

STATUS OF ELEPHANT POPULATIONS, LEVELS OF ILLEGAL KILLING AND THE TRADE IN IVORY: A REPORT TO THE STANDING COMMITTEE OF CITES

Introduction

Decision 14.78 (Rev. CoP15) directs the Secretariat to produce an updated analysis of MIKE data, and invites TRAFFIC to submit an updated analysis of ETIS data, UNEP-WCMC to provide an overview of the latest elephant trade data and the IUCN/SSC African and Asian Elephant Specialist Groups to submit new and relevant information on the conservation status of elephants, and on pertinent conservation actions and management strategies, for consideration at the present meeting of the Standing Committee. This document has been prepared accordingly and is presented as an integrated piece of work to assess the status of elephants, levels of illegal killing and trade in ivory.

Decision 14.78 (Rev. CoP15) recognizes four global monitoring systems for elephants and trade in elephant specimens. The programme for Monitoring the Illegal Killing of Elephants (MIKE), managed by the CITES Secretariat, and the Elephant Trade Information System (ETIS), managed by TRAFFIC to track illegal trade in ivory and other elephant specimens, are mandated by the CITES Parties through Resolution Conf. 10.10 (Rev. CoP15). Thirdly, Article XII, paragraph 2 (d), of the Convention requires CITES Parties to submit annual reports on the trade they conduct in specimens of CITES-listed species. These data, including legal trade in all elephant specimens, are compiled by UNEP-WCMC. Finally, IUCN, through the SSC African Elephant and Asian Elephant Specialist Groups, maintains the African and Asian Elephant Database, housing information on elephant population numbers and range.

This report, representing a collective effort from all of these bodies, serves as an important first step towards developing linkages between the systems so that critical information and data on elephants are assessed and presented in an integrated manner to support evidence-based decision-making in the CITES context.

Asian elephant (*Elephas maximus*): status and threats

This section draws on the IUCN/SSC Red List account for Asian elephants, survey reports collected by the CITES MIKE programme and the Asian Elephant Specialist Group (AsESG), and data compiled at mapping and strategic planning workshops run by the AsESG, the World Wide Fund For Nature (WWF) and the Wildlife Conservation Society (WCS) (with funding from the United States Fish and Wildlife Service) in October 2008. Curation of these data by the AsESG is underway to allow the publication of an Asian Elephant Status Report, pending necessary funding.

CITES listing status and IUCN Red List status.

The Asian elephant has been listed in CITES Appendix I since 1975, and as Endangered (A2c; ver 3.1; Choudhury *et al.*, 2008) in the IUCN Red List. The rationale behind the Endangered status is an inferred population size reduction of at least 50 % over the last three generations, based on a reduction in the species's area of occupancy and the quality of its habitat. Although there are few accurate data on historical population size, from what is known about trends in habitat loss or degradation and other threats including poaching, an overall population decline of at least 50 % over the last three generations (estimated to be 60–75 years, based on a generation time estimated to be 20–25 years) seems realistic.

Taxonomy and nomenclature

While subspecies taxonomy of *Elephas maximus* has varied among authors, the most recent treatment (Shoshani and Eisenberg, 1982) recognizes three subspecies: *E. m. indicus* on the Asian mainland, *E. m. maximus* on Sri Lanka, and *E. m. sumatranus* on the Indonesian island of Sumatra. Borneo's elephants have traditionally been included in *E. m. indicus* (Shoshani and Eisenberg, 1982) or *E. m. sumatranus* (Medway, 1977), as they were believed to be feral descendants of elephants introduced in the 14th–19th centuries. However, recent genetic evidence suggests they are indigenous to the island (Fernando *et al.*, 2003; but see Cranbrook *et al.*, 2008). The subspecies designations were based primarily on morphological characteristics (Shoshani and Eisenberg, 1982), but the Sri Lankan subspecies designation is not strongly supported by current molecular evidence (Nozawa and Shotake, 1990; Hartl *et al.*, 1996, Fernando *et al.*, 2000; Fleischer *et al.*, 2001). There is, however, molecular evidence to suggest that the Sumatran subspecies is sufficiently distinct for it to be defined as an evolutionarily significant unit (ESU; Fleischer *et al.*, 2001). This suggests that Sumatran elephants should be managed separately from other Asian elephants in

captivity, and is also an argument for according particularly high priority to the conservation of Sumatran elephants in the wild. A definitive subspecific classification awaits a detailed range-wide morphometric and genetic study.

Geographic range

Asian elephants formerly ranged from West Asia along the Iranian coast into the Indian subcontinent, eastwards into Southeast Asia, including Sumatra, Java, and Borneo, and into China at least as far as the Yangtze-Kiang rivers. This former range covered over 9 million km² (Sukumar, 2003). Asian elephants have been extinct in West Asia, Java and most of China for several hundred years. Even within its surviving range in South and Southeast Asia, the species has been in retreat for hundreds if not thousands of years, and generally survives only in highly fragmented populations (Olivier, 1978; Sukumar, 2003; Blake and Hedges, 2004). Asian elephants still occur in isolated populations in 13 range States, with an approximate total range area of 878,639 km² (data from AsESG/WWF/WCS mapping and strategic planning workshops in 2008; Figure 1), which represents only 10.2 % of the 8,613,003 km² historical range for the species as defined by Santiapillai and Jackson (1990). Thus almost 90 % of the species' historical range has been lost. Asian elephants now occur in Bangladesh, Bhutan, India, Nepal, and Sri Lanka in South Asia and Cambodia, China, Indonesia (Kalimantan and Sumatra), the Lao People's Democratic Republic, Malaysia (Peninsular Malaysia and Sabah), Myanmar, Thailand, and Viet Nam in Southeast Asia. Feral populations occur on some of the Andaman Islands (India) and perhaps in Borneo (see under Taxonomy and nomenclature section above; also see Figure 1).

Population size and trend

The most recent 'estimate' for the global population size of the Asian elephant was 41,410 to 52,345 animals Sukumar (2003; see also Table 1 in Annex 2). The estimated population size for each country according to Sukumar (2003) is shown in Table 1. More recent data on the status of Asian elephants in the 13 range States were summarized by the AsESG in 2008 (Choudhury *et al.*, 2008) and have been updated for inclusion as Table 2 in Annex 2.

Blake and Hedges (2004) and Hedges (2006) argue that the oft-repeated global population 'estimate' of about 40,000 to 50,000 Asian elephants is no more than a crude guess, which has been accepted little-changed for a quarter of a century (see Table 1 in Annex 2). They further argue that, with very few exceptions, all that is really known about the status of Asian elephants is the location of some (probably most) populations, in some cases with a crude idea of relative abundance. For large parts of the species' range, the location of the populations, or indeed whether they are still extant, remains unknown. Differences of opinion regarding the status of Asian elephants are due in part to the difficulty in counting elephants in dense vegetation in difficult terrain, different (and sometimes inappropriate) survey techniques being used in different places, and a too-widely held belief that population monitoring is unimportant. In the context of the MIKE programme, it is clear from the elephant population data submitted from Asia that more widespread use of reliable monitoring methods is needed as a matter of some urgency. Nevertheless, whatever the error margins, it appears almost certain that over 50 % of the remaining wild Asian elephants occur in India.



Figure 1. Asian elephant range showing all Confirmed, Possible, and Recoverable range categories plus the historical range (source: AsESG/WWF/WCS mapping and strategic planning workshops, October 2008).

Table 1. Estimated population sizes for Asian elephant populations from Sukumar (2003). More recent data can be found in Table 2 in Annex 2.

South Asia	Range of estimate	Southeast Asia	Range of estimate
Bangladesh	150-250	Cambodia	250-600
Bhutan	250-500	China	200-250
India	26,390-30,770	Indonesia	2,400-3,400
Nepal	100-125	Lao People's Democratic Republic	500-1,000
Sri Lanka	2,500-4,000	Malaysia	2,100-3,100
		Myanmar	4,000-5,000
		Thailand	2,500-3,200
		Viet Nam	70-150

The overall trend of the Asian elephant population has been downwards, probably for centuries. This remains the case in most parts of its range, but is especially true in most of the countries of Southeast Asia. Within India, there is evidence that the large population in the Western Ghats in the south of the country has been increasing in recent years due to improved conservation effectiveness.

Threats

The pre-eminent threats to the Asian elephant today are habitat loss, degradation and fragmentation (Leimgruber *et al.*, 2003; Sukumar, 2003; Hedges, 2006), which are driven by an expanding human population, and lead in turn to increasing conflicts between humans and elephants when elephants eat or trample crops, and injure or kill people. Hundreds of people and elephants are killed annually as a result of such conflicts. The long-term future of elephants outside protected areas, as well as in some protected

areas, is therefore inextricably linked to mitigating such human-elephant conflicts, and this is one of the largest conservation challenges in Asia today (Sukumar, 1992, 2003; Hedges, 2006).

Asian elephants live in the region of the world with the densest human population, which continues to grow at a rate of between 1-3 % per year. Because elephants require much larger areas of natural habitat than most other terrestrial mammals in Asia, they are one of the first species to suffer the consequences of habitat fragmentation and destruction. Because of their great size and large food requirements, elephants cannot co-exist easily with people in areas where agriculture is the dominant form of land use. In extreme cases, elephants have been confined as so-called 'pocketed herds' in small patches of forest in landscapes dominated by people. Such 'pocketed herds' represent an extreme stage in the human-elephant conflict (Olivier, 1978). In other cases elephants have been caught and taken to so-called Elephant Training Centres where they languish, lost to the wild population (Hedges *et al.*, 2005, 2006).

Illegal killing is also a threat in Asia, with elephants killed for a variety of reasons, including ivory, meat and other body parts, and in retaliation for human-elephant conflict. However, reliable estimates of the number of elephants killed illegally and the quantities of ivory and other body parts collected and traded are scarce (Sukumar *et al.*, 1998; Milliken, 2005). It is also important to note that selective removal of tuskers has several implications for the affected populations: sex ratios obviously become highly female biased, genetic variation is reduced, and fecundity and recruitment may decline (Sukumar *et al.*, 1998; Sukumar, 2003). An additional threat to Asian elephants is the illegal international trade in live wild-caught elephants for the circus trade in China and the tourist trade in Thailand. For example, it is known that elephants have been smuggled out of Myanmar into both China and Thailand, including 240 smuggled into Thailand in an 18-month period (Shepherd and Nijman, 2008), which suggests the threat is significant at least for the Myanmar population. More data are needed to set this threat in its proper context.

Conservation strategies and action plans

The AsESG began the process of compiling an Asian Elephant Strategy in late 2008, working with representatives of range States, NGOs, and other stakeholders; that strategy is still in preparation. Most range States have national action plans but little action has been taken to implement these plans in many places.

African Elephant (*Loxodonta africana*): Status and threats

This section draws on survey reports collected by the IUCN/SSC African Elephant Specialist Group (AfESG) and the CITES MIKE programme since the publication of the last African Elephant Status Report (Blanc *et al.*, 2007) as well as recent published research to outline the status and major threats to elephants, and the status of conservation strategies. Curation of these data by the AfESG is underway to allow the publication of an African Elephant Status Report in the near future, pending necessary funding.

CITES listing status and IUCN Red List status

All populations of African elephant have been listed on CITES Appendix I since 1989, except for four national populations that were transferred to Appendix II (Botswana, Namibia and Zimbabwe in 1997, and South Africa in 2000). The African elephant is currently listed as Vulnerable (A2a; Ver 3.1; Blanc, 2008) on the IUCN Red List.

Taxonomy

New research into the genetics of the African elephant (Rohland *et al.*, 2010; Ishida *et al.*, 2011) suggests a potential division of the African elephant into two species. The AfESG is still evaluating these results against their list of outstanding research questions (AfESG, 2003). While a division into two species could have consequences for the status of the species under a number of different regulatory and monitoring regimes, the division would not materially impact the management challenges and necessary actions, which have long been known to be very different for the two subspecies (*Loxodonta africana cyclotis* and *Loxodonta africana africana*) in forest and savannah habitats.

Geographic range

African elephants are assumed to have been widely distributed south of the Sahara prior to colonial times. Today, African elephants are believed to occur in 37 range States, although their continued presence in two of those countries (namely Senegal and Somalia) is uncertain. Continental range covers approximately 3,335,827 km² or 22 % of the continent, according to the most recent assessment of elephant range in the African Elephant Status Report 2007 (AESR 2007; Blanc *et al.*, 2007). Only 31 % of this range is protected and only 51 % has been surveyed. The distribution of elephants varies considerably across the four regions, with small fragmented populations in West Africa and large undisturbed areas of range in southern Africa.

Detailed knowledge of elephant distribution is poor, but improving, in Central Africa. Of concern is the increasing fragmentation of elephant habitats across many parts of its range, leading to possible compression of elephant populations. African elephant distribution is outlined in Figure 2.

Population status

According to the AESR 2007, the most recent comprehensive assessment of elephant numbers available, there may be between 472,269 and 689,671 elephants on the African continent. Even though these figures only relate to approximately 50 % of the estimated range, the actual total is not likely to differ significantly from these totals.

Elephant numbers in each subregion as reported in AESR 2007 are outlined in Table 2 below, while estimates at the national level can be found in Table 3 in Annex 2. Details on the methodology used to pool estimates into subregional and continental totals can be found in the Data Types and Categorization section of the AESR 2007 (Blanc *et al.*, 2007). Southern Africa holds the largest known number of elephants in any subregion, followed by Eastern Africa and Central Africa. The quality of data varies significantly across subregions, with Central Africa's subregional estimates in the Possible and Speculative categories being very large compared to other subregions.

Table 2. Continental and subregional estimates of elephant populations in Africa. Also shown are measures of coverage and data quality (AESR 2007).

SUBREGION	ELEPHANT NUMBERS ¹				RANGE AREA (km ²)	% OF CONTINENTAL RANGE	% OF RANGE ASSESSED	IQI ²
	DEFINITE	PROBABLE	POSSIBLE	SPECULATIVE				
Central Africa	10,383	48,936	43,098	34,129	975,079	29	52	0.22
Eastern Africa	137,485	29,043	35,124	3,543	880,063	26	45	0.36
Southern Africa	297,718	23,186	24,734	9,573	1,305,140	39	53	0.48
West Africa	7,487	735	1,129	2,939	175,545	5	66	0.44
TOTAL	472,269	82,704	84,334	50,364	3,335,827	100	51	0.41

¹ For further information on the categorization of data, please refer to p6-16 of the AESR 2007.

² IQI: Information Quality Index. This index quantifies overall data quality at the regional level based on the precision of estimates and the proportion of assessed elephant range (i.e. range for which estimates are available). The IQI ranges from zero (no reliable information) to one (perfect information). See the AESR 2007 for details on how the IQI is calculated.

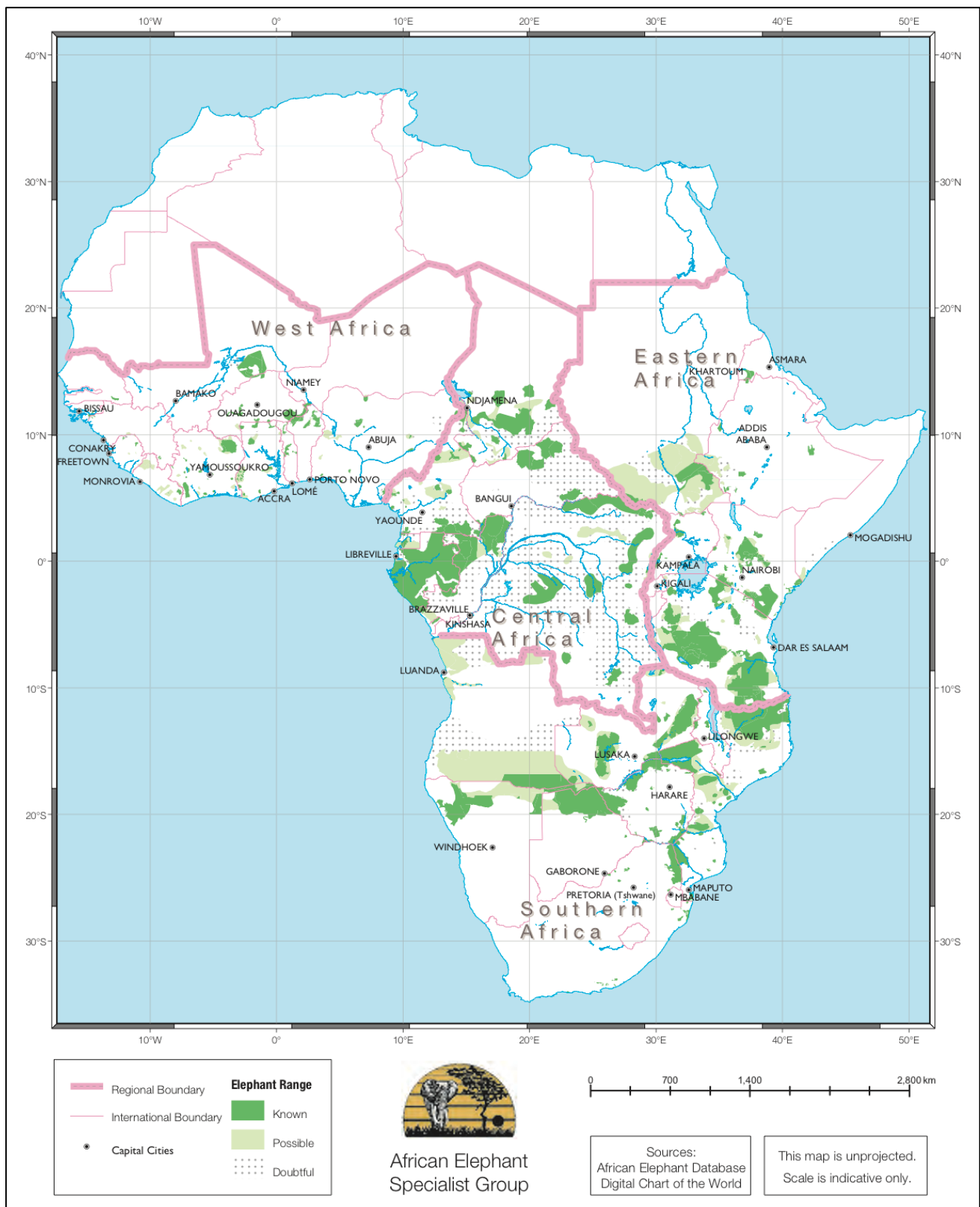


Figure 2. Elephant range in Africa showing known, possible and doubtful range (Blanc *et al.*, 2007).

Since the publication of the AESR 2007, a large number of elephant population surveys have been conducted (see Table 4 in Annex 2). Some of the more notable surveys are noted below.

In Central Africa, a series of surveys of key gorilla populations have provided refined knowledge of elephant distribution and density in a number of important forest landscapes (e.g. Maisels *et al.*, 2010). Annual aerial surveys have been conducted in Zakouma National Park in Chad (Fay *et al.*, 2006 & Potgieter *et al.*, 2009; 2010; 2011), demonstrating a severe decline in elephant populations, likely due to poaching, although it is

possible that there has been some movement to other parts of the country. The presence of the Lord's Resistance Army in southeastern Central African Republic has prevented any survey of potentially important elephant populations in that region (Luhunu pers. comm.). Hart (2009) concluded that, in the Democratic Republic of the Congo, there are likely to be only six populations with more than 500 elephants, with all other populations being defined as remnant. This information, combined with information from experts operating on the ground throughout the country, signals substantial declines across many important elephant populations.

In eastern Africa, a number of key populations have been surveyed in recent years, including the first systematic surveys of elephants in the Sudan since the 1980s (Grossman *et al.*, 2008; Fay *et al.*, 2007), which confirmed important populations in southern Sudan. In the United Republic of Tanzania, a national aerial count of six important ecosystems was undertaken (TAWIRI, 2009). Notable was the apparent decline of the population in the Selous ecosystem by approximately 30,000 elephants since the last count in 2006. This is likely to be due to problems with the 2006 count resulting in an overestimate, but other reasons such as illegal killing and migration of elephants outside the survey area cannot be ruled out.

In southern Africa, a survey of the Niassa Reserve (Mozambique) in 2009 recorded an increase in numbers (Craig, 2009), but it is unknown whether this was due to an actual increase in the population, immigration from the United Republic of Tanzania or elsewhere in Mozambique, or a combination thereof. Carcass ratios in a number of bordering concessions were high, which could indicate high levels of poaching and potential compression into the relatively secure Niassa Reserve. A partial aerial survey of northern Botswana has been conducted this year by Elephants Without Borders, the first since 2006. The other major national population in southern Africa, namely that of Zimbabwe, has not been comprehensively surveyed for many years. South Africa continues to survey all her elephant populations on an annual basis. Zambia conducted a national survey in 2008 (Simukonda, 2009) and has demonstrated a renewed commitment to monitoring her elephant populations. A major data gap exists for Angola, with no comprehensive elephant surveys since the 1980s.

Very few new reports are available from West Africa, but reliable surveys of the Taï (Côte d'Ivoire) and Sapo (Liberia) populations have been successfully completed in recent years. A planned survey of the WAPOK complex, the largest population in the subregion, spanning parts of Burkina Faso, Benin, Togo and Niger, had to be postponed owing to civil unrest in the region (Massalatchi, pers. comm.).

Resource challenges have prevented the integration of results from these surveys into the national and subregional estimates presented in Annex 2. In addition, challenges remain in the analysis of elephant population trends over the entire range, as well as in reliable surveys of elephant populations in large forest sites.

Threats

A number of protected areas and key elephant habitats suffer from human encroachment, including illegal logging, settlement and livestock grazing (e.g. Plumptre *et al.*, 2010; Omondi *et al.*, 2007; Steel *et al.*, 2007). In Central Africa, roads in unprotected areas act as effective barriers to elephant movement and elephant abundance increases with distance from roads (Stokes *et al.*, 2010; Blake *et al.*, 2008). These roads are often built in order to access oil or timber concessions. There is evidence that well-managed concession areas can provide refuge to forest elephants in an otherwise insecure landscape (Kolowski, 2010; Clark *et al.*, 2009; Weinbaum *et al.*, 2007; Stokes *et al.*, 2010). This finding merits more attention and may offer promise for collaboration with the extractive industries in this region and beyond.

Concerns over the impact of local overabundance of elephants have continued to elicit a great deal of debate and research in southern Africa. A special task force of the IUCN/SSC AfESG published a comprehensive review of options for managing the impact of locally overabundant elephants (Balfour *et al.*, 2007). In South Africa, the government convened a panel of experts in 2006 to examine elephant management options, resulting in a comprehensive scientific assessment of various elephant management strategies (Mennell & Scholes, 2007). Following this assessment, the government has identified a number of different management options for their largest elephant population in Kruger National Park. Culling, while listed as a last resort option, has not been ruled out.

Human-elephant conflict (HEC) remains one of the primary challenges for elephant conservation throughout the species' range. While few studies have been carried out in Central Africa on the topic, it is clear that this problem is widespread in both forest and savannah habitats. In some areas, such as the Central African Republic and the Democratic Republic of the Congo, high levels of insecurity have made it difficult for the government to address the problem. In eastern and southern Africa, settlement and human activities in wildlife corridors and other important habitats, including livestock grazing, are leading to increased isolation

of elephant populations in many protected areas and increasing levels of HEC (KWS & TAWIRI, 2010; Omondi *et al.*, 2010). This conflict is in some cases exacerbated by the influx of immigrant settlers with a hostile attitude to elephants (Jones *et al.*, 2007). Many elephant habitats in West Africa are experiencing severe fragmentation and human encroachment (Ouattara *et al.*, 2010; Nakandé *et al.*, 2007), and in dry areas, competition for water and pasture can be severe and is exacerbated during drought years (Douglas-Hamilton & Wall, 2009; Hibert *et al.*, 2010). The direct economic costs of the conflict can be substantial (Ngene & Omondi, 2009). As a result, large numbers of elephants are killed each year as part of problem-animal control (Edjang Miko, 2009; Campfire, 2007; Niskanen, 2009; WWF, 2008; Hoare, 2007). Lack of policies and institutional support for mitigating impacts is a significant constraint for dealing with the problem. Despite general consensus on the failure of most centralized compensation schemes (IUCN, 2003), a number of range States are again considering implementing such schemes. Self-insurance schemes, such as those piloted in Namibia and Guinea, may be more successful (Lamarque *et al.*, 2009). Human-elephant conflict is exacerbated by habitat loss and fragmentation, but also by the lack of opportunities for affected communities to benefit from legal uses of wildlife, whether consumptive or non-consumptive (Sitati & Tchamba, 2008; Wilungula Balongelwa, 2008). Landscape-level approaches, which combine land-use planning with increased benefit distribution to impacted communities, are necessary for successful HEC mitigation (Agreco, 2008; Metcalfe & Kepe, 2008).

A recent study into the trade in elephant meat in Central Africa (IUCN, in press), conducted under the auspices of the MIKE programme, has shown that, while elephants are primarily hunted for ivory, elephant meat may be a significant by-product. Research is also being undertaken on this topic in eastern Africa (BEAN 2010) and southern Africa (Lindsey *et al.*, 2011).

Illegal killing of elephants has risen to alarming levels in many parts of Central Africa. Both the MIKE analysis for the 15th meeting of the Conference of the Parties to CITES (CoP15, Doha, 2010) (Burn *et al.*, 2010) and the 2011 update (the present document) show that Central Africa remains the subregion with the highest poaching pressure on the continent. Likewise, ETIS analyses have consistently pointed to Central Africa as the source of large volumes of illicit ivory, with the Democratic Republic of the Congo and Nigeria (from where ivory of primarily Central African origin is traded) identified as two of the three countries most heavily implicated worldwide in illicit ivory trade (Milliken *et al.*, 2007; 2009). While the dynamics influencing poaching differ in each country, the situation has been exacerbated by armed conflict and weak law enforcement. There are also concerns about populations in eastern Africa, with recent information about changing demographic structure of the Samburu elephant population in Kenya indicating the results of high poaching pressure (Douglas-Hamilton & Wittemyer, pers. comm.) Carcass ratios from recent surveys in some sites in Botswana, Mozambique, Zambia and Zimbabwe also indicate the existence of poaching pressure (Simukonda, 2009; Dunham, 2008; Botswana MIKE report, 2009; Mesochina *et al.*, 2008; Craig, 2009).

Conservation strategies and actions

In March 2010, the African elephant range States unanimously adopted a continental African elephant action plan. Details of this process and subsequent steps are provided in the next section. Subregional strategies have been completed for Central (2005), West (2005) and southern (2007) Africa, but little action has been taken to implement the strategies in Central and southern Africa. An inter-governmental memorandum of understanding concerning the conservation of elephants in West Africa under the Convention on Migratory Species of Wild Animals contributed to the implementation of the strategy in this subregion, although this too has slowed down since 2009. A list of existing national plans and strategies is shown in Table 5 in Annex 2.

The African elephant action plan and the African Elephant Fund

The *African elephant action plan* was agreed by African elephant range States during a meeting held in the margins of CoP15 (see document CoP15 Inf. 68). An African elephant working group, composed of range and donor States, was also established at CoP15 and the Secretariat thereafter consulted with this working group on the implementation of Decision 14.79 (Rev. CoP15) concerning the establishment of an African Elephant Fund that will be applied to the implementation of the *African elephant action plan*.

In August 2010, the CITES Secretary-General wrote to the Executive Director of the United Nations Environment Programme (UNEP) to request his help in establishing and administering a general, multi-donor trust fund to support implementation of the *African elephant action plan*. During the same month, the Secretariat circulated a set of draft terms of reference for the steering committee of the African Elephant Fund to members of the African elephant working group for their comments. The Executive Director of UNEP responded to the Secretary-General in September 2010, indicating that he was inclined to respond positively to the request to host the African Elephant Fund but that he first wished to clarify certain issues.

The African Elephant Fund was discussed in detail at the Third African elephant meeting (AEM3, Gigiri, Kenya, 1-3 November 2010). The African elephant range States thoroughly reviewed and amended the draft revised interim terms of reference for the Fund's steering committee, and a new version was later distributed to participants for finalization. Range States agreed that the steering committee for the Fund should consist of 11 members, that is, three donor States (each of which had contributed a minimum of USD 50,000 to the Fund) and eight range State representatives consisting of two range States for each of four subregions, specifically: Central Africa (Cameroon and the Congo); East Africa (Kenya and the Sudan); southern Africa (Botswana and South Africa) and West Africa (Burkina Faso and Nigeria). France, Germany and the Netherlands were identified as the likely donor State members in the steering committee. They would be confirmed as donor State members as soon as their donations to the African Elephant Fund had been received.

As indicated in the AEM3 summary record³, a number of range States were supportive of UNEP as a possible host of the African Elephant Fund, especially if the usual Programme Support Cost (PSC) of 13 % could be waived or reduced. Other range States thought that it could be useful for the Fund to be hosted by UNEP at this time, but that other institutional options might be explored later. In November 2010, the Secretary-General of CITES wrote again to the Executive Director of UNEP about the possible establishment of the Fund by UNEP. The Executive Director informed the Secretary-General in December 2010 that he had decided to establish the African Elephant Fund and that the request for a reduction in the PSC was under consideration. In February 2011, the UNEP Governing Council approved the establishment of a multi-donor, technical cooperation trust fund for the implementation of the African Elephant Action Plan with effect from 1 February 2011. By agreement with UNEP, the applicable Programme Support Costs are equal to 7 % of the expenditures incurred for activities and projects financed by the trust fund.

The Secretariat will soon be writing to African elephant range and (anticipated) donor State members of the steering committee to obtain written comments on the latest draft interim terms of reference and to facilitate the transfer of pledged money into the African Elephant Fund.

Monitoring the Illegal Killing of Elephants

This section is based on the results of an analysis of data generated by the CITES programme for Monitoring the Illegal Killing of Elephants (MIKE), conducted in April 2011 and duly reviewed by the MIKE Technical Advisory Group at its 10th meeting in May 2011. A more detailed report of the analysis will be made available to the Standing Committee as an information document. The data set used for analysis consists of 7,378 carcasses of elephants that died between 2002 and 2010 in 46 MIKE sites in 25 range States in Africa and 11 sites in four range States in Asia, representing a total of 348 site-years (Table 6 in Annex 2). The MIKE system formally comprises 45 sites in Africa and 18 sites in Asia, and has been in operation in Africa since 2002, and in Asia since 2003. The data contain a considerable number of gaps across several years caused by non-reporting on the part of several sites. Similarly, an evaluation of the efficiency with which sites are detecting and reporting elephant carcasses revealed that carcass detection efficiency leaves much to be desired in a number of sites. As can be seen from Table 6 in Annex 2, reporting and detection rates are particularly poor in West African and Asian MIKE sites. This may be partly due to the fact that these regions harbour the smallest elephant populations. Nevertheless, there remains ample room for improvement in reporting and carcass detection rates in both. The potential effects of these data gaps were evaluated and were not found to have a significant impact on the overall results, but given the paucity of data from Asia, the analysis is unable to reveal any insights on trends of levels of illegal killing of elephants in that region.

The MIKE programme evaluates relative poaching levels based on the Proportion of Illegally Killed Elephants (PIKE), which is calculated as the number of illegally killed elephants found divided by the total number of elephants encountered by patrols (or other means), aggregated by year for each site. PIKE may be affected by a number of potential biases related to data quality, carcass detection probabilities and other factors, and hence results need to be interpreted with caution. However, the fact that the quantitative results presented below are in good agreement with qualitative information available from other sources, gives some confidence as to the robustness of the results. These results provide a number of new, evidence-based insights into the spatial distribution of the illegal killing of elephants, its trends in time and important factors associated with it.

3 Available at http://www.cites.org/eng/prog/MIKE/reg_meet/africa3/EN-Summary%20record%20AEM3.pdf.

Trends and levels of illegal killing

Figure 3 shows time trends in PIKE at the continental level for both African and Asian MIKE sites, with error bars (95 % confidence intervals). The African data are suggestive of a mildly increasing overall trend, punctuated by declines in 2005-2006 and 2009. However, given the widths of the error bars, the overall trend in trend raw PIKE is only of marginal significance – even though some of the inter-annual changes, such as that between 2009 and 2010 are highly significant. Similarly, the data suggest an ongoing and sustained increase in levels of illegal killing since 2006, only interrupted by a transitory decline in 2009.

Some of the temporal variation in the trend could be affected by issues associated with data quality. This is most apparent for the Asian region, where the paucity of data (220 carcasses over seven years) makes it impossible to infer any trend for that region. For Africa, on the other hand, it seems plausible that the patterns recorded may reflect real trends in illegal killing, influenced by fluctuations in factors directly related with the demand for ivory.

Most of the overall variation in PIKE, however, is explained by spatial factors (sites and the countries and subregions in which they are located) rather than temporal factors. As can be seen from Figure 4, Central Africa consistently displays high levels of poaching, while poaching levels are generally lower in eastern Africa and lowest of all in southern Africa. The picture is mixed in west Africa, with PIKE levels varying widely across years. This is probably a result of poor reporting rates and small numbers of carcasses reported by that subregion.

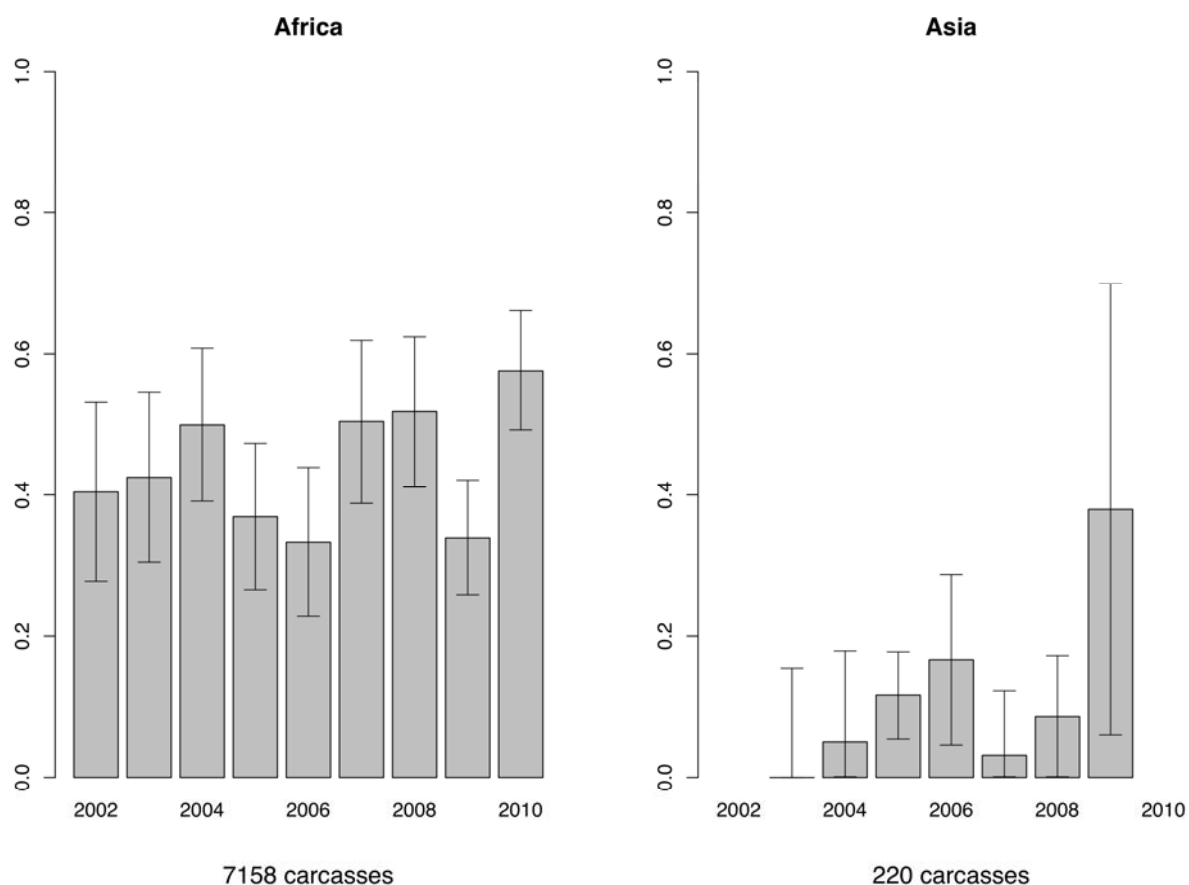


Figure 3. Regional PIKE trends with 95 % confidence intervals. The numbers of carcasses on which the graphs are based are shown at the bottom of each graph.

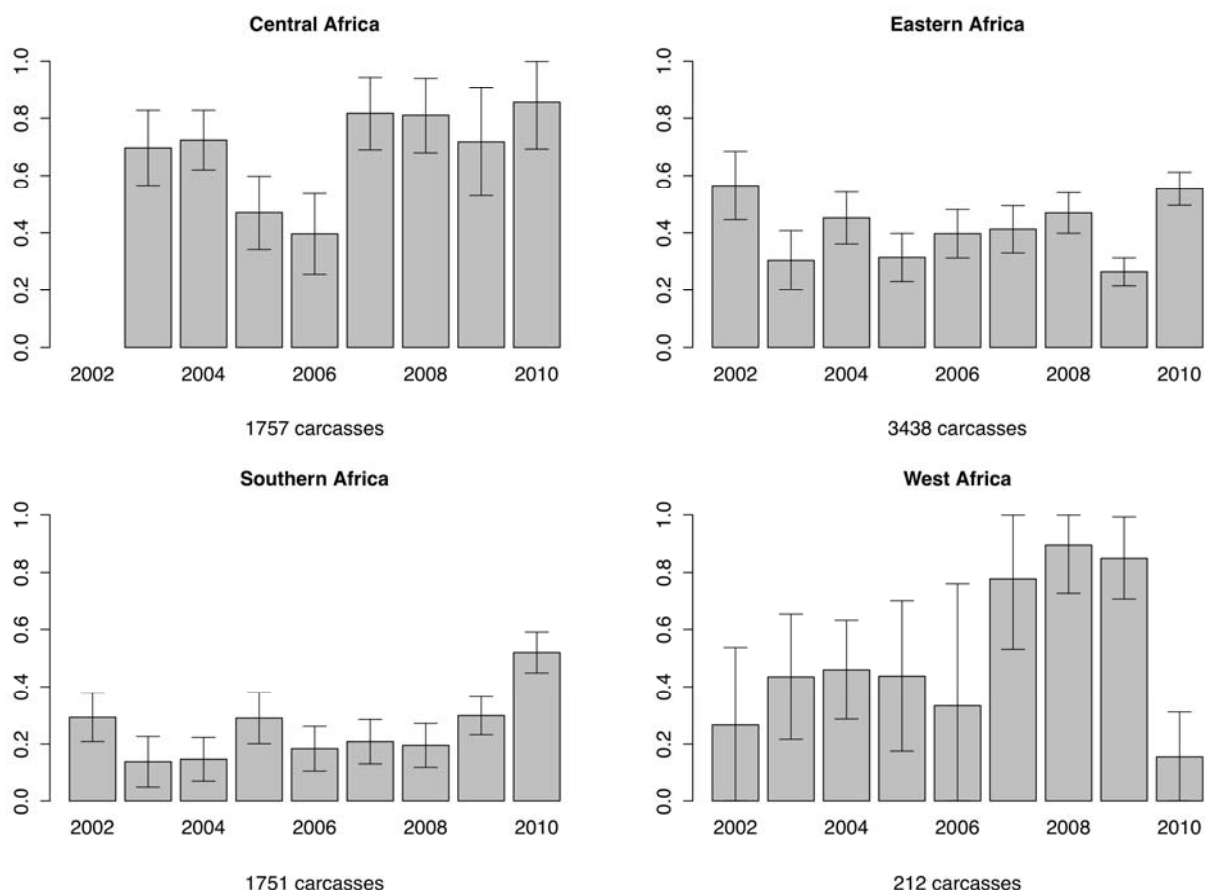


Figure 4. Subregional PIKE trends with 95 % confidence intervals. The numbers of carcasses on which the graphs are based are shown at the bottom of each graph.

Factors associated with levels of illegal killing

The recent MIKE analysis evaluated the relationships between poaching levels and a wide range of factors at the site, national and global levels, which are considered in turn below. The overall model, which includes all the factors described below, explains over 60 % of the total variation in PIKE.

Site-level factors

The MIKE analysis reveals a strong relationship between (human) infant mortality at the site level and levels of illegal killing of elephants. This suggests a direct link between poaching and poverty levels, with sites suffering from higher levels of poverty experiencing higher levels of elephant poaching. PIKE was also significantly, albeit less strongly, related with cattle density and land use heterogeneity at the site level. The relationship between cattle density and PIKE was negative, meaning that poaching levels tend to be lower where cattle densities are higher. This result may also be related to poverty, and to human nutrition in particular, as going out to hunt is less of an imperative in places where there is a readily available supply of animal protein in the form of livestock. However, this relationship may be confounded by the fact that cattle densities are significantly correlated with human population density. Although this implies that higher human densities are associated with lower levels of poaching, human impact on the landscape (as measured by the heterogeneity of land-use types) is positively related to PIKE. Thus it appears that human influence may exert both positive and negative effects on levels of elephant poaching.

There is also a strong, positive relationship between net primary productivity (which is used as a proxy for vegetation cover) and PIKE. Areas with denser vegetation cover tend to be associated with higher levels of poaching. Dense vegetation reduces visibility and hence decreases the detectability of poachers, making it easier and less risky for them to operate. A significant negative relationship between MIKE site area and PIKE was also recorded, with larger sites experiencing lower levels of poaching. This could also be associated with issues of poacher detectability, or with the logistics of poaching, as it is easier to quickly get in and out of a small site and less preparation is required in terms of rations, porters, and so on.

Country-level factors

As in previous MIKE analyses, governance emerges as the most important national-level predictor of elephant poaching. The consequences of bad governance are likely to manifest themselves throughout the ivory trade chain, facilitating the movement of illegal ivory from the site all the way to the point of export. Human development, which was also an important predictor in the analysis, seems inextricably related to governance and poaching in a vicious circle: Poor governance prevents the improvement of the human condition, driving the rural poor to poaching for sustenance, which in turn provides incentives for underpaid and demotivated officials to facilitate, and benefit from, the movement of illegal ivory. Levels of governance are generally lowest in the Central African subregion, where poaching levels are highest.

Global-level factors

Demand for ivory in the absence of a legal market is widely recognized to be a key factor driving the illegal killing of elephants. As most of the ivory currently in trade is an illegal commodity, it is not possible to measure demand for it based on trade data. Instead, a measure of general consumer demand for goods and services in ivory-consuming nations, namely the annual percent change in household consumption expenditure (i.e. consumer spending), was used as a proxy for ivory demand in the analysis. Changes in consumer spending in China were indeed found to be strongly and positively related to PIKE, whereas the relationship between PIKE and consumer spending in Japan was negative but statistically marginal and unlikely to hold true (Figure 5). These relationships were also tested for a number of other countries known to be implicated in the transit or consumption of illegal ivory – namely Malaysia, the Philippines, Thailand and Viet Nam – but such relationships were found to be insignificant or marginal at best. Preliminary findings suggest, however, a positive relationship between tourist arrivals in Thailand and levels of illegal killing of elephants. If validated, this would support the view that Thailand acts primarily as an illegal ivory market for tourists rather than for its own nationals.

These findings support the evidence from ETIS that China has overtaken Japan as the world's largest consumer market for illegal ivory products, and that countries such as Malaysia, the Philippines and Viet Nam are entrepôts in the trade route to China. It is worth noting that levels of private consumption expenditure in China are continuing to increase in 2011. Thus, if demand in China is indeed a reliable predictor of levels of elephant poaching, PIKE could be expected to increase accordingly in the course of the current year (2011). Preliminary evidence from the Samburu-Laikipia MIKE site, where record levels of poaching for ivory are being measured this year, seems to support this hypothesis (Wittemyer and Douglas-Hamilton, pers. comm.).

The close relationship between trends in private consumption and levels of illegal killing suggests that illegal ivory is a luxury (or superior) good in China, and that demand for it is income-dependent (i.e. there is positive income elasticity of demand). On the other hand, if the negative relationship between PIKE and private consumption in Japan holds, it would suggest that illegal ivory in Japan has become, to use the technical term from economics, an "inferior good", whereby increases in income would lead to declines in demand for illegal ivory (i.e. there would be negative income elasticity of demand). This could be a consequence of increased environmental awareness associated with higher levels of per capita income.

There appears to be no time lag (within the annual time-frame in which both MIKE and ETIS operate) between demand and poaching trends. This suggests that poaching levels may quickly respond to perceived levels of current demand. Longer lags may be expected between the poaching and the arrival of ivory at the consumer market, but given the breadth of the global transport network, such lags could well be much shorter than a year. Furthermore, it might be expected that dealers in illegal goods, such as ivory, would tend to prefer to move the merchandise along the trade chain as quickly as possible to minimize chances of detection by law enforcement agencies, to avoid sitting on idle inventory, and to get the product to market while demand is still high.

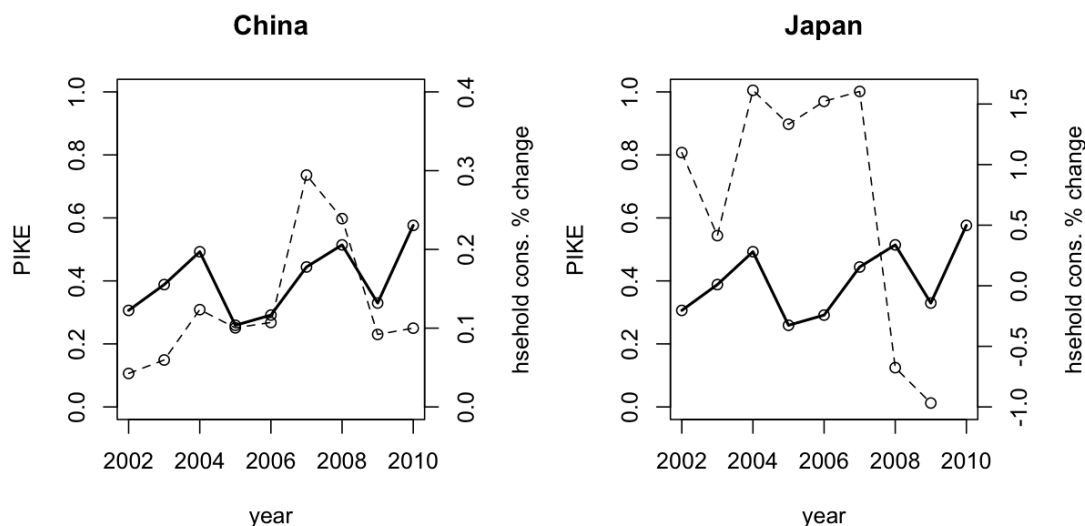


Figure 5. Superimposed trends of PIKE and household consumption in China and Japan.

Nevertheless, the role of illegally stockpiled ivory, which could have a strong influence on this dynamic, is not well understood at present. Data on the age and source of seized ivory would be needed to explore this dimension of the ivory trade chain. Data from isotope- and DNA-based techniques for identifying the age and source of ivory hold great promise in this respect, but their reliability needs to be independently assessed. If validated, these methods could, in conjunction with mandatory provision of ivory samples from ivory seizures, greatly improve current understanding of the dynamics of the ivory trade chain and its impact on elephant populations.

Illegal Trade in Elephant Specimens

This section is based on results from ETIS. The ETIS data, as of 8 June 2011, comprised 16,929 elephant product seizure records from 87 countries or territories since 1989 (Table 7 in Annex 2). In comparison to the CoP15 analysis (see document CoP15 Doc. 44.1, Annex 2), there are now 2,565 more records in ETIS, indicating that nearly four seizures have occurred each day since the last analysis was completed, and suggesting a much higher rate of reporting than previously (Milliken *et al.*, 2009). Since the production of document CoP15 Inf. 53, a subregional update of the ETIS data, a total of 184 new seizure records from 16 African elephant range States and 960 new records from four Asian elephant range States have been entered into ETIS. It is worth noting that eight African elephant range States (Angola, Benin, Equatorial Guinea, Guinea-Bissau, Liberia, Senegal, Somalia and Togo), and four Asian elephant range States (Bangladesh, Cambodia, the Lao People's Democratic Republic and Myanmar) have still never submitted a single elephant product seizure record over the 23-year period 1989-2011, but these countries collectively have been implicated in 495 ivory seizures that have taken place elsewhere in the world.

A total of 1,732 records represent non-ivory elephant products, whilst the remaining 15,197 cases detail ivory seizures. These records total 368,955 kg of ivory⁴. Annual raw data totals, with the number of seizure cases in each year, are presented in Figure 6. In comparison to the CoP15 ETIS analysis, unadjusted annual totals of ivory seized reached the highest level over the entire 23-year period in 2009, whilst 2010 represented the fifth highest annual total. Although only 62 seizure cases have been reported to ETIS for 2011, the volume of ivory seized has already surpassed the annual totals of three entire years which derive from hundreds of more seizure records. The remarkable increase in the number of seizure records reported in 2009 and 2010 is due to improved reporting from China, which is now submitting non-criminal ivory seizure cases to ETIS. These seizures, mostly comprising personal effects taken from citizens returning from overseas destinations, have effectively increased the annual number of records in the Chinese dataset by an order of magnitude over the typical annual number of seizure records from that country in the recent past (see Table 7 in Annex 2).

⁴ The weight (kg) values of seizure records that only report number of pieces by ivory type have been estimated using regressions models based on the current ETIS dataset. Thus, slightly different formulas have been used in comparison to similar calculations made for the CoP15 analysis. Consequently, weight values of individual seizure cases may not be directly comparable between reports.

Trends and levels of illegal ivory trade

The CoP15 ETIS analysis documented a steadily increasing trend in levels of illicit ivory trade from 2004 onwards, with an exceptionally sharp upsurge in 2009. Although a trends analysis was not undertaken for this report, there is very little reason to believe that there has been any appreciable change since then. The raw, unadjusted data demonstrate that seizures of ivory reached record levels in 2009⁵ and that these levels were largely sustained in 2010. At the same time, the ETIS data give an indication that, taken as a whole and unadjusted for bias, the global law enforcement effort for ivory trade may have decreased since CITES CoP15, but this factor requires further statistical investigation. In most cases, effective law enforcement is believed to produce a deterrent effect on illegal activity, but the corresponding effect could be occurring, that is to say, ineffective law enforcement could be stimulating greater illegal trade in ivory. Finally, key underlying factors that were seen to be drivers of illegal trade in the CoP15 analysis, especially the pull of major unregulated domestic ivory markets in both Africa and Asia and large-scale movements of ivory to service these centres of consumption, have continued to exert great influence on trade patterns. As a consequence, there can be little expectation that the overall situation has shown improvement; indeed, there are legitimate reasons for believing that illicit trade in ivory may actually be getting worse. Overall, illicit trade in ivory remains at very high levels and little has changed for the better since the last comprehensive analysis produced in August 2009 for CoP15.

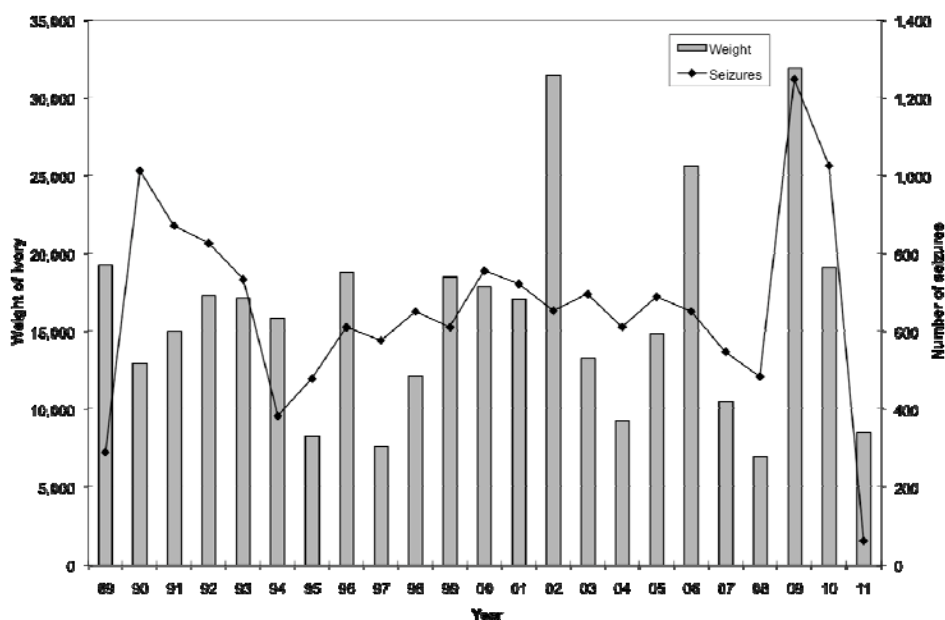


Figure 6. Estimated weight of ivory and number of seizure cases by year, 1989-2011 (ETIS, 08 June 2011)

Unregulated domestic ivory markets

Since 2002, each of the comprehensive analyses of the ETIS data prepared for meetings of the Conference of the Parties to CITES has demonstrated a statistically significant correlation between countries which have large, unregulated domestic ivory markets and poor law enforcement effort ratios. This relationship implies that countries which continue to allow elephant ivory products to be openly sold, in the absence of effective regulatory frameworks that serve to implement the provisions of Resolution Conf. 10.10 (Rev. CoP15) 'Regarding control of internal ivory trade', are most likely to be the primary destinations for illicit flows of ivory. The Democratic Republic of the Congo, Nigeria and Thailand, the three countries shown to be the most highly implicated in the illicit trade in ivory in the CoP15 ETIS analysis, continue to permit some of the world's largest unregulated ivory markets to operate within their borders and this status remains unchanged. Angola, Mozambique, Egypt and Myanmar also allow large unregulated ivory markets to operate without complying with CITES requirements.

⁵ The CoP15 analysis was based on only partial data through August 2009 and stated: "There is every expectation that the collection of more data will only enhance this result further, making 2009 a pivotal year in terms of escalating illicit trade in ivory" (Milliken et al., 2009).

Since CoP15, two ivory market surveys have been undertaken in Thailand and Egypt. In Thailand, where the last published study documented 26,277 ivory products in 270 outlets in five cities (Stiles, 2009), an initiative to track ivory stock turnover was undertaken by TRAFFIC in October-December 2010. Repeat surveys of 35 retail ivory outlets in Bangkok saw available ivory stocks grow from 4,822 products on the first visit to at least 5,537 items on a second visit, indicating nearly a 15 % increase in worked ivory product irrespective of any sales that occurred over the three-month period (P. Tansom, in litt. to TRAFFIC). Another survey in Egypt, conducted in 2011 with funding from TRAFFIC, found 9,261 ivory items openly for sale in Cairo and Luxor, of which one-third appeared to be recently carved items, indicating only a marginal reduction over the results of a similar study in 2005 (Martin and Vigne, in prep.). At least seven workshops with a minimum of 23 craftsmen were documented in Cairo, where Chinese buyers reportedly accounted for at least half of all sales of ivory objects in Egypt's capital (Martin and Vigne, in prep.). Finally, there is evidence to suggest that worked ivory processing expressly for illegal export to the Hong Kong SAR and mainland China markets is now taking place in Nigeria (D. Jeldon, in litt. to TRAFFIC). Nigeria has long had the largest domestic ivory market in West Africa, but wholesale exports of worked ivory products to East Asia marks a worrying new development.

Overall, the evidence suggests that very little has changed since the ETIS analysis for CoP15 (Milliken *et al.*, 2009) which stated:

Whilst Decision 13.26 [the 'action plan for the control of trade in African elephant ivory'] remains the Convention's principal vehicle for closing unregulated and illicit domestic markets in Africa and Asia, its implementation has not affected any significant change since CoP13. Once again, the increasing trend is a clear signal that measures taken to date to implement Decision 13.26 have not been sufficient to demonstrate any positive impact.

Despite the *Action plan for the control of trade in elephant ivory* adopted with Decision 13.26 (Rev. CoP15), a number of large, unregulated domestic ivory markets continue to operate with impunity in various countries, especially Thailand, Nigeria and the Democratic Republic of the Congo. Such markets remain potent drivers of illegal trade and are currently not subject to any penalty risks or meaningful oversight pressure.

Large-scale ivory seizures

The ETIS analysis for CoP15 (Milliken *et al.*, 2009) also documented the increasingly significant role that large movements of ivory play as a driver of illegal trade in ivory and discussed the value of using large-scale ivory seizures as a proxy measure for assessing the involvement of organized crime in the trade, stating:

The frequency of large-scale ivory seizures is increasing and provides evidence that there is a growing involvement of organized crime in the illicit trade in ivory. Asian crime syndicates operating from bases in various parts of the African continent are an increasing dimension in the trade which produces major challenges for effective law enforcement and good governance both in Africa and Asia.

In the CoP15 analysis, large-scale seizures were defined as seizure events that involved one tonne of ivory or more (using 'raw ivory equivalent' weight⁶). Since then, one study using extreme value theory to assess the threshold above which seizures of ivory should be classified as 'large-scale' suggested that 800 kg could be a better threshold for considering high-volume seizures in the ETIS data (Donovan, 2010). Thus, in the present analysis, seizures cases which involve 800 kg or more have been considered as large-scale seizures of ivory.

Currently, 75 cases from the period 1990-2011 can be defined as large-scale seizures. These seizures comprise both raw and worked ivory, and collectively total 146,015 kg of ivory, or a remarkable 40 % of the total volume of ivory represented by the ETIS data for this time period. Looking at the annual totals of these extreme seizure events, it can be seen that large flows of ivory within and from Africa appear to be a steadily increasing phenomenon over the last two decades, although fairly broad confidence limits are demonstrated in Figure 7 (left). At the same time, the weights of individual seizures are also gradually getting larger as can be seen in the statistically significant trend depicted in Figure 7 (right). It needs to be appreciated that both of these factors point to organized criminal syndicates becoming increasingly involved in the illicit trade in ivory from Africa to Asia.

⁶ In the ETIS data, the loss of scrap and wastage is calculated for semi-worked and worked ivory pieces so that all weight values used for analytical purposes represent 'raw ivory equivalent'.

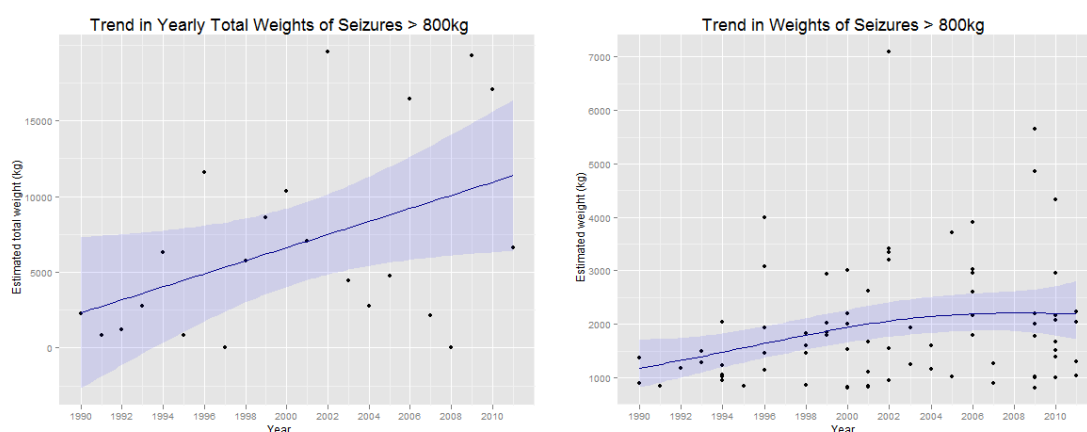


Figure 7. Trend in yearly total weight of seizures >800 kg, 1990-2011 (ETIS 08 June 2011) (left); and trend in weights of seizures >800 kg, 1990-2011 (ETIS 08 June 2011) (right)

Looking at the large-scale seizure data from 2009 onwards, an estimated 35,713 kg of ivory has been seized on 18 occasions in eight countries (Table 3). All but four of these major seizures have occurred since CoP15. Thailand, with six large-scale seizure events during this period, has impressively made the most seizures in terms of number, whilst Viet Nam has apprehended the greatest volume of ivory. The data indicate that Asian transit or importing countries collectively are four times more likely to make a large seizure than an African elephant range State. Most large consignments of ivory are reaching Asian markets through eastern Africa as Kenya, Uganda and the United Republic of Tanzania accounted for nearly 83 % of the total volume of ivory seized for which the country of origin or export was known. Another 10 % represents ivory flows from Nigeria, a country with very few elephants of its own. It is worrying to note that, in recent years, very few large-scale ivory seizures appear to have been successfully investigated and prosecuted, although regional law enforcement bodies, most notably the Lusaka Agreement Task Force in Eastern Africa and ASEAN-Wildlife Enforcement Network in Southeast Asia, are present in the two subregions where most such seizures are taking place. ETIS data suggest that, apart from the considerable financial loss such seizures entail, little, if any, other disruption to the organized crime bodies behind these transactions is occurring.

Table 3. Large-scale ivory seizures >800 kg, 2009-2011 (ETIS 08 June 2011)

Large-scale Ivory Seizures, 2009-2011					
Country or place of discovery	Number of seizures	Total weight seized (kg)	Country of origin or export	Number of seizures	Total weight seized (kg)
Asia			Africa		
China	2	4,017	United Republic of Tanzania	4	14,015
Viet Nam	3	9,312	Kenya	5	9,237
Thailand	6	8,356	Zimbabwe	1	2,198
Philippines	1	4,861	Nigeria	2	2,028
Hong Kong SAR	2	2,508	Uganda	2	1,832
Subtotal	14	29,054	Cameroon	1	997
Africa			Subtotal	15	30,307
Kenya	2	3,464	Unknown	3	5,406
South Africa	1	2,198	Total	18	35,713
Cameroon	1	997			
Subtotal	4	6,659			
Total	18	35,713			

Trade routes and ivory flows

Modelling of the ETIS data (which has not been bias-adjusted or smoothed) reveals useful insights in terms of understanding contemporary ivory trade patterns from Africa. Figure 8 compares raw ivory seizure data

that involve 50 kg or more aggregated at the subregional level between two 11-year periods, 1990-2000 and 2001-2011. The arrows show the route from subregion of origin to subregion of destination, but have been simplified to eliminate transit countries that might fall in other subregions. In these figure, the broader widths of arrows denote larger volumes of ivory moving along these pathways. Where circular arrows around the subregional labels are found, they indicate that seizures occurred whereby the country of origin and the country of destination were both within the same subregion.

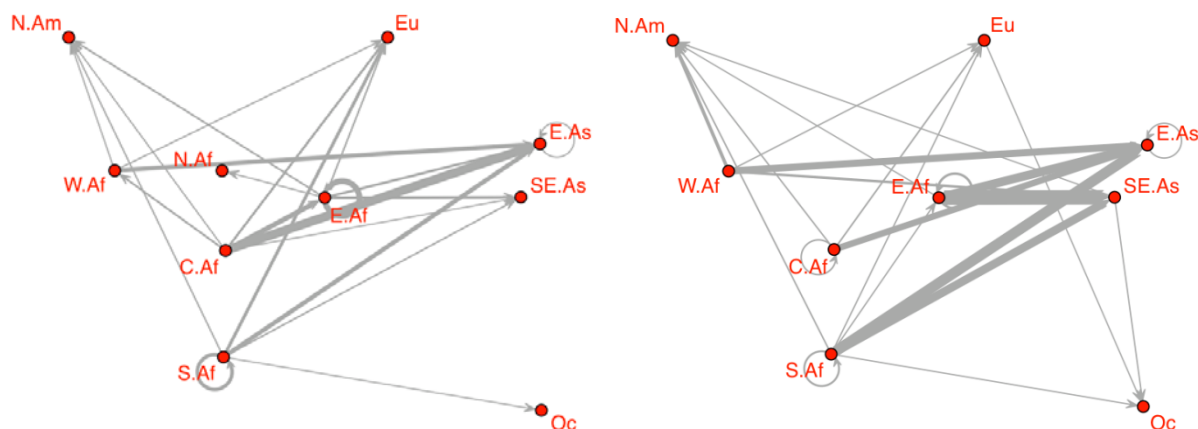


Figure 8. African raw ivory flows from origin to destination by subregion⁷, 1990-2000 (left); and 2001-2011 (right). 1990-2000 chart is based on 290 seizures (maximum weight: 6,625 kg); 2001-2011 chart is based on 360 seizures (maximum weight: 11,453 kg). Source: ETIS data 8 June 2011; all raw ivory seizures >50 kg.

Overall, it can be seen that there has been a substantial increase in illicit ivory flows from Africa to East Asia, which almost exclusively represents the Chinese market, including Hong Kong SAR and Macau SAR. Significantly, in the most recent period, these ivory transactions emanate from all four of the African subregions with elephant range States, but the trade from East, Southern and West Africa shows a marked increase. On the other hand, direct trade from Central Africa appears to have marginally decreased in the most recent period, but large volumes of ivory from this subregion are believed to be subsumed partially within the trade flows from eastern Africa, whilst probably most of the ivory coming from West Africa is derived from Central African elephants. Overall, because of a persistent lack of reporting, the ETIS data somewhat obscure the true dimension of illicit ivory trade from Central Africa.

At the same time, illicit ivory trade to Southeast Asia has also dramatically increased from East, Southern and West Africa over the last decade. These large ivory flows are principally due to the role Thailand plays as a major consuming country for raw ivory, but also results from other Southeast Asian countries, especially Viet Nam, Malaysia, the Philippines, Viet Nam and, most recently, the Lao People's Democratic Republic, serving as intermediate destinations for the Chinese and possibly Thai markets. Finally, it is worth noting that ivory trade flows from Africa to Europe have decreased over the last decade, whilst trade to North America in the last decade appears to have increased to some extent over the earlier period, especially from West Africa.

Legal trade in ivory

Based on CITES annual report data over the 10-year period 2000-2009, an overview of legal trade in *Loxodonta africana* and *Elephas maximus* has been produced by the UNEP World Conservation Monitoring Centre (UNEP-WCMC, 2011). Apart from legal exports of CITES-approved ivory stocks from southern Africa in 2008, most legal trade in this period has comprised wild-sourced hunting trophies from African elephants. Averaging roughly 1,200 tusks annually (600 elephants), most countries generally appear to be within their declared export quotas reported to CITES on an annual basis. However, Côte d'Ivoire, which is not a destination for foreign sport-hunters and has never communicated a sport-hunted trophy quota to the CITES Secretariat, reported the export of 1,313 kg of tusks between 2000-2009, but importing countries only reported the direct import of 98 kg of tusks and 112 tusks over the same period. Of the reported trade, the majority was recorded as pre-Convention stock, with the exception of 579 kg of tusks recorded by Côte

⁷ Legend for sub-regions: E.AF - Eastern Africa; E.AS - East Asia; EU - Europe; C.Af - Central Africa; N.Af - North Africa; N.AM - North America; Oc - Oceania; S.Af - Southern Africa; SE.As - Southeast Asia; W.Af - West Africa.

d'Ivoire as wild-sourced, and 38 kg of tusks and 35 tusks reported by importers as wild-sourced. All wild-sourced tusks were reported as personal possessions over this period. No wild-sourced trade with Côte d'Ivoire has been recorded since 2007. Summaries of legal transactions, compiled by UNEP-WCMC, are shown in Tables 8 to 12 in Annex 2.

Discussion and Conclusions

From an African perspective, the situation facing elephants in Central Africa appears to be grave and is probably worsening. Compared to other parts of the continent, the status and distribution of elephants in this subregion are poorly documented and understood (Blanc *et al.*, 2007; Blake and Hedges 2004). Endemic problems such as civil unrest, weak law enforcement and poor wildlife management are compounded by habitat loss, fragmentation and disturbance from infrastructure development and extractive industries (timber and mining). Assessing poaching through PIKE, the MIKE data consistently demonstrate substantially higher levels of illegal killing of elephants in Central Africa than any other subregion (Figure 4). The MIKE analysis also finds that poverty and governance are the most important predictors of elephant poaching and, not surprisingly, levels of governance and human welfare generally rank the lowest in Central Africa. Finally, the ETIS data point to large ivory flows emanating from Central Africa, westward through Nigeria in West Africa or eastwards through Kenya, Uganda and the United Republic of Tanzania, a trade pattern that masks the true origin of the ivory. Expert opinion throughout Central Africa lends further support to the notion that elephants are in crisis in that subregion. This is not necessarily through lack of funding for conservation work on the ground, as large sums of money have been invested in forest conservation in Central Africa over the last 10 years. It would appear that these issues need to be holistically addressed at multiple levels.

Another important development in the ETIS data since CoP15 is the fact that the eastern Africa subregion has consolidated its position as the primary exit point for illicit ivory leaving the African continent, with Kenya and the United Republic of Tanzania as prominent countries of origin or export in the trade (Table 7 in Annex 2; Figure 8), despite significant seizures being made in Kenya in recent times. As regional airline hubs continue to pioneer flight routes between Africa and Asia, and Kenyan and Tanzanian Indian Ocean seaports remain an essential link between vast interior expanses of Africa to external markets, East Africa offers the essential connectivity that illicit ivory trade requires. Whilst large amounts of Central African ivory are moving through these channels, levels of poaching appear to be escalating across the continent, including eastern Africa (Figure 8), and ivory from this subregion is also increasingly a part of these illicit trade flows.

Whilst the AESR 2007, as well as more recent surveys in key countries, continue to suggest further elephant population increases in the southern African subregion, the largest stronghold of the species, the marked escalation in PIKE values in 2010 gives cause for concern (Figure 4). Although overall PIKE values for this subregion remain relatively low in comparison to other parts of Africa, the large recent increase needs to be carefully watched, particularly in view of the ETIS data which point to an increase in illicit ivory trade from this subregion, owing to the emerging role of Mozambique as a source and exit country for illicit ivory to Asian markets.

In West Africa, although elephant populations remain small and highly fragmented, PIKE values are also high and increasing throughout the subregion (Figure 4). From an ETIS perspective, however, Nigeria remains the main country for large flows of illicit ivory. Again, most of this ivory originates in Central Africa, but Nigeria was also recently identified as the destination for a major shipment of ivory from Kenya, suggesting that ivory from as far away as eastern Africa may now be moving into the country.

Moving from Africa to Asia, the Chinese market remains the most prominent destination for illicit ivory in spite of the fact that restrictive government policy, committed implementation and steadfast law enforcement remain strong mitigating factors (Table 3; Figure 8). The recent seizure of 707 elephant tusks coming across the terrestrial border with Viet Nam supports previous assumptions that the series of large ivory seizures that occurred in Viet Nam in recent years were probably intended for the Chinese market. The internal destination within China of such large volumes of ivory remains a puzzle. As of yet, ongoing market monitoring and law enforcement within China do not suggest the presence of large, clandestine ivory processing operations or retail outlets. Thus, the prospect of such stocks leaking into legitimate ivory trade streams remains a real possibility against which China must remain vigilant. Reports that certain officially authorized retail ivory outlets are no longer openly displaying registration cards with legal ivory products is a development that could mask illicit trade and needs to be addressed (E. Martin, pers. comm., 2011). At the same time, Chinese nationals continue to be involved in illicit ivory trade throughout the African continent.

Likewise, the sensational series of large ivory seizures in Thailand since CoP15 supports the reoccurring ETIS finding that identifies the ivory industry in that country as a major player in the global trade (Table 7 in

Annex 2; Figure 8). These large shipments constitute the raw ivory supply required by the country's ivory processing industry and its large retail market. Whilst improved law enforcement action at Thailand's ports of entry demonstrates important progress, legislative processes to address loopholes in Thai legislation appear stalled. The country's negative profile in ETIS could change if concerted law enforcement action were to be directed against the hundreds of retail-level outlets that continue to move vast volumes of worked ivory products of illicit origin each year.

Recommendations

1. The global systems that monitor the status of elephants, the illegal killing of elephants and the legal and illegal trade in ivory have made considerable progress in enhancing current understanding of the illegal trade in elephant ivory from a supply chain perspective. The CITES-mandated ETIS and MIKE systems are now working closely together and are collaborating with the IUCN/SSC African and Asian Elephant Specialist Groups. Collectively, these systems deliver consistent, integrated and evidence-based results. It is important that MIKE and ETIS, together with those programmes that track legal elephant product trade under CITES and compile and analyse elephant numbers and distribution, be adequately funded to continue to provide critical information and analyses to the CITES Parties for their decision-making processes for elephant conservation.
2. The information and analyses provided to the Parties by these monitoring systems can only be as good as the quality of the data that go into them. Elephant range States must be encouraged to demonstrate their commitment to elephant conservation by providing timely, accurate data to the CITES-mandated monitoring systems as well as to the systems that underpin them. In particular, the following recommendations can be made in this regard:
 - a) Thorough and up-to-date knowledge of the status of elephant populations throughout their range remains central to a good understanding of the ivory trade chain and its impact on elephant populations in the wild. It is therefore recommended that elephant range States, assisted by international donors and appropriate partners where necessary, conduct regular, reliable surveys of all their elephant populations. It is essential that such surveys employ standardized and reliable methodologies such as those recommended in the MIKE survey standards. This is particularly applicable to Asia and Central Africa, where more widespread use of reliable monitoring methods is needed as a matter of some urgency.
 - b) There is ample room for improvement in the quantity and quality of elephant mortality data supplied to the MIKE programme, particularly by elephant range States in West Africa and the two Asian subregions. There are doubts about the accuracy of some of the data supplied by range States in these subregions, and their reporting rates are generally poor. Although elephant populations in these subregions are comparatively small, their contribution in terms of data is crucial to informed decision-making by the CITES Parties.
 - c) Poor reporting rates and inadequate compliance with MIKE standard protocols on the part of many elephant range States have dictated the need for the MIKE programme to utilize PIKE, rather than measures of catch per unit effort, as its main monitoring variable. While PIKE is theoretically a good indicator of poaching, its reliability is affected the quality of the data used to compute it. Range States should be encouraged to provide adequate law enforcement coverage to protect and monitor their elephant populations, and to regularly submit both elephant mortality and patrol effort data to the MIKE programme following its standard formats and protocols. These will serve to enrich the information base available to CITES Parties for decision-making, and would also enable a full validation of the 'PIKE approach'.
 - d) Whilst rates of reporting to ETIS have increased, data submissions from many range States still remain poor, especially in Central and West Africa, and Southeast and South Asia. Once again, Parties are urged to report elephant product seizures to ETIS in a timely manner, as called for in Resolution Conf. 10.10 (Rev. CoP15). Similarly, Parties should be urged to investigate and prosecute cases involving large-scale ivory seizures, and to report the outcomes of any such actions.
3. Numerous calls have been made and continue to be made for MIKE to provide an 'early warning' functionality. However, MIKE was not conceived as an early warning system, as this is not one of the stated objectives of Resolution Conf. 10.10 (Rev CoP15). In its current configuration, and with current rates and speeds of reporting from elephant range States, it is unrealistic to expect it to perform that

function. Given appropriate resources, MIKE is currently able to deliver reports on trends in illegal killing on an annual basis. If the Parties consider a true early warning system to be desirable, a full feasibility study and an assessment of resource requirements would need to be undertaken, bearing in mind that these might be much greater than the current needs of the MIKE system. Alternative early warning methods, based for example on informal and press reports, have been considered by the MIKE Technical Advisory Group (TAG). The TAG concluded that, while systems based on such methods would likely suffer from significant bias and unreliability, they may merit further evaluation. The CITES community may wish to consider whether the MIKE system currently meets its informational needs, or whether additional studies should be undertaken to explore the feasibility of integrating an early warning system within MIKE.

4. Isotope- and DNA-based techniques for ageing and identifying the source of ivory hold great promise for improving understanding of the dynamics of the illegal ivory supply chain. However, these techniques should be subject to a thorough, independent and objective assessment to establish their reliability and validity. In addition, it is recommended that the feasibility of mandatory sample collection from (at least large) ivory seizures for analysis by accredited, independent forensic research laboratories, be evaluated.
5. More data are needed on the illegal international trade in live Asian elephants, especially that from Myanmar into China and Thailand and from India into Nepal. In addition, given the large number of domestic working elephants in several of the Asian range States, which provide potential cover for illicit trade in elephants and elephant parts, including ivory, it would be highly desirable for an international registration system to be standardized across Asia, as recommended at the IUCN-coordinated Asian Elephant Range States Meeting in 2006.
6. The Democratic Republic of the Congo, Nigeria and Thailand were identified in successive ETIS analyses for the Conference of Parties to CITES in 2002, 2004, 2007 and 2010 as the three most problematic countries with regard to the illicit trade in ivory. There is little doubt that this situation still prevails in 2011. In order to diminish the illegal trade in ivory, the Democratic Republic of the Congo, Nigeria and Thailand need to be urged to take firm steps to close down the large retail ivory markets that operate with apparent impunity in their major cities and international airports. The effectiveness of the actions should be monitored.
7. Significant efforts need to be maintained in eastern Africa, especially in Kenya and the United Republic of Tanzania, and in Mozambique in southern Africa, to control and curtail illicit trade in ivory. These countries currently offer the most prominent ports of exit for ivory moving to Asian markets and should be a focus for law enforcement action and support. Equally, in West and Central Africa, Cameroon, Gabon and Nigeria offer major ports of exit for illicit ivory trade flows moving off the western coast of Africa, often in conjunction with exports of timber. Authorities in these countries need to remain vigilant, improve detection strategies and be supported in these efforts by relevant international enforcement agencies.
8. It is a continuing worry to note the persistent challenge to China's internal ivory trade control system posed by the ongoing flow of large consignments of ivory to that country and neighbouring countries in the immediate region for onward illegal trade. The scale of this problem seems to be growing. In that regard, a review of China's internal ivory trade protocol to determine whether there are possibilities for illicitly sourced ivory to leak into the legal ivory trade system would be welcomed. Further, a more aggressive and comprehensive public relations campaign should be undertaken to inform Chinese citizens, especially those in Africa, about the illegal trade in ivory and its negative conservation impacts. Once again, China remains the key to a diminishing illicit trade in elephant ivory.