanced security comes at a significant cost that can negatively impact on other conservation activities. For example, law enforcement costs in Kruger National Park, KwaZulu-Natal and on private land now range from US$1,210 to US$10,620 per rhino per year (M. Knight unpublished data; A.J. Conway unpublished data and Balfour *et al.* 2016) with high expenditure also reported in some Kenyan private reserves. Average security expenditure on private land in South Africa (excluding monitoring costs) from 2010 to 2014 increased 339% (Balfour *et al.* 2016), and costs in KwaZulu-Natal have doubled over the last eight years to roughly US$1.32 million/year for a 400km^2 sized reserve (A.J. Conway unpublished data). ► Cross boundary cooperation increased between Kruger National Park and Mozambique (discussed further below) with settlement relocation also taking place in Mozambique's Limpopo National Park. ►Opportunistic or routine dehorning in some areas.
Capacity Building
►Many range States continue to develop capacity. ► Wildlife Crime Directorate and a Specialist Anti-poaching school established in Namibia ►Joint Operations Centre established in Kruger National Park with a doubling of helicopter capacity. ►Specialized Rhino and Elephant Protection Unit in Zambia with canine unit in North Luangwa National Park. ► South African GEF project boosting wildlife forensic and investigations capacity. ► US$2.6m grant from the Howard G. Buffett Foundation is assisting efforts in Kruger ►Chinese government has provided US$2.2 million of equipment to Zimbabwe Parks and Wildlife Management Authority.
DNA Forensics
► ~100,000 samples from 18,000+ individual rhinos from all but one African range State have been submitted to RhoDIS®, the DNA profiling and database system developed by the University of Pretoria's Veterinary Genetics Lab (VGL), with samples from 3,800 criminal investigations receiving top priority (Cindy Harper, pers. comm.). ►Support to VGL for analysis and infrastructure development from a South African GEF project aimed at boosting wildlife law enforcement capacity. ►Smartphone applications for RhODIS developed and in use in South Africa to automate data capture and reporting. ►Desirability of using validated standardised rhino DNA markers together with a single global database of compatible DNA profiles recognised in draft continental African Rhino Range States Rhino Plan, and by IUCN World Conservation Congress Recommendation 138 and other stakeholders. ►June 2016 workshop funded by USAID, through the Wildlife-TRAPS Project, and WWF's African Rhino Programme agreed requirements for development of revised validated methods to facilitate future RhODIS-compatible analysis at multiple laboratories across the world, and the continued maintenance of a global DNA profile database to support law enforcement, investigation of trade routes and species ID. ►Accredited training courses in sample collection, ►Rhino DNA sampling workshop in 2013 attended by participants from 11 African range States and China, Thailand and Viet Nam. ► DEA/ South African Police developing a facility to coordinate and analyse wildlife forensic evidence similar labs are under way in Botswana and Kenya.

2.5 Management plans and strategies

At the continental level, a draft range States African Rhino Conservation Plan is currently undergoing final approval following three workshops with participation by all range States. Globally, resolutions, decisions and recommendations under CITES and IUCN World Conservation Congress continue to give direction. In most range States, national management or conservation plans have been formally accepted or developed, with many undergoing revision or review since CoP16. Uganda has also developed its first draft plan and Rwanda is developing a rhino plan as a necessary step before reintroduction of rhino. Although not a formal conservation plan, Mozambique has produced a National Ivory and Rhino Action Plan on measures to deal with rhino crime.

2.6 Coordination and implementation mechanisms

Rhino range States promote continental and regional coordination through membership in various groups with regular meetings, including the IUCN SSC AfRSG, the SADC Rhino Management Group, and the SADC Rhino and Elephant Security Group/Interpol Environmental Crime Working Group. Kenya formally requested the AfRSG to assist with reinvigorating the East African Community Rhino Management Group; with WWF funding, the second meeting was held in January 2016. At the national level, public engagement on rhino issues in South Africa continued through parliamentary portfolio meetings and a Committee of Inquiry established by the South African Minister of the Environment to consider different policy options, including the feasibility of a legal rhino horn trade proposal to CITES; the Committee's deliberations informed the South African cabinet decision in April 2016 to forego a trading proposal at CoP17. Bilateral collaboration between South Africa and Mozambique has improved significantly through Operation Lebombo, a standing joint initiative between South Africa (principally SANParks) and the Mozambique Police, to facilitate joint cross-border operations and share information and intelligence with ANAC, Mozambique's conservation authority. There has been greater consolidation of the Greater Limpopo Transfrontier Park, with a move to unify law enforcement effort by 2016. An anti-poaching force in Mozambique (Force Bravia) has been established. There have also been increased initiatives on private land in Mozambique adjoining Kruger National Park with schemes to generate benefits (primarily through trophy hunting) for local communities to reduce the threat of poaching. South Africa now has signed MoU's with China, Vietnam, Cambodia and Mozambique.

2.7 Rhino horn stocks

Resolution Conf. 9.14 does not mandate a process for the regular reporting of rhino horn stockpiles, making it difficult to track accumulation, thefts and destructions in range States or other countries. Some information on stocks has been provided by certain rhino States to AfRSG, but major gaps exist. The very incomplete information to date tentatively suggests that government stockpiles continue to grow through natural mortalities and de-horning. It was reported in June 2016 that a large quantity of rhino horns (228 kg) has gone missing from government stocks in Zimbabwe (Dzirutwe 2016).

South African private sector stocks also continue to increase in part due to improved declaration and reporting. Whilst problems clearly remain regarding their tracking, the discrepancy between reported and estimated horn has narrowed since CoP16. A 2014 survey of white rhino owners in South Africa found that privately-held stocks totalled 1,697 pieces (6,256 kg) (Balfour *et al.* 2016), accounting for ~80-85% of the potential estimated weight of stocks expected from natural mortalities (i.e. 7,690 kg). Fear of reporting stockpiles to authorities in some provinces where such information can be leaked to criminals is a factor in under-reporting. It is also noted that some private sector rhino owners are believed to have sold horns into illegal trade (Huebschle 2016).

Since CoP16, publicised horn destructions in the Czech Republic, Mozambique and Kenya have provoked some controversy. Some argue that public destruction raises awareness, signals that trade will not be tolerated and horn has no legal value, stigmatises and reduces demand, and prevents stocks leaking into illegal trade, saving on recurrent storage costs. Others argue that stock destruction may obliterate evidence in rhino crime cases, prevent forensic examination and stolen property from being returned to rightful owners, could serve to conceal theft or signal increasing scarcity of horn to investors and the market, stimulating increased poaching due to rising prices and further demand (Huebschle 2016). Caution is called for in view of indications that rhino horn is now the object of speculative investment. Whilst Resolution Conf. 6.10 once urged rhino horn stock destruction, it was repealed when Resolution Conf. 9.14 was adopted. This issue remains unresolved but independent auditing should precede all destruction events.

2.8 Legislation and prosecutions

Since CoP16, Kenya and Zambia have increased penalties for rhino trade crime, and similar moves are underway in Malawi and Mozambique. Namibia, South Africa, Swaziland, Tanzania and Zimbabwe already have deterrent penalties for rhino crimes. For example, in 2015, Tanzania convicted four Chinese nationals smuggling 11 rhino horns to 20 years imprisonment each, whilst in Zimbabwe, a rhino poacher was sentenced to 35 years in jail after pleading guilty. There is value in pursuing multiple charges in court cases: in South Africa, two Mozambicans were sentenced to 30 years each for illegal trespassing, illegal hunting, and possession of illegal firearm and ammunition. Judicial outreach to magistrates and prosecutors continues in Kenya, Zimbabwe and South Africa, and a Wildlife Prosecution Unit under the Office of the Director of Public Prosecutions has been established in Kenya. Dedicated prosecutors continue to be used for most rhino cases in South Africa with high conviction rates (e.g. 89% from April 2015 to January 2016, with over half receiving custodial sentences) in cases making it to court. Unfortunately many of those arrested never get to court. Prosecution of certain high-profile rhino crime cases in South Africa has also been delayed over a number of years, although court dates have been set for three major racketeering cases later this year. One case also was nearly aborted because of an inability to secure Vietnamese translation skills for court proceedings.

3. Asian rhinos

3.1 Status and trends since CoP16

Population estimates of Asian rhino species are summarized in Table 8 based on AsRSG information.

Table 8: Estimates of Asian rhino numbers by country, species and subspecies with trends since CoP16 report (AsRSG, February 2016)**.**

Species	**Greater One-Horned**	**Lesser One-Horned or Javan**			**Sumatran**		
Subspecies	*R.unicornis* and Trend	*R.s.sondaicus*	*R.s.annsmitticus*	**Total & Trend**	*D.s.sumatrensis*	*D.s.harrisoni*	**Total & Trend**
India	2,912+ ▲						
Nepal	645+ ▲						
Pakistan	Extinct ▼						
Indonesia		63		63 ▲	73	3	76 ▼
Malaysia					Extinct in wild?	Extinct in wild?	0 ▼
Viet Nam			Extinct	0 -			
Total	3,264 ▲	63	0	63 ▲	73	3	76 ▼

▲ = Increase; ▼ = Decline - No change Sumatran rhino estimates are minimum estimates based on footprints, camera traps and range occupancy information (data from Miller *et al.* 2015).

The greater one-horned rhino (*Rhinoceros unicornis*) is categorized as Vulnerable on the IUCN Red List of Threatened Species. Surveys in 2014 and 2015 confirm an increase of 9% since June 2012 to reach 3,557 rhinos in India and Nepal. Assam continues as the species stronghold in India with ~2,625 rhinos in four populations. West Bengal holds ~255 rhinos, with an additional 32 animals in Uttar Pradesh. Kaziranga National Park in Assam conserves the bulk (82.5%) of India's population, with numbers continuing to increase at a slow rate since 2012 (+1.6%/yr) to an estimated 2,401 in 2015. From 2008-2012, 18 founder rhino were re-established in Manas National Park, where rhino had previously been extirpated during a period of civil unrest. Eight more rhino from Kaziranga have since been released into Manas, but eight others have been poached since re-introduction, including all of the breeding-age males. Still, following 14 births, the Manas population has increased to 32. Reintroduction of rhino into Assam's Burhachapori Wildlife Sanctuary has also commenced with plans to introduce at least 20 founders. In Nepal, heavy poaching in a period of socio-political unrest caused numbers to fall by almost one-third during 2000-2008 to 408, but since the subsequent re-engagement of the army to assist with rhino protection in 2010, only two rhinos have been poached in the entire country from 2011 through April 2016. Under continued protection, Nepal now conserves an estimated 645 rhinos (up from 503 in 2011 and now exceeding the 2000 total of 612 before serious poaching commenced). The majority (93.8%) of Nepal's rhinos occur in one population, Chitwan National Park, where numbers have increased by an average of 5.6%/annum from ~372 in 2005 to ~605 individuals in 2014.

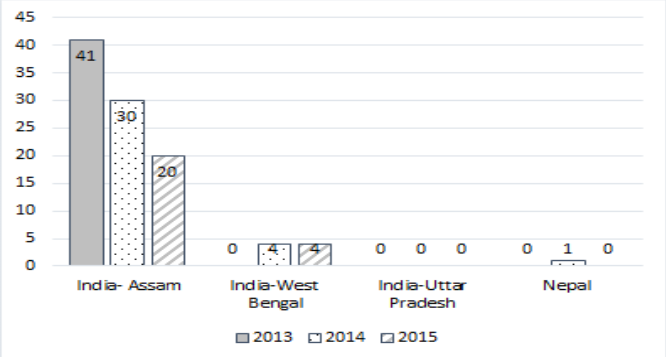
The Critically Endangered Javan rhino (*Rhinoceros sondaicus sondaicus*) only exists in a single population in Ujung Kulon National Park in west Java, Indonesia. Since CoP16, monitoring has improved with camera traps now covering the entire park that over 2013-2014 indicated a population of 58-61 rhino, which is significantly higher than the 35-45 reported to COP16. This increase is largely due to improved population estimation. Park authorities report seven calves were born in 2015, bringing the estimated population to about 63 individuals. Having all individuals in a single population is a strategic risk, leaving the species vulnerable to outbreaks of poaching (Haryono et al. 2015), disease carried by domestic cattle and potential natural disaster through volcanic activity ("Anak Krakatau", son of Krakatoa, is active immediately north of the park) or a major tsunami. Plans (over decades) to establish a second population continue to show little progress. Strategically, a second population would not only reduce risk, but should promote breeding in the current population (by freeing up food resources for remaining females) contingent upon a sufficient area of suitable and well-protected habitat.

The Sumatran rhino (*Dicerorhinus sumatrensis*) is believed to be extinct in the wild in Malaysia (Peninsula and Sabah) and is restricted to only four isolated sites in Indonesia, with as many as ten subpopulations, some numbering only between two and five animals. In addition to the three known Parks in Sumatra, since CoP16 at least four rhinos were found surviving in Kalimantan (Borneo), Indonesia; one was captured in March 2016 but subsequently died. No existing subpopulation is thought to be greater than 35 individuals. In 2015, the minimum total number of Sumatran rhino was estimated at 73 individuals (Miller et al. 2015), far fewer than previously thought. While there may be a few more in Bukit Barisan Selatan (BSS) and Way Kambas National Parks, much uncertainty exists around numbers in Gunung Leuser National Park. The degree of uncertainty around estimates reflects extreme difficulty in monitoring a shy species in dense, sometimes mountainous, rain forest, and limited effort and expenditure. In recent years, the use of camera trapping and DNA analyses has started at all four sites and could produce more accurate estimates of numbers and distribution (as has happened for Javan rhino). Such knowledge would assist biological management and help guide security needs and deployment of Rhino Protection Units. Since CoP16, the clearance of an encroachment settlement in Way Kambas was completed, and natural vegetation is being replanted. In BBS National Park, authorities also initiated an ambitious drive to evict illegal settlements, but the national park leadership changed in 2014 and the program has made little progress since then.

In contrast to India, Nepal and some African range States, where staffing densities, expenditure and political will are much higher, there has been limited government support and funding for rhino conservation efforts in Southeast Asia. Vast areas of suitable rhino habitat have been converted to palm oil cultivation and other forms of development, leaving rhinos vulnerable to (undetected) poaching, disturbance and loss of habitat. Further, protected areas have suffered human encroachment and clearing. Sumatran rhino conservation faces a number of challenges from low densities of anti-poaching field rangers and insufficient budgets for infrastructure, equipment and operations for protection and monitoring. There are also problems of isolated outlier animals and small population effects, habitat conversion, invasive species and limited biological management to improve carrying capacity.

3.2 Poaching

Figure 6: Poaching of greater one-horned rhino from 2013-15



UNESCO has applauded the Nepalese authorities for their successful efforts to protect threatened species, particularly the greater one-horned rhino. Since CoP16, poaching has declined, with only one rhino killed in Nepal over the last three years and no reported poaching to date in 2016 (Figure 6).

From 2010 through June 2012, Assam lost ~40 rhino to poaching, including seven rhino translocated to Manas National Park under the Indian Rhino Vision 2020 programme; an eighth rhino was lost in Manas in 2013. Post-CoP16, poaching in Assam increased to a high of 41 animals in 2013, but then decreased to 30, then 20 animals in 2014 and 2015, respectively (Figure 7). As of April 2016, nine more rhino had been poached in Assam. In West Bengal, where no rhino had been poached since 2001, four rhino each were lost in 2014 and 2015 (Figure 7). No poaching has been reported for Uttar Pradesh. Compared to Africa, reported greater one-horned rhino poaching levels across India and Nepal in 2015 are low (0.7% of the population in 2015 compared to 5.6% for white rhino and 4.0% for black rhino).

Since 2013, Rhino Protection Units patrolling in three Sumatran rhino areas have not detected any carcasses (either poached or from natural mortalities). With low manpower and patrol coverage in dense rain forest habitats, the absence of detected mortalities and declining encounter rates at two sites could mean that undetected poaching is an issue. Numbers appear to be stable and/or increasing in only one Sumatran location where evidence of new calves continues to be found.

The CoP16 report documented the poaching of the last known individual of the Vietnamese subspecies, but there has been no evidence of Javan rhinos being poached in Indonesia over the last 20 years. There were two presumed natural mortalities in 2014, with carcasses found with horn intact.

3.3 Trade

The CoP15 report indicated that most rhino horns from Assam moved first to Nepal then on to China, with only about one-tenth of the traffic crossing the Indo-Myanmar border (Milliken *et al.* 2009). However, trade patterns have since changed. The spike in rhino poaching in Assam from 2013 has resulted in at least 24 rhino horn seizures in India, with only two cases suggesting onward export to Nepal. Previously, in 2010-2011, three rhino horn seizures occurred in Nepal, including a case that involved two Chinese nationals (TRAFFIC RHS database). Since then, Nepalese law enforcement efforts have become more stringent, with a joint operation of Nepalese army and special police in October 2013 dismantling a rhino poaching network and arresting a major Kathmandu-based trader who allegedly ran a cross-border smuggling enterprise from Nepal to Tibet which killed 12 rhinos over six years. In December 2013, Interpol issued a Red Notice at Nepal's request for a rhino poacher wanted for killing 15 rhinos in Chitwan National Park and sentenced in absentia to 15 years in prison.

Cross-border trade into Myanmar has become the primary route for Assamese horns, according to investigations by AsRSG members. TRAFFIC's seizure data supports this view with China making three horn seizures in Yunnan province in 2010-2011 that involved cross-border trade from Myanmar's Kachin State; these seizures are believed to represent greater one-horned rhino. In 2015, four rhino horns were also seized in the Muse Township, Shan State on the Myanmar border with China, the suspected end-use destination, and in Manipur, India, another rhino horn was seized the same year at the Khudenthabi Check Point on the Myanmar border. Rhino horns have also been observed for sale in Mong La, another border enclave in Myanmar's Shan State that functions as a notorious 'backdoor' wildlife trafficking hub to China (Nijman & Shepherd 2014).

3.4 Major conservation actions and field activities

Like Africa, the greatest rhino conservation successes in Asia occur where there has been significant political will and dedicated staff commitment to effective action in the field. India's anti-poaching efforts continue to be critical to success, and the commencement of reintroductions into former range show long-term vision. Since CoP16, a review of protection and management options for rhino in Kaziranga National Park has been undertaken by park authorities (with AsRSG, AfRSG and other expert input). This in-depth review identified human encroachment into migration routes outside the park used by rhino in times of floods, promoting the desirability of adding higher ground areas to the park. In response to increased rhino poaching in 2013, the government of Assam entrusted a Special Task Force of the Assam Police to initiate action in and around Kaziranga. The proactive efforts of this task force have coincided with declining poaching in Assam in 2014 and 2015.

Nepal's second largest rhino population is being monitored using ID-based approaches to assist management. A strategy on anti-poaching and illegal wildlife trade is under preparation and trans-boundary relations with a tiger reserve in India have been initiated through formal information sharing with officials and local communities. Despite negligible poaching in Nepal in recent years, the regular

arrest of poachers indicates that threats posed by rhino horn trade remain. The heightened anti-poaching operations, together with improved management of habitat, should lead to positive impacts.

In 2010, an Indonesian government/NGO partnership (Yayasan Badak Indonesia, International Rhino Foundation) launched a programme in Ujung Kulon National Park for increasing useable space for Javan rhinos through the removal of invasive Arenga palm (*Arenga obtusifolia*), regeneration of rhino food plants, creation of new wallows, increased protection with new patrol paths and guard posts, and construction of a fence to lessen disease risk from domestic cattle. By 2015, 78ha had been cleared with between 4-10 rhino now frequenting targeted areas. Establishing a second captive population of Javan rhino with adequate protection, infrastructure and management remains under consideration.

For Sumatran rhino protection varies between the protected areas in Indonesia, with reasonably good coverage in BBS and Way Kambas National Parks, much more limited coverage in the Gunung Leuser Ecosystem, and virtually no protection in Kalimantan, where the current known population of three animals lives within a mining concession. Three non-reproductive Sumatran rhino now reside in the Borneo Rhino Alliance facility in Sabah with seven others in a managed breeding facility in Indonesia, which had its first birth in 2012 and a second calf in May 2016. In Indonesia, there are no reports of any conviction of rhino poachers or rhino horn smugglers from January 2013 to March 2016.

3.5 Management plans and strategies

Nepal developed an action plan for greater one-horned rhino in 2006, which is now due for revision. India still lacks a national rhino strategy, with conservation currently coordinated at the State level in Assam, West Bengal and Uttar Pradesh; AsRSG is negotiating to prepare a national plan. Indonesia has developed action plans for both Javan and Sumatran rhinos covering the period 2007-2017. A Population Viability Assessment was conducted in 2015 (Miller *et al.* 2015), the first step in developing an updated plan for Sumatran rhinos, with development of a comprehensive recovery strategy the next phase. For Javan rhino, the immediate action plan target is to increase numbers in the wild through improved biological management and the creation of a second population in suitable habitat.

3.6 Coordination and implementation mechanisms

Indonesia convened an Asian rhino range State meeting in 2013 which Indonesia, Malaysia, India, Nepal and Bhutan attended; the Bandar Lampung Declaration set a goal for “the populations of the Greater One-horned, Javan, and Sumatran Rhinos [to] be managed for an annual growth rate of at least 3%” and laid out conservation needs for all three Asian rhino species. Since CoP16, AsRSG has not held a full meeting, but some members took part in a Sumatran Rhino Crisis Summit meeting in 2013, the Population and Habitat Viability Assessments conducted for both Indonesian rhino species (Haryono *et al*. 2015; Miller *et al*. 2015), and a November 2015 meeting on the conservation of the greater one-horned rhinoceros in West Bengal and neighbouring areas in India and Nepal. The AsRSG is looking at new sites to absorb increasing rhino numbers in India and Nepal and has recommended feasibility studies for identifying potential new habitats. Further, based on genetic analysis of rhino in Jaldapara and Gorumara National Parks, exchange of healthy, breeding adult rhinos between the two parks was recommended to increase genetic diversity in both populations.

3.7 Horn stockpiles

No rhino horn stock information is officially available for this report. In India, based on the rhino horn stock registries maintained by forest officials in Assam, West Bengal and Uttar Pradesh, more than 1,700 rhino horns have reportedly been deposited in various treasuries, with more than 90% in Assam; most horn stock concerns recoveries from natural mortalities, but about 10% is derived from seizures. Rhino horn stocks in Nepal, Malaysia and Viet Nam are unknown, but in Indonesia, a few horns are reportedly in government custody. Overall, management and reporting of rhino horn stocks in Asia needs to be improved. The extent of rhino horn stocks in some previous horn consuming nations, including Thailand, is also unknown. An official rhino horn stock reporting mechanism for Asian rhino range States and other countries should be included in a future revision of Resolution Conf. 9.14.

3.8 Legislation

Jail terms under national wildlife legislation are generally high, but compared to the value of horns in illegal trade, fines in both India and Nepal remain extremely low. Fortunately, in most cases fines are

only given in addition to a jail term and not as an alternative. Capturing rhino poachers and traders and collecting sufficient evidence for successful convictions has proved to be very challenging. In 2011, two poachers with rifles were photographed by camera traps inside Rajiv Gandhi Orang National Park, India prior to killing a rhino eventually surrendered, along with their weapons, to local police; in July 2015, the suspects were convicted and given two years rigorous imprisonment and fined US$375 each. In August 2014, a mother and son were convicted of abetting rhino poaching in India's Kaziranga National Park, and sentenced to five years rigorous imprisonment.

4. Measures by implicated States to end illegal use and consumption of rhino parts and derivatives

In addition to measures discussed earlier, demand reduction initiatives for rhino horn in end use markets are called for in Decision 16.85. A number of consumer surveys, research projects and awareness initiatives have taken place. Campaigns tackling consumption have largely focused on Viet Nam and tended towards raising awareness, stressing the ineffectiveness of rhino horn as medicine and the illegality of rhino horn purchase and use. Some initiatives use social marketing and behavioural change approaches, employing selected messaging, messengers and mechanisms to undermine motivations for consumption in line with proven social science principles to achieve measurable reduction amongst target individuals and consumer groups (TRAFFIC 2012; Zain 2012). Intervention design is informed by insight into motivations, values and beliefs and the Decision 16.85 strategy principles. Consumer research evidence indicates that communications should avoid conservation or rhino poaching themes because of their potential to compromise success in changing consumptive choices. Impact assessment in terms of measuring changes in knowledge, awareness, attitudes and, ultimately, behaviour are being made, but sampling methodologies, survey sizes and statistical robustness needs to be improved (TRAFFIC 2016; Olmedo 2015). A 2016 workshop on "Changing Behaviour to Reduce Demand for Illegal Wildlife Products" which included some 100 people from 60 organisations, identified priorities for collective action. A 'community of practice' approach will be adopted and a 'Wildlife Consumer Behaviour Change Toolkit' created to improve uptake of behavioural change and social science principles in demand reduction approaches.

5. Conclusions and Recommendations

Rhinos remain in serious crisis. Since CoP14, there has been an uninterrupted increase in rhino poaching in Africa and the number of horns leaving Africa for illicit trade has reached the highest levels in over 20 years (Milledge 2007; Milliken *et al*. 2009; Emslie *et al.* 2012). Implementation of the nine rhino decisions adopted at CoP16 (Decisions 16.84-16.92) has had little impact (apart from a recent slowing in *rate of increase* in poaching and reduced levels of pseudo-hunting) in terms of curbing further expansion of the trade, which has effectively doubled since 2013.

In Africa, South Africa remains the main source of rhino horns for illegal trade, with most derived from poaching but natural mortality losses, pseudo-hunting, thefts from government and private stockpiles, and illegal internal sales also continue to contribute to illicit supply. Recent escalation of poaching in Namibia and Zimbabwe makes these two important range States a focus of concern as well. Turning to trafficking, analysis of seizure data to understand rhino horn trade flows, South Africa (as a source) and Mozambique (as an entrepôt and exporter) emerge as the priorities of greatest concern. The entrenched presence of Asian-run transnational criminal syndicates in Africa, ongoing government and private sector corruption, and ineffective law enforcement strategies and practices remain challenges that clearly frustrate progress.

In Asia, Viet Nam remains the primary end-use destination for rhino horn, but there is little evidence of concerted law enforcement action: since CoP16, flourishing cross-border markets have been documented, involvement of Vietnamese nationals in pseudo-hunting and trafficking continues, and implementation of a revised penal code has been postponed. China (including Hong Kong SAR) also emerges as the second most prominent destination, although Chinese authorities demonstrate a far more active commitment to prosecution of rhino crimes. However, seizure and sport hunting data, evidence from court cases, market surveys and attitudinal research all attest to the continuing, and perhaps growing, involvement of Chinese nationals around the world in rhino horn acquisition, trafficking, processing and consumption. Increased linkages between the Vietnamese and Chinese rhino horn trades have been documented. Demand reduction efforts continue in both countries but so far there has been limited assessment of its impact on rhino horn consumption.

Addressing rhino horn trade - Recommendations and Final Comments
Priority Countries for Attention
Despite some progress, it is appropriate that **South Africa**, **Mozambique**, **Viet Nam** and **Zimbabwe** remain countries for priority attention by the CITES Rhino Working Group (RWG). Parties should consider adding **Namibia** to this list because of the recent escalation of rhino poaching. Parties should also consider adding **China** to the list of CITES RWG countries of priority concern~~,~~ because evidence has now established a significant market for rhino horn.
Investigations
Countries, especially those with end-use markets, are encouraged to undertake long-term, intelligence-led investigations (like those that have transpired in Europe and the U.S.) as part of their strategies to combat illegal rhino horn trade. Besides port-of entry seizures, more focus on controlled deliveries, follow-the-money initiatives and, where legally possible, sting-type operations to penetrate and disrupt transnational crime syndicates needs to occur. With so many Asian nationals arrested in conjunction with rhino crime all along the trade chain, it is of concern that mechanisms and procedures for ensuing information sharing and language-appropriate interrogations and evaluation of evidence (e.g. documents, computers, cell phones, etc.) remain underdeveloped, especially in Africa.
Legislation
Legislation in key countries, including transit countries, needs to be evaluated and revised where necessary to ensure that it serves to deter rhino trade crime adequately. Penal codes for rhino crimes in Mozambique and Viet Nam remain inadequate and need to be upgraded and effectively implemented as a matter of urgency.
Prosecutions
Rhino crime prosecutions should ideally employ a combination of laws which carry the highest penalties, with custodial sentences (possibly with additional fines and asset forfeitures) preferred, rather than just fines.
Anti-corruption
As corruption remains a major factor behind rhino crime, Parties are encouraged to support actions that serve to mitigate and prevent systemic corruption within government regulatory and law enforcement institutions, and that foster compliance and accountability of private sector players.
DNA Forensics
The proposed development of methods and standardized protocols to facilitate validated and compatible DNA forensic analysis at multiple laboratories across the world linking to a global rhino DNA profile database is supported.
Regulation of Trophy Hunting
The development of a national rhino hunting database by South Africa is welcomed, but consideration should be given to enhancing its links to the CITES permitting and endorsement processes to track the export of trophies. South Africa should also consider the imposition of stricter domestic measures requiring the prior issuance of import permits for rhino trophies from countries of import to enhance control and reporting of legal rhino trophies. Investigation of discrepancies with respect to the CITES Trade Data should be pursued.
Rhino Horn Stock Management
A provision for annual reporting of rhino horn stocks by the Parties should be mandated as a revision to Resolution Conf. 9.14 (Rev. CoP15), as is the case for ivory in Resolution Conf. 10.10 (Rev. CoP16).
Rhino Horn Destructions
When rhino horn destructions occur, their impact, including on horn prices, needs to be evaluated to ensure that they do not result in unintended negative consequences. Where destructions are to be carried out, they should also be subject to independent auditing, DNA sampling and certification that no stocks are part of ongoing investigations or pending court cases.
Asian Rhino
India and Indonesia are encouraged to remain vigilant in their efforts to combat rhino poaching and curtail illegal horn trade, particularly in Kaziranga and Manas National Parks in Assam, and Bukit Barisan Selatan, Way Kambas and Gunung Leuser National Parks in Sumatra. Information on trade routes and other dynamics should be communicated to the CITES Rhino Working Group.

Acknowledgements and main sources of information

Rhino range States in Africa and Asia are especially thanked for the contribution of information. The U.S. Fish & Wildlife Service's Rhino and Tiger Conservation Fund, WWF's African Rhino Programme, Save the Rhino International, International Rhino Foundation, Peace Parks Foundation, African Wildlife Foundation, SANParks, Aaranyak, and UK's Department for Environment, Food, and Rural Affairs are all acknowledged for their support of the IUCN SSC African and Asian Rhino Specialist Groups and TRAFFIC. In addition, Richard Jenkins, Dena Cator, Dan Challender, Simon Stuart, Steven Broad, Gayle Burgess Richard Thomas and Ben Okita are thanked for commenting on drafts of this document.

References

Ammann, K. (2012). The Rhino and the Bling. http://karlammann.com/pdf/rhino-bling.pdf

Amman, K. (2016). China, Ivory and Wishful Thinking. http://karlammann.com/pdf/china-ivory-2016.pdf

Anon. (2014). *Testimonial of a rhino horn smuggler.* Education for Nature, Hanoi, Vietnam.

Anon. (2015). United States v. Dawie Groenewald, et al. (M.D. Ala.) http://www.justice.gov/opa/pr/owners-safari-company-indicted-illegal-rhino-hunts

Balfour, D.A., Knight, M. and Jones, P. (2016). *Status of White Rhino on Private and Communal Land in South Africa: 2012 – 2014*. Department of Environmental Affairs. Pretoria.

Bandar Lampung Declaration (2013)
https://cmsdata.iucn.org/downloads/arrsm_bandar_lampung_declaration_final.pdf

CITES. (2015). Workshop on Demand-side Strategies for Curbing Illegal Ivory Trade, Hangzhou, China, 28-29 January 2015. A joint collaboration between the CITES Secretariat and the Chinese CITES Management Authority. http://www.changewildlifeconsumers.org/wp-content/uploads/2016/03/ Hangzhou-Workshop-Record.pdf

Czech Republic CITES Management Authority. (2015). *Report on the implementation of measures taken to combat illegal trade in rhinoceros horn.* Report to the Rhino Working Group of the 66th meeting of the CITES Standing Committee. CITES Secretariat, Geneva, Switzerland.

Dzirutwe, M. (2016). *Zimbabwe's wildlife agency suspends boss over missing rhino horns*. http://www.reuters.com/article/us-zimbabwe-rhinohorn-idUSKCN0ZE0YF

Emslie, R.H., Milliken, T., and Talukdar, B. (2012). *African and Asian Rhinoceroses – Status, Conservation and Trade*. CoP16, Doc. 54-2-Annexe 2. CITES Secretariat, Geneva, Switzerland.

Emslie, R.H. and Knight, M.H. (2014). Update on African Rhino Status and Poaching Trends from IUCN SSC African Rhino Specialist Group (AfRSG) – IUCN briefing document for delegates attending 55th CITES Standing Committee Meeting.

Ferreira S.M, Greaver, C., Knight, G.A., Knight, M.H., Smit,I.P.J., and Izak P. J. Danie Pienaar. (2015). Disruption of Rhino Demography by Poachers May Lead to Population Declines in Kruger National Park, South Africa. PLOS ONE. http://dx.doi.org/10.1371/journal.pone.0127783

Gao, Y. and Clark, S. (2014). Elephant Ivory Trade in China: trends and drivers. *Biological Conservation* 180: 23-30.

Haryono, Muh., Miller, P.S., Lees, C., Ramono, W., Purnomo, A., Long, B., Sectionov, Isnan, M.H., Aji, B.D., Talukdar, B., and Ellis, S. (Eds.) 2016. *Population and Habitat Viability Assessment for the Javan Rhino.* Apple Valley, MN: IUCN SSC Conservation Breeding Specialist Group.

Hall-Martin, A.H., du Toit, J.G., Hitchins, P.M. and Knight, M.H. (2009) *The 2008 Survey of White Rhinoceros, Ceratotherium simum simum on Private Land in South Africa*. Report to WWF.

Huebschle, A.R. (2016). Game of horns: transnational flows of rhino horn. Dissertation published in Cologne, IMPRS-SPCE (Studies on the Social and Political Constitution of the Economy), pp. 1-424.

Higginbotham, A. (2014). *The Irish Clan Behind Europe's Rhino-Horn Theft Epidemic: Who is stealing all of Europe's horns?* Bloomberg, 03 January 2014. http://www.bloomberg.com/news/articles/2014-01-02/the-irish-clan-behind-europes-rhino-horn-theft-epidemic.

IUCN (2012) IUCN World Conservation Congress Recommendation 138
https://portals.iucn.org/library/node/44105

Kennaugh, A. (2016). *Rhino Rage: What is driving illegal consumer demand for rhino horn.* The Natural Resources Defense Council, Beijing, China. 21 pp.

Krishnasamy, K. (In prep.). An assessment of the ivory market in Lao PDR. TRAFFIC, Kuala Lumpur, Malaysia.

Liu, H. (2015). *Trafficking market goes wild in Vietnam*. Oxpeckers. http://oxpeckers.org/2015/11/trafficking-market-goes-wild-in-vietnam/.

Mabunda, L. (2014). Hunting Season. https://www.quora.com/profile/Rory-Young-1/Anomie/Hunting-Season-By-L%C3%A1zaro-Mabunda.

Milledge, S. (2007). *Rhino-related crimes in Africa: an overview of poaching, seizure and stockpile data for the period 2000-2005*. CoP14 Inf. 41. CITES Secretariat, Geneva, Switzerland.

Miller, P.S., Lees, C., Ramono, W., Purwoto, A., Rubianto, A., Sectionov, Talukdar, B., and Ellis, S. (Eds.) 2015. *Population Viability Analysis for the Sumatran Rhino in Indonesia.* Apple Valley, MN: IUCN SSC Conservation Breeding Specialist Group.

Milliken, T. Emslie, R.H and Talukdar, B. (2009). *African and Asian Rhinoceroses – Status, Conservation and Trade*. CoP15, Doc. 45.1 Annexe 1 CITES Secretariat, Geneva, Switzerland.

Milliken, T. and Shaw, J. (2012). *The South Africa – Viet Nam Rhino Horn Trade Nexus: A deadly combination of institutional lapses, corrupt wildlife industry professionals and Asian crime syndicates.* TRAFFIC, Johannesburg, South Africa.

Nijman, V., and Shepherd, C.R. (2014). Emergence of Mong La on the Myanmar–China border as a global hub for the international trade in ivory and elephant parts. *Biological Conservation* 179 (2014) 17–22.

Nowell, K. (2012). Assessment of Rhino Horn as a Traditional Medicine: A report prepared for the CITES Secretariat. SC62 Doc. 47.2 Annex (Rev. 2). CITES Secretariat, Geneva, Switzerland.

Olmedo, A. (2015) Evaluating Behaviour Change Interventions: A case study in Viet Nam. MSc Thesis in Conservation Science, Imperial College London

Stiles, D. (2015). *Analysis of Ivory Demand Drivers*. http://wildlifenews.co.uk/test/Ivory%20Analysis%20Final%20Report.pdf

TRAFFIC (2012). Creative experts' meeting on messaging to reduce consumer demand for tigers and other endangered wildlife species in Vietnam and China: Meeting Report. TRAFFIC International, Cambridge, United Kingdom.

TRAFFIC (2013) Rhino Horn Consumers, Who Are They? TRAFFIC Greater Mekong Region, Hanoi, Viet Nam.

TRAFFIC. (2015). *Vital evidence goes up in smoke*. TRAFFIC International, Cambridge, United Kingdom. http://www.traffic.org/home/2015/7/7/vital-evidence-goes-up-in-smoke.htm

TRAFFIC (2015b) *TRAFFIC BULLETIN* Seizures and Prosecutions March 1997–October 2014. TRAFFIC International, Cambridge, United Kingdom.

TRAFFIC (2016). Changing Behaviour to Reduce the Demand for Illegal Wildlife Products, Workshop Proceedings (in prep.). TRAFFIC International, Cambridge, United Kingdom.

UNODC. (2016). *World Wildlife Crime Report: Trafficking in protected species*. UNODC, Vienna, Austria.

Viet Nam CITES Management Authority. (2015). Report to the Rhino Working Group pursuant to Decision 16.86 for the 66th meeting of the CITES Standing Committee. CITES Secretariat, Geneva, Switzerland.

Xiao, Y. and Wang, J. (2015). *Moving Targets: Tracking Online Sales Of Illegal Wildlife Products In China.* A briefing paper, TRAFFIC East Asia-China, Beijing, China.

Zain, S. (2012) Behaviour Change We Can Believe In: Towards A Global Demand Reduction Strategy for Tigers. TRAFFIC International, Cambridge, United Kingdom.