

The ivory trade and elephant conservation

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SUMMARY

In response to significant elephant population declines in the 1970s and 1980s because of poaching for ivory, the Convention on the International Trade in Endangered Species of Wild Fauna and Flora (CITES) banned the international trade in Asian and African elephant species by listing them on Appendix I in 1973 and 1989, respectively. Many southern African countries disagreed with the African elephant trade ban and have continued to argue against it since the mid-1980s. They maintain that their governments practise sound wildlife management policies and actions and, as a consequence, their national elephant populations have reached unsustainable size. They argue that they should not be penalized because other countries cannot manage their wildlife. Further, they say they need the proceeds from ivory and other by-product sales to finance conservation efforts. In 1997, the CITES Conference of Parties voted to allow Botswana, Namibia and Zimbabwe to auction off 50 tonnes of government ivory stockpiles to Japanese traders on a one-off experimental basis, which took place in 1999. Ivory trade opponents allege that this sale stimulated ivory demand, resulting in a surge of elephant poaching. Nevertheless, CITES voted again in 2002 to allow Botswana, Namibia and South Africa to auction off another 60 tonnes of ivory after May 2004. Trade opponents have launched an active campaign to prevent the sales, warning that they could provoke a renewed elephant holocaust. This paper reviews available quantitative evidence on ivory trade and elephant killing to evaluate the arguments of the ivory trade proponents and opponents. The evidence supports the view that the trade bans resulted generally in lower levels of ivory market scale and elephant poaching than prevailed prior to 1990. There is little evidence to support claims that the 1999 southern African ivory auctions stimulated ivory demand or elephant poaching. Levels of elephant poaching and illegal ivory trading in a country are more likely to be related to wildlife management practices, law enforcement and corruption than to choice of CITES appendix listings and consequent extent of trade restrictions. Elephant conservation and public welfare can be better served by legal ivory trade than by a trade ban, but until demand

for ivory can be restrained and various monitoring and regulation measures are put into place it is premature for CITES to permit ivory sales.

Keywords: CITES, conservation, elephants, ivory trade, poaching, wildlife use

INTRODUCTION

Since the mid 1980s, there has been an active campaign to ban the international trade in elephant ivory through the listing of elephant species on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). CITES Appendix I species are supposed to be those threatened with extinction as a result of trade (CITES Conference 1.1, 1976). Commercial international trade of an Appendix I species, or its products, is prohibited amongst CITES Party countries. Amongst CITES Parties, Kenya and India have most recently led the opposition to the trade (CITES 2000; CITES 2002*a*), and several animal preservation organizations, such as the International Fund for Animal Welfare (IFAW), Born Free Foundation, Care for the Wild International, the Humane Society of the United States (HSUS) and others have posted anti-ivory-trade editorials on their web sites. IFAW (IFAW 2003; Reeve *et al.* 2003) has presented a detailed argument outlining reasons why CITES should not re-list African elephant populations from Appendix I to Appendix II, which would result in limited international trade in elephant ivory. Various environmental non-governmental organizations (NGOs) have also presented arguments against the ivory trade (Douglas-Hamilton 2000; Environmental Investigation Agency [EIA] 2000, 2002; Sakamoto 2000, 2002). Most southern African Parties to CITES, supported by Japan, have presented counter-arguments to make a case that international trade in ivory from their countries is justified (Martin *et al.* 1986; Cumming 2000; CITES 2002*b, c, d, e*). Southern African community organizations that benefit from wildlife use, such as CAMPFIRE in Zimbabwe and the Namibian Association of Community-based Natural Resources Management Support Organization (NACSO), have also supported the sales (Tavengwa 1997; Shigwedha 2004).

Elephant conservation has sparked heated debate at every CITES Conference of the Parties since 1985. The Asian elephant was listed on Appendix I of CITES in 1973 and the African elephant followed suit in 1989. The debate centres on the issue of the international trade of live elephants and elephant products, principally ivory. Poaching for ivory increased throughout the 1970s and 1980s as ivory demand grew,

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stimulated by economic development and increased tourism, particularly in Asia. The ivory trade was widely recognized as the single most important cause of substantial elephant population declines (Clarke & Bertin 1989; Cobb 1989).

Between 1999 and 2002, quantitative ivory trade surveys (Martin & Stiles 2000, 2002, 2003; Stiles & Martin 2000, 2001, 2002*a,b*, 2003*a,b*) revealed that there were problem hotspots in Africa and Asia of illegal ivory trading and manufacturing. TRAFFIC (the Worldwide Fund for Nature-World Conservation Union [WWF-IUCN] wildlife trade monitoring network) and other conservation organizations also made various ivory trade surveys during the late 1990s and early 2000s, but they lacked the systematic quantitative data that are required for trend monitoring and assessment. There have also been allegations of increased illegal elephant killing in both Africa and Asia in the late 1990s and early 2000s (Menon & Kumar 1998; EIA 2000, 2002; CITES 2002*a*; Anon. 2003).

At the 10th CITES Conference of the Parties in 1997 the member states voted to allow a one-off, experimental sale of 50 tonnes of raw ivory from Zimbabwe, Botswana and Namibia. Japanese traders bought the ivory at auction in 1999 under the proviso that none of it would be re-exported. Some conservationists alleged the CITES decision provided the incentive that sparked a rise in elephant poaching. In spite of the criticisms, CITES decided at the 12th Conference of the Parties in 2002 to permit a second sale of 60 tonnes of ivory stockpiles, this time from Botswana, Namibia and South Africa after May 2004. The Fifth African Elephant Range States Dialogue Communiqué at CITES 12 demonstrated that most African elephant range state governments supported limited re-listing of the African elephant to Appendix II, and the attendant ivory sales, if stringent conditions were met. These conditions, relating to ivory trade and elephant killing monitoring and regulation, are set forth in CITES Resolution Conf. 10.10 (Rev. CoP 12). TRAFFIC (2002) also recommended that the trade be allowed.

Using the data presented in the Martin and Stiles (2000, 2002, 2003) reports and available figures related to elephant numbers and poaching, I (1) assess the effectiveness of the 1989 CITES ivory trade ban in reducing ivory demand and elephant poaching, (2) review arguments both for and against reopening the international trade in elephant ivory, and (3) suggest new ways to reduce ivory demand.

EFFECTIVENESS OF THE CITES IVORY TRADE BAN

The rationale for imposing the ban was the assumption that stopping the legal supply of ivory to and movement of ivory between international markets would result in a reduction of elephant poaching, thus conserving threatened elephant populations. There are two phenomena to examine in order to test whether this assumption turned out to be correct, namely the scale of national ivory markets and rates of elephant poaching prior to and after the 1989 CITES ban. Early 1990

was selected as the threshold date, because that is when the ban came into effect in most countries. If national ivory markets decreased substantially in size after 1990, this should have led to reduced elephant poaching. It is assumed that ivory markets and poaching are closely correlated, since the former corresponds to demand and the latter represents supply in the current ban context.

Ivory trade scale and demand

Ivory market data are available currently for only two regions of the world, Asia and Africa, though a report on parts of Europe is in preparation (E. Martin & D. Stiles, unpublished report). Asia is more difficult to assess than Africa because markets there depend on raw ivory from both the Asian and African elephant, while in Africa only African tusks are used. There are almost no data available to assess the effectiveness of the 1973 Asian elephant ivory trade ban, but there is some information that can be used to evaluate the effects of the 1990 African ivory ban in Asia.

The indicators that are used in this assessment of market scale and trends are: price of raw ivory, number of active ivory craftsmen, number of workshops, number of retail outlets selling ivory and the number or weight of ivory items seen for sale. The gross domestic product (GDP) inflator index was applied to past prices to render them comparable to 2002 prices. Martin and Stiles (2000, 2002, 2003) gathered data for these indicators in 29 cities in Asia and 22 cities in Africa. If the trade ban has been effective, we would expect to see lower values for each indicator except raw ivory price after 1990, reflecting the effects of a supply restriction. If demand remained constant, the price for raw ivory should have risen in countries with few or no elephants, and fallen in countries with abundant elephants.

Table 1 presents data for four markets in East Asia and five in Africa. Data were not good enough for pre-1990 years in the other countries to make comparisons with post-1990 years. The comparisons show expected post-1990 values in: (1) China, where number of workshops and number of craftsmen had decreased; (2) Hong Kong, where number of craftsmen had decreased; (3) Taiwan, where number of craftsmen and probably the number of retail outlets had decreased; (4) Japan, where number of craftsmen had decreased; (5) Côte d'Ivoire, where number of retail outlets and weight of items for sale had decreased; (6) Cameroon, where price of raw ivory, number of retail outlets and weight of items for sale had decreased; (7) Democratic Republic of Congo (DRC), where price of raw ivory and number of workshops had decreased; and (8) Gabon, where price of raw ivory, number of workshops, number of retail outlets and weight of items for sale had decreased.

Values that did not conform with expectations were: (1) China, where the raw ivory price dropped after 1990; (2) Hong Kong, where raw ivory price was about the same in 1988 and 2002 (however, a press report in early 2004 stated that the price in Hong Kong had dropped to US\$ 179 kg⁻¹;

Table 1 Ivory trade indicators for pre-ban 1989 and post-ban years in Asia and Africa. Sources: Cobb (1989), Martin and Stiles (2000, 2003), Dublin and Jachmann (1992) and Dublin *et al.* (1995).

<i>Place</i>	<i>Year</i>	<i>Price US\$ kg⁻¹ for 5–10 kg tusk</i>	<i>GDP inflator index 2002 (US\$)</i>	<i>Workshops (no.)</i>	<i>Craftsmen (no.)</i>	<i>Retail outlets (no.)</i>	<i>Items traded (min. no.)</i>
<i>Asia</i>							
China	1989	197–350	261–464	~15	900	–	–
	2002	120–170	120–170	~10	100–200	117	9096
Hong Kong	1988	180	248	–	600–1000	–	–
	2002	200–320	200–320	0	0	85	35 884
Taiwan	1989	–	–	–	10	>55	–
	2002	–	–	1	1	59	1849
Japan	1988/89	288	396	–	~200	–	–
	2001/02	140–320	140–320	~73	~107	138	7565
<i>Africa</i>							
							<i>Weight for sale (kg)</i>
Côte d'Ivoire	1989	–	–	12	–	56–61	4880
	1999	40–80	42–84	14	97–107	37	2748
Cameroon	1989	65–81	86–107	>3	–	65	1490
	1999	27–50	29–53	>7	38–50	35	654
Democratic Republic of Congo	1989	40–50	53–66	21	–	–	–
	1999	30–50	32–53	13	116	30	485
Gabon	1989	45–65	59–86	>9	–	>48	740
	1999	30–42	32–44	0	0	10	44
Nigeria	1989	14–29	18–38	–	–	34	1082
	1999	46–50	49–53	6	33–43	35	1742

Table 2 A comparison of ivory trade indicators for the most important ivory markets in Africa and Asia. NA = Not applicable, as there was no trade. Sources: Martin and Stiles (2000, 2002, 2003).

<i>Place</i>	<i>Cities/towns surveyed (no.)</i>	<i>Price for 5–10 kg tusk (US\$ kg⁻¹)</i>	<i>Workshops (no.)</i>	<i>Craftsmen (no.)</i>	<i>Outlets (no.)</i>	<i>Items (min. no.)</i>
<i>2002</i>						
China	3	120–170	3	10–20	117	9096
Hong Kong	1	200–320	0	0	85	35 884
Japan	2	140–320	~73	~107	138	7565
Taiwan	4	NA	0	0	59	1849
Totals for East Asia	11	120–320	~76	~123	413	54 413
<i>2000–2001</i>						
Thailand	3	91–182	~13	~76	194	88 179
Myanmar	2	142–350	11	55	53	5801
Vietnam	2	350–500	6	~22	50	3039
Singapore	1	NA	0	0	23	2700
Totals for South and SE Asia	18	91–500	30+	~200	521	105 081
<i>1998–1999</i>						
Egypt	3	62–98	11	110	142	21 460
Zimbabwe	2	12–17	7	30	33	20 475
Cote d'Ivoire	1	58–80	15	97–107	52	20 114
Ethiopia	1	37–53	6	10–20	54	9996
Cameroon	2	30–50	14	50	43	6015
Nigeria	1	50	6	43	40	5966
Totals for Africa	22	12–137	89	615–625	657	~110 000
<i>Grand total</i>	51	12–500	~195	938–948	1591	~270 000

Joanilho 2004); (3) Côte d'Ivoire, where the number of retail outlets had increased slightly; (4) Cameroon, where the number of workshops had increased; and (5) Nigeria, where raw ivory price, number of retail outlets and weight of items for sale were all higher.

The higher numbers of retail outlets for Côte d'Ivoire and workshops for Cameroon (Table 1) could be sampling errors rather than real increases.

Table 2 presents a summary of the trade indicator data for the most important ivory markets in Africa and Asia from

Martin & Stiles (2000, 2002, 2003). If the ban had been successful in reducing ivory market scale, then the indicators should reflect this. In Asian countries, where appropriate data are available, prices fell and there were significantly fewer workshops and craftsmen in 2002 than in 1989. Unfortunately, there are no data on the quantities of worked ivory for sale pre-1990. There was a reduction in ivory processing, and also of demand (Table 2). If demand had remained as high as the pre-ban period, raw ivory prices should have risen with the constriction of supply. The alternative hypothesis explaining a price drop would be that supply was not constricted, but this explanation is highly unlikely. The Elephant Trade Information System (ETIS), a monitoring arm of CITES, reported seizures of 191 tonnes of raw ivory and 182 415 pieces of worked ivory between the start of the ban and June 2004. These are minimum figures, since reporting by governments is generally incomplete (Milliken *et al.* 2004). Between 40 and 50 tonnes of ivory were seized between 1996 and 2002 in China alone (Martin & Stiles 2003). If raw ivory prices still fell even with these seizures, demand must have fallen off considerably since 1990.

In Africa, everywhere but Nigeria showed indicators that implied smaller ivory markets in 1999 than before the ban (Table 2). Lagos raw ivory prices were higher and more ivory was displayed for sale in 1999 than a decade earlier, suggesting greater demand, though a restriction of supply caused by the war in the DRC probably contributed to the higher price (Martin & Stiles 2000).

Interviews with ivory industry workers indicated that the two main factors responsible for the decline in most ivory markets were the reduction in raw ivory supply and the decrease in demand, particularly in the West. Demand was driven down in North America, Europe and Japan by effective anti-ivory campaigns that created stigma, which made buying ivory ethically unacceptable, and by Western governments passing legislation that made the import of most types of elephant ivory illegal, thus introducing risk of prosecution as a factor in buying foreign ivory. Conversely, ivory demand has been rising amongst citizens of the People's Republic of China since 1990 in conjunction with increased economic prosperity.

Overall, the CITES trade ban does seem to have been successful in reducing ivory market scale and demand in many places. Nigeria, Myanmar and Thailand all had larger or equal ivory markets ten years after the ban, and China, Egypt, Côte d'Ivoire, Ethiopia and Cameroon still have high levels of ivory market activity and illegal ivory movements. The attempt to limit supply has not suppressed demand for ivory everywhere. There is also evidence that there is still a market for ivory in Europe and the USA (HSUS 2002; IFAW 2004; E. Martin & D. Stiles, unpublished report), though how much of it is post-ban and thus illegal cannot be specified with any degree of certainty.

Elephant numbers and poaching

The data for the poaching of elephants are extremely poor. For this reason CITES recommended in 1997 that a system for

monitoring illegal killing of elephants (MIKE) be established. It is unlikely that MIKE will be fully functional until late 2005 at the earliest (CITES 2002*f*; Reeve *et al.* 2003). There is no published database for any country of the number of elephants poached stretching across the pre- and post-1990 period. However, we can examine the gross number of elephants in each range state country. Although this will not tell the complete story on poaching, it can give a good indication of the bottom line effectiveness of the ivory trade ban on elephant conservation.

Recent research on elephant DNA concluded that there are two species of elephants in Africa: *Loxodonta africana*, the savannah elephant, and *Loxodonta cyclotis*, the forest elephant (Roca *et al.* 2001). Eggert *et al.* (2002) have suggested that a third species exists in West Africa. Debruyne (2004) disagreed with both findings and concluded that enough hybridization had occurred between the geographical variants that they should remain classified at the subspecies level. One elephant species inhabits Asia (*Elephas maximus*), with three subspecies (*E. m. indicus*, *E. m. sumatrensis* and *E. m. borneensis*) (Shoshani & Eisenberg 1982; Fernando *et al.* 2003). Each of these elephant variants, whether at the species or subspecies level, occupies a specific range, though at times overlapping with another variant, and constitutes an individual 'evolutionary significant unit' (ESU). As such, each one deserves protection from extinction on biological grounds (Moritz 1994; Bluestone & Dublin 1999; WWF 2002).

Africa

In 1976, the African Elephant Specialist Group of IUCN organized the first continent-wide census of the African elephant. It concluded that there were 1.34 million elephants ranging over 7.3 million km², and documented serious population declines in most African countries in the 1970s (Douglas-Hamilton 1979). In 1987, the Group estimated that the elephant population had declined to 760 000 (African Elephant and Rhino Specialist Group 1987). In 1989, the estimate dropped further to 608 000 (Cobb 1989). It was this loss of an estimated half of Africa's elephants in ten years, an average of over 70 000 elephants a year, that led to the calls for an international ivory trade ban.

The first continental survey after the CITES ivory trade ban (Douglas-Hamilton *et al.* 1992) arrived at a 1991 estimated range of elephant numbers consistent with the Ivory Trade Review Group (ITRG) 1989 figure. In 1998, a range of elephant numbers suggested that elephant populations were still declining, but at a reduced rate (Barnes *et al.* 1999). Elephant numbers apparently rose slightly between 1998 and 2002 (Blanc *et al.* 2003).

African elephant populations declined by about 60–70% in two decades, 1979–2002 (Table 3), following great losses in the 1970s. Central and Eastern Africa were the sub-regions hardest hit by elephant poaching, while Southern Africa made substantial population gains between 1990 and 2002 (Table 3).

Elephant populations were growing in some countries even before the ivory trade ban came into effect (for example

Table 3 Elephant population estimates (number of elephants) 1979–2002 in Africa. Numbers have been rounded to the nearest 10. For 1998 and 2002, the definite and probable classes were combined to make the minimum number, and the possible and speculative classes were added to make the maximum number. Sources: Douglas-Hamilton (1979), ITRG (1989), Douglas-Hamilton *et al.* (1992), Barnes *et al.* (1999) and Blanc *et al.* (2003).

Area	1979	1989	1991	1998	2002
West Africa	17 100	18 480	10 100–16 800	3100–12 800	5460–13 180
Central Africa	497 400	275 600	268 000	34 400–125 500	16 450–195 750
Eastern Africa	546 600	110 650	102 000–122 000	106 500–125 200	117 720–163 670
Southern Africa	282 000	203 300	168 700–244 700	213 900–236 700	246 590–303 920
Total	1 343 100	608 030	548 800–651 500	357 900–500 200	386 220–676 520

Table 4 Late 1990s wild elephant population estimates (number of elephants) in Asia. *The India estimate is for 2001. Sources: Kemf and Santiapillai (2000), WWF (2002) and Anon. (2003).

Area	Minimum	Maximum
<i>South Asia</i>		
India*	28 242	28 307
Nepal	40	60
Sri Lanka	2500	4000
Bangladesh	195	240
Bhutan	60	100
Sub-total	31 037	32 707
<i>South-east Asia</i>		
Myanmar	4600	6000
Thailand	1300	2000
Laos	950	1300
Cambodia	200	600
Vietnam	100	150
Malaysia (mainland)	800	1200
Indonesia (Sumatra)	2800	4800
Borneo (Malaysia + Indonesia)	500	2000
Sub-total	11 250	18 050
<i>China</i>	250	300
<i>Total</i>	42 537	51 057

Botswana, South Africa and Zimbabwe), while in others serious population declines continued years after the trade ban (for example Central African Republic, Democratic Republic of the Congo and Sudan) (Douglas-Hamilton 1979; Barnes *et al.* 1999; Blanc *et al.* 2003). This indicates that factors other than legal ivory trade were the cause of elephant population changes. These factors appear to be political and economic in nature, such as political stability, governmental investment in wildlife conservation and law enforcement and good governance.

Asia

Actual censuses using aerial surveys and dung counts in Asia are limited to protected areas in most cases, thus country estimates are largely educated guess work. Late 1990s estimates yielded a general consensus range of wild elephants of from about 42 500–51 000 (Table 4). Rates of elephant poaching have been fairly high in some Asian countries since 1995, so the figures in Table 4 are today probably

Table 5 Wild elephant population estimates (number of elephants) for South and South-east Asia in the late 1980s and 2000. Sources: Santiapillai and Jackson (1990), Kemf and Santiapillai (2000) and Martin and Stiles (2002).

Country	Late 1980s	2000
Nepal	90	70
Sri Lanka	2950	2500–3000
Myanmar	6500	4820
Thailand	1650	1650
Laos	2500	1125
Cambodia	2000	250
Viet Nam	1750	135
Total	17 440	10 550

overestimates. There are also 15 000–16 000 domesticated Asian elephants (Baker & Kashio 2002).

Asia exhibits patterns similar to those seen in Africa, in which from 1990 to 2000 elephant populations remained fairly stable in South Asia, where law enforcement and wildlife conservation are fairly effective, while they declined drastically in Vietnam, Cambodia and Laos, where the opposite is the case (Table 5). In the late 1980s, there were an estimated 6250 wild elephants in Vietnam, Cambodia and Laos, declining by two-thirds to approximately 1510 in 2000 (Martin & Stiles 2002).

Summary

If the ivory ban contributed significantly to elephant conservation, population numbers should have risen in range states after 1989. Care must be taken when comparing the elephant population numbers from the African Elephant Database reports between points in time and sub-regions, because the data are so deficient, but even if the statistical error limits are extended some notable points emerge when comparing the pre-ban 1989 numbers with the 2002 post-ban figures (Table 3). Elephant numbers have decreased in Central and West Africa, while they have increased in Southern and Eastern Africa. The ivory trade ban has not achieved its stated objective in two African sub-regions, particularly in Central Africa (Hunter *et al.* 2004).

The situation in Asia was worse than in Africa (Table 5). No country increased its wild elephant population following the 1990 ivory trade ban, and some even lost a large proportion. The high rates of elephant poaching in Asia after the African

ivory trade ban may be due to attempts by traders to continue to supply the Asian markets with ivory from Asian elephants.

Elephants killed to supply the unregulated ivory trade

The approximately 270 000 worked ivory items found by Martin and Stiles (2000, 2002, 2003) would represent about 35 tonnes of tusks prior to carving. The average African elephant carries 1.88 tusks (Parker & Martin 1982). The average tusk weight seized between 1989 and 2004 reported to ETIS was 3.95 kg (Milliken *et al.* 2004, table 5), almost all of them African. Assuming seized and successfully smuggled tusks are equal, an average poached African elephant would therefore yield about 7.4 kg of ivory. The Asian elephant carries a considerably smaller average tusk weight than the African because few females have tusks and the few that do have small tusks, and there has been hunting selection pressure that has lowered the proportion of bulls carrying tusks (Menon & Kumar 1998). Poachers often kill elephants in the vicinity of the target tusker to reduce the chances of being attacked, even if these elephants do not carry tusks, which increases the number killed per kilogram of ivory taken. Taking these factors into consideration, a conservative estimate would be that 6000 elephants were killed to produce the ivory observed in the three surveys (Martin & Stiles 2000, 2002, 2003), and the true number would probably be closer to 10 000. Hunter *et al.* (2004) estimated that between 4862 and 12 249 African elephants and 123–349 Asian elephants would be necessary annually to supply the Asian and African markets. The persisting ivory markets explain why elephant numbers continue to decline in some countries.

THE ARGUMENTS FOR REOPENING IVORY TRADE

Legal

Trade proponents

The CITES 'Berne Criteria' assign species to one of the three appendices that determine the degree of international trade restrictions that will apply. The Criteria state that CITES Appendix I comprises 'all species that are threatened with extinction and that are, or may be, affected by trade. No permits are issued for international trade in these species except in very exceptional circumstances' (CITES Conf. 1.1, 1976). Ivory trade proponents argue that the Berne Criteria are being ignored by assigning *Loxodonta africana* to CITES Appendix 1, because the species is not threatened with extinction.

Trade opponents

Loxodonta africana qualifies for CITES Appendix I listing because it meets the criteria for listing in accordance with CITES Resolution Conf. 9.24, Annex 1, Criterion C(i), C(ii) and D, and in light of Annex 4 on 'Precautionary Measures'

(CITES 2000, 2002a). The trade opponents maintain that trade in elephant products does threaten the elephant, which could eventually lead to extinction, a view supported by the ITRG (Cobb 1989). Resolution Conf. 9.24, Annex 4, states that even if a species does not meet criteria for Appendix 1, it should remain there if no effective enforcement controls over the trade are in place. CITES Decision 10.1 lays out the criteria for the enforcement controls for the southern African ivory sales. Many opponents have argued that these criteria have not been met (Sakamoto 2000, 2002; CITES 2002a; Reeve 2002; IFAW 2003; Reeve *et al.* 2003). In addition, the listing of some southern African elephant populations on CITES Appendix II to allow the sales contravenes Resolution 9.24, Annex 3, which states that 'listing of a species in more than one appendix should be avoided in general in view of the enforcement problems it creates'.

Renewed sales would be contrary to CITES Resolution Conf. 10.10 (Rev. CoP 12) that requires that the MIKE system and ETIS be fully operational before ivory sales are allowed (Kenya Wildlife Service [KWS] 2002; Reeve *et al.* 2003).

Economic

Trade proponents

If no value is attached to wildlife resources, the imperatives of other land uses will inadvertently militate against the continued existence of wildlife. Wildlife competes with agriculture as primary land use, therefore it must provide economic value as an incentive for people not to convert wild habitats to farmland.

Trade in ivory generates income that can be used towards conservation efforts, and the proceeds of the ivory sales will be put to this use (Cumming 2000; CITES 2002b, c, d, e). Wasting natural resources in cash-strapped countries works to the detriment of wildlife conservation.

A trade ban raises enforcement costs by driving the trade underground. There are also costs to bear in storing ivory (CITES 2002e). The 1990 ban resulted in a drop in the price of ivory as demand in the West fell, but this drop stimulated latent demand in Asia, where demand has grown attendant with economic development and as poachers and smugglers devised new trafficking methods, as predicted by Barbier *et al.* (1990). The higher ivory prices that result from greater demand motivates more elephant poaching, driving up enforcement costs even more. In addition, even if the international ivory trade is illegal, many countries allow legal ivory markets. Demand in these national markets stimulates elephant poaching and ivory smuggling to provide the supply (Bulte & van Kooten 1999). Allowing international ivory trade would avoid these problems by providing legal ivory (Martin *et al.* 1986).

Trade opponents

The 1999 southern African ivory sales increased poaching because they sent a signal to ivory poachers that demand would increase. The sales also stimulated ivory demand as

ivory buyers received the wrong signal from CITES. The southern African ivory sales encouraged consumers to believe that trade was re-opening and that it was now all right to buy ivory, lowering the stigma associated with buying ivory. Another southern African ivory sale after May 2004 would have a severe knock-on effect in other parts of Africa. Illegal ivory could be traded ('laundered') under the guise of the legal ivory, as happened in the 1980s. The economic incentive to poach is restored by expanding the ivory trade, which could provoke a situation worse than that of the 1970s and 1980s, with increasing instability and availability of guns in parts of Africa, giving rise to an elephant holocaust (Douglas-Hamilton 2000; KWS 2002).

Political

Trade proponents

Related to the economic argument, human–elephant conflict is a serious problem in many parts of Africa. Elephants destroy crops and property and injure or kill people. Some local communities have even started questioning the morals of CITES authorities where these have been seen to place a higher value on elephants than on humans (CITES 2002*b*). There is increasing political pressure from rural communities to get rid of elephants. The only way to mitigate this pressure and ensure political support for elephant conservation is to compensate people who have suffered elephant damage, and in cash-strapped Africa the best place to generate the resources to achieve this is from elephants themselves through the sale of ivory, hides, meat and so on.

Trade opponents

Public support in elephant range states for wildlife conservation can be raised by environmental education programmes and by governments compensating people for losses incurred through human–elephant conflict. These expenses can be generated through tourism, in which elephants play a major role (Brown & Henry 1989; Cobb 1989). Several research projects are underway that aim to reduce the problems caused by human–elephant conflict (Bluestone & Dublin 1999; Hoare 2001).

Biodiversity conservation

Trade proponents

Growing elephant populations in southern Africa now exceed the carrying capacity of the land in many places. High elephant densities destroy woodland and create wastelands, adversely affecting themselves and many other wildlife species (Western 1989; Cumming *et al.* 1997; Western & Maitumo 2004). Culling and translocation programmes are needed to save biodiversity, and these are expensive. Funds from ivory sales that could be put to these expenses, and other wildlife conservation uses, are urgently needed (Cumming 2000).

Trade opponents

Large elephant populations out of equilibrium with the land carrying capacity is an outmoded concept. 'Nature in flux' is a more accurate view of land–biodiversity dynamics than 'nature in balance'. Elephants reducing woodlands to mixed grasslands can actually increase biodiversity (Gillson & Lindsay 2003), and they can provide an important service by suppressing shrub encroachment on commercial rangelands (Augustine & McNaughton 2004). Elephants are a keystone species upon which many other species depend, thus even their local extinction can have serious deleterious consequences for biodiversity. Culling also disturbs elephant populations, reducing their value for tourism.

General

Trade proponents

Preventing ivory sales in countries that practise sound wildlife management under the pretext that it will save elephants elsewhere is 'robbing Peter to pay Paul'. 'Peter' comprises southern Africans and the region's biodiversity. Such a trade-off cannot be just, particularly when a causal link between the sale of southern African ivory and elephant poaching elsewhere has not been demonstrated. It also cannot be just when the main causes of elephant population declines elsewhere are not ivory trade, but rather are bad policies, corruption and a failure to invest in the protection and management of wildlife resources (Cumming 2000).

Trade opponents

The ban has worked. Since the CITES international ivory trade ban came into effect in 1990, ivory markets and elephant poaching have declined almost everywhere. Elephant populations are stable or growing in many range states as a consequence. Since it has worked, why reverse it? An ivory trade ban does not prevent countries from earning income from ivory. CITES Decision 11.2 permits non-commercial purchases of ivory stockpiles, and CITES does not prevent sport hunting or culling operations (KWS 2002).

Economic predictions

Economists have applied economic theory to the question of whether allowing or banning legal trade would be best for elephant conservation. They each make a number of assumptions in modelling possible outcomes (see Barbier *et al.* 1990; Bulte & van Kooten 1999; Kremer & Morcom 2000; Heltberg 2001; Fischer 2002, 2003). They reach a number of different conclusions, based on which assumptions they choose to make. These efforts have been useful in identifying most of the critical factors at play relating to the ivory trade, but none of the formal economic modelling exercises have captured the complexities and vagaries of the real world of elephant killing, ivory ownership, ivory trading and consumer behaviour.

Fischer (2002, 2003), however, raised some important points worth considering in formulating ivory trade policy. The first is that social 'welfare' and 'stigma' are commonly omitted from ivory trade economic modelling. The former term refers to the benefits that the public of ivory selling countries would receive from ivory sales, and the latter term represents a negative perception of goods, in this case ivory, by potential consumers when they think that the goods were obtained illegally or inhumanely. Banning ivory trade reduces welfare; legalizing it reduces stigma. It was partly the lack of stigma associated with buying ivory that caused the elephant massacres of the 1970s and 1980s. Once publicity and the 1990 ban created stigma, ivory demand fell considerably. The trade-off was the loss of welfare in the form of jobs, income with which to fund enforcement for wildlife conservation, and the potential demise of an art form that has endured for centuries.

The view taken here is that economic modelling is no substitute for the information provided by past experience in legal and banned trade in ivory. What does the evidence show? Are there enough hard data to allow predictions to be made on what might happen if future international ivory sales are allowed?

The proponents and opponents state that the 1990 CITES ivory trade ban and the 1999 southern African ivory sales produced certain consequences as regards elephant poaching and ivory consumer demand. Based on these experiences, they both also predict that similar outcomes will occur if the second southern African ivory sales take place. The predictions therefore depend largely on what came before.

Alleged recent ivory demand increase

National level

Ideally, we would need ivory trade indicator data from the years immediately preceding and succeeding 1999 in order to test the hypothesis that the southern African sales stimulated demand. The only data that even approach this ideal are those for Côte d'Ivoire, Nigeria and Senegal for the years 1999 and 2002 (Table 6). If the southern African sales stimulated ivory demand, we would expect higher raw ivory prices, assuming supply remained constant, more workshops and carvers, and more displayed worked ivory.

The raw ivory price data show no pattern at all. Prices rose in Abidjan, remained about the same in Dakar, and were considerably lower in Lagos in 2002 (Table 6). Courouble *et al.* (2003) hypothesized that these price patterns reflected local availability of raw ivory, where supplies were more abundant in Lagos in 2002 than in 1999, about the same in Dakar and scarcer in Abidjan. In Abidjan, other indicators suggest a market contraction; for example fewer ivory workshops and carvers and much less ivory were seen in the shops in 2002. This is most likely because of the coup in late 1999 and the subsequent civil war scaring off foreign visitors. In Dakar in 2002, there was less ivory displayed for sale, but the number of active craftsmen and retail outlets selling ivory had increased considerably from 1999. Demand was probably a bit higher in 2002 than in 1999. The Lagos data pose an anomaly. Raw ivory prices, the number of workshops and craftsmen, and the number of ivory retail outlets had all declined appreciably in 2002 from 1999, but the amount of ivory displayed had increased. The 1990 kg weight for a reported 4640 ivory items seems very high, resulting in an average of 429 g per piece, an average weight unprecedented in any of the Martin and Stiles (2000, 2002, 2003) surveys. For example, in 1999, Martin and Stiles (2000) counted 5966 worked ivory items in Lagos, 1326 more than Courouble *et al.* (2003) found, consistent with the higher number of craftsmen and outlets at the time. The average weight of an item in Lagos in 1999 was 292 g, higher than in any other African market, but still one-third lighter than the 2002 average. The large average size of displayed ivory objects in Lagos in 2002 (Table 6) could indicate that larger pieces were not selling and had been accumulating, suggesting decreased demand, consistent with the other indicators.

IFAW (2004) stated that tens of thousands of illegal ivory items were for sale on the Internet (a finding reported earlier by HSUS 2002), and that thousands of illegal ivory carvings were for sale in the UK. These findings have been linked to the proposed southern Africa ivory sales (UK Director of IFAW, press release, 2004).

There is little doubt that some of the ivory was illegally imported after 1990, and that Internet sales have become a serious threat to the control of international ivory marketing. Quantification of the demand that Internet sales represent is needed in order to assess the impact on elephant populations.

Table 6 Ivory trade indicators for Abidjan (Côte d'Ivoire), Dakar (Senegal) and Lagos (Nigeria), 1999 and 2002. Sources: Martin and Stiles (2000) and Courouble *et al.* (2003).

City	Year	Raw ivory price (US\$)	GDP inflator index 2002 (US\$)	Workshops (no.)	Craftsmen (no.)	Retail outlets (no.)	Weight (kg)
Abidjan	1999	40–80	42–84	14	97–107	52	2748
	2002	115–123	115–123	10	88	62	1495
Dakar	1999	100–120	106–127	2	4	30	407
	2002	115–164	115–124	2	26	44	330
Lagos	1999	46–50	49–53	5–6	33–43	40	1742
	2002	24–36	24–36	1	5	31	1990

Unfortunately, no previous quantitative studies have been made of European ivory markets, so there are no data with which to assess trends.

The Martin and Stiles (2000, 2002, 2003) ivory market surveys, all made subsequent to the 1999 ivory sales, documented no widespread increase in market activity, and, if anything, many ivory markets are declining (see Stiles 2004a).

International level

It is not possible with currently available data to assess trends in international ivory demand since 1990. Direct measurement is not possible for most sales because the trade is hidden, but seizures of illegal ivory could eventually act as a proxy measurement through the ETIS facility. Differentiating legal from illegal ivory remains a major challenge for enforcement officials. CITES Decision 7.4, the amendment that placed the African elephant on Appendix I, prohibits the imports of elephant products for commercial purposes, but not their export, provided that CITES export permits have been obtained according to Article III.2 of the Convention. These permits can be obtained if African ivory is certified as being held in government stocks prior to 1990, and if the importing country deems the ivory legal. (China made several exports of worked ivory to Japan in the 1990s under this loophole). Most countries have laws defining what constitutes legal ivory. For example, in the UK it is ivory manufactured prior to 1947 or imported prior to 1990, and in the USA it is ivory more than one hundred years old ('antiques'), or hunting trophy tusks.

Past enforcement activities and reporting to ETIS in many countries have been lax, although CITES conferences and media pressure have been effective in promoting improvement in behaviour in these areas in key countries such as China (TRAFFIC, personal communication 2003). Because enforcement intensity has not been constant over time in many of the most active ivory trading and consuming countries, it would not be valid to make across the board comparisons of pre- and post-1999 ivory seizure data.

As a sample, the seizure data of seven countries with high quality BIDS/ETIS reporting records since 1990, and that are a supplier and/or consumer of ivory, were examined to assess any changes in illegal ivory imports or exports, suggesting possible ivory demand trends (see table 2 in Milliken *et al.* 2004).

In Africa, Kenya appeared to have a significant increase in seizures after 1999, while South Africa and Zimbabwe showed clear decreases. Zimbabwe, however, experienced an upsurge in seizures 1997–1999 leading up to the sale. In Europe,

Switzerland displayed a pattern similar to that of Zimbabwe, while Germany's seizure rate was on the decline. Japan, a key consumer nation, showed a clear pattern of seizure decline. The USA, another important ivory consuming nation, showed no clear changes in seizure pattern. The ivory seizure data provide no unequivocal indication that international demand for ivory increased in conjunction with the southern African sales. This is the same conclusion reached by the ETIS report to the CITES 13 conference, though the volume of ivory seized annually has been on the increase since 1995 (Milliken *et al.* 2004).

Alleged illegal elephant killing increase

Data on illegal elephant killing are patchy, but some statistics are available for Kenya, Namibia, South Africa, Zambia and Zimbabwe (Table 7). These figures should be considered as minimum numbers only. Claims have been made that elephant poaching increased in Central Africa as well, but the data presented are insufficient for any conclusion to be drawn (Nishihara 2003; Hunter *et al.* 2004). Anti-trade advocates allege that the 1999 southern African ivory auctions provoked a wave of elephant poaching. The reported number of elephants illegally killed in 1999 in Kenya, Namibia and Zimbabwe is indeed higher than immediately preceding and subsequent years, but, looked at over the longer term, the numbers are not unusual. There was an even greater elephant poaching increase in Kenya in 2002, but there was also the greatest rhino poaching increase in Kenya in more than 12 years in 2002 (Martin & Vigne 2003). According to the CITES 12 Kenya-India proposal to re-list all African elephant populations to CITES Appendix I, poachers took 965 African elephants and 39 Asian elephants between 1 January 2000 and 30 April 2002 (CITES 2002a). Without comparative data it is not possible to conclude whether these numbers represent an increase on previous years. Up to 2001–2002 there seems to have been no evidence of increased elephant poaching in southern Africa, but Central Africa was a region of great concern (N. Hunter, MIKE, personal communication April 2004). Press reports in 2004, however, indicate that levels of elephant poaching have risen in Kenya, Zambia and Zimbabwe (see the *Save the Elephants News Service*; <http://www.savetheelephants.org/>). Whether the prospect of future sales in southern Africa has sparked this poaching would be difficult to prove. We could argue that smugglers were trying to replace ivory that has been seized.

Another point usually ignored in discussions of elephant killing is the fact that in many African countries in recent years

Table 7 Minimum numbers of poached elephants. Sources: ¹Kantai (2000), Western (1995), CITES (2002a) and Paula Kahumbu, personal communication (2003); ²CITES (2002c); ³CITES (2002d); ⁴CITES (2002b; note data for 1999 missing); and ⁵CITES (2002e).

Country	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
Kenya ¹	–	–	–	–	36	43	18	41	75	66	34	44	45	49	67	16	57	87
Namibia ²	–	–	–	–	–	6	1	6	10	7	6	11	4	4	12	2	2	–
South Africa ³	5	6	8	0	9	16	28	9	12	3	12	5	1	2	2	0	0	0
Zambia ⁴	–	–	–	–	–	–	–	–	–	27	22	18	18	16	–	16	13	–
Zimbabwe ⁵	32	24	39	848	28	99	66	61	58	46	38	11	43	42	83	35	43	–

more elephants are killed annually in legal culling and problem animal control operations than by poaching (see examples in Western 1995; CITES 2002*b,d,e*). A review of hundreds of press reports disseminated by the *Save the Elephants News Service* (<http://www.savetheelephants.org/>) since early 2003 shows that human–elephant conflict situations killed more elephants than ivory poachers.

DISCUSSION

Ivory demand stimulated by 1999 sales?

The data presented above from the three African countries do not support the hypothesis that demand for ivory increased after the 1999 southern African sales. This does not mean, however, that data from elsewhere might not yield different results, if they become available. Local ivory market demand seems to vary more with local circumstances, such as economic conditions, political stability, law enforcement vigilance and visitor numbers, rather than the presence or absence of legal international ivory sales.

Ivory vendors and craftsmen in Africa and Asia provided evidence supporting this conclusion. With few exceptions, they reported declining sales between 1996 and the time of the Martin and Stiles (2000, 2002, 2003) surveys.

Internet ivory sales (HSUS 2002; IFAW 2004) make it easier to market and sell ivory internationally, but the movements are still subject to seizure in the same way as conventionally sold ivory. Quantifying Internet sales could provide a direct measurement of ivory sales made by that method, but still could not distinguish legal from illegal ivory. Only seizures measure illegal ivory movements, and more complete and more widespread ETIS data are needed to monitor and evaluate ivory movement trends. Ivory market surveys have demonstrated that a demand for ivory objects persists in spite of CITES efforts to control trade and publicity campaigns that condemn buying ivory.

Poaching increased in 1999 because of the ivory sales?

There are few hard data to support a view of a large-scale increase in elephant poaching associated with the 1999 sales. A poaching spike did take place in 1999 in three African countries (Table 7). Elephant poaching is causing concern in several African and Asian countries, and much of the killing is linked with ivory trade (Menon *et al.* 1997; Menon & Kumar 1998; EIA 2000, 2002; CITES 2002*a*; Milliken *et al.* 2004). Better data are needed to demonstrate a correlation between illegal elephant killing and CITES approved sales, which should become available when the MIKE system becomes operational after 2005 (CITES 2002*f*; Reeve *et al.* 2003).

Poaching holocaust with future sales?

There is no good evidence to suggest that another CITES authorized raw ivory sale would encourage an increase

in elephant poaching. Rather, evidence suggests that all wildlife poaching and illegal trade are correlated with lax law enforcement, corruption and lack of government investment in wildlife conservation (Bluestone & Dublin 1999; Roe *et al.* 2002). If anything, the sale of 60 tonnes of tusks to a CITES-approved country or countries would temporarily reduce elephant poaching by increasing supply.

Policy implications for reducing ivory demand

The current situation involving legal national ivory markets in the context of an illegal international ivory trade appears to encourage elephant poaching. Most markets cannot meet demand by legal ivory, thus they resort to illegal ivory. An ideal scenario would involve a legal ivory trade that would benefit range state governments and citizens, supplied by ivory from naturally deceased and culled problem elephants, to supply markets. If range state countries could supply legal ivory to meet demand, poaching would be reduced or even eliminated. Why would a trader assume the risk to buy illegal ivory if legal ivory were available at comparable quality and prices?

The problem with this scenario is that of limiting demand to a legal supply. If legalizing international ivory trade once more were to greatly increase demand, African range states could be hard pressed to meet the required supply through natural deaths and problem elephant cropping. This would motivate governments to initiate biologically unnecessary cropping, or private traders to order poaching in order to obtain the needed raw ivory supply, putting elephant populations into danger. The crux of the problem is therefore that of limiting demand to a supply level that would not threaten any elephant population.

In areas with decreasing available wildlife habitat, policies and actions must come into effect to deal with increased elephant and other wildlife numbers when conservation is successful. It is not rational to expend resources to conserve wildlife that will have to be culled as problem animals.

Not all elephant ‘evolutionary significant units’ are equally at risk. The African savannah elephant (*Loxodonta africana africana*) is in no immediate danger of extinction, while *L. a. cyclotis* might well be. There may be as few as 16 500 *L. a. cyclotis* and 5500 West African variants (Table 3). The same applies to *Elephas maximus sumatrensis* and *E. m. borneensis*, each of which probably number fewer than 3000 individuals in highly fragmented habitats. Policy-makers should consider treating each of these geographical variants independently in respect to CITES Appendix classifications. Advances in ivory source identification make enforcement of differential listing a real possibility (Cerling 2003; Comstock *et al.* 2003; Kautenburger *et al.* 2004).

Currently the main beneficiaries of the international ivory trade are technically criminals, namely poachers, smugglers, and unscrupulous ivory workshop and retail outlet owners. Governments, who in principal ‘own’ the elephants, earn nothing from the contraband. There is little incentive for

governments to protect elephants because they receive no reciprocal direct benefits, other than possibly tourism and sport hunting. The best way to take ivory out of the hands of criminal elements, and thus also to control poaching, would be to permit limited international trade of *Loxodonta africana* by-products, including ivory, under the supervision of governments and CITES. The main benefit of this policy would be the increased financial and public support given to elephant conservation by range state governments and communities.

There are currently two main constraints to implementing this policy. Too many elephant-range states and ivory-importing countries do not practise adequate wildlife management, law enforcement and ivory trade regulation. Secondly, there are as yet no policies or strategies formulated to deal with the problem of limiting ivory demand to sustainable supply levels once international trade is legalized. The CITES trade ban deals directly with only half of the equation, namely supply. Until ivory demand and the management and regulation problems are addressed, it is premature to re-open international ivory trade, even at the restricted level proposed by CITES in southern Africa.

Limiting demand

Two approaches to limit demand under legalized ivory trade conditions come to mind. The first involves maintaining the stigma associated with buying ivory even if it is legal. Environmental NGOs can be instrumental in this, as they have been to the present. Many potential consumers will not buy ivory if they believe it is unethical to do so. The second approach involves engaging ivory carvers as active participants in elephant conservation. All ivory, whether legal or illegal, must pass through the hands of an ivory artisan to render it saleable to the public. If ivory carvers cooperate in limiting the amount of ivory that they process by refusing to manufacture low quality, mass market goods, sustainable supply, in terms of elephant conservation, can be achieved (Stiles 2004a,b). National legislation can support this effort by prohibiting the manufacture of most types of jewellery, tourist curios and name seals made of elephant ivory.

It is quite possible that Africa's 350 000–450 000 savannah elephants from southern and eastern Africa could supply a moderate global demand for ivory from natural deaths and elephants culled in human–elephant conflict situations. Supplying the markets with acceptable quality tusks at reasonable prices could put many of the poachers and smugglers out of business. Large scale culling would be unnecessary.

CONCLUSIONS

There is a moderate-scale, unregulated and mainly illegal international ivory trade persisting even after the 1973 and 1989 CITES Asian and African ivory trade bans. The 1990 ban did succeed in lowering the scale of ivory trading at national levels and reducing elephant poaching from pre-1990 levels

in places, but thousands of elephants are still killed illegally each year in Africa and Asia to satisfy ivory demand. These poached elephants are found principally in countries with poor wildlife management and widespread corruption, and in areas of lawless conflict. There is little available evidence that the poaching is influenced by CITES decisions to allow limited ivory sales in southern Africa, though better data could alter this conclusion.

In spite of it being eventually desirable to re-open the international trade in ivory, more needs to be done to regulate domestic ivory markets before this comes about. Time is needed to register ivory workshops and craftsmen and license retail outlets, and for MIKE and ETIS to become fully functional. CITES Parties should set the conditions that would allow for the long-term listing of specific elephant populations to CITES Appendix II. If these conditions cannot be achieved, all elephant species should be listed on CITES Appendix I, and all domestic ivory markets should also be banned. As long as there are domestic ivory markets, there will be demand for raw ivory, whether legally obtained or otherwise.

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