CONSERVATION STATUS OF AND TRADE IN ELEPHANTS

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Introduction

Pursuant to Decision 14.78 and recommendations adopted by the 57th meeting of the Standing Committee in 2008, the Secretariat concluded a contract with UNEP-WCMC in May 2009 to produce an overview report summarizing relevant information on the conservation status of and trade in elephants. This work was completed in June 2009 for consideration at the 58th meeting of the Standing Committee (SC58).

Methods

This report summarises the best publicly available scientific information on the conservation status of African and Asian elephant. For African elephant, the review focuses on published and unpublished reports from the last 5-10 years and provides both a continental assessment and regional evaluations for southern, eastern, central and western African populations. The latest African Elephant Status Report (Blanc *et al.,* 2007) was referred to extensively. It provides the most authoritative, comprehensive and up-to-date information on the distribution and abundance of African elephants.

No equivalent recent continental assessment exists for Asian elephant. The IUCN Asian Elephant Specialist Group convened a strategic conservation planning workshop for Asian elephants in October 2008, which focused on range-wide status, population data and conservation strategies for the species throughout the range. The meeting report is currently in preparation and was therefore not referred to in the production of this review. Each Asian elephant range State is considered separately. A literature review focuses on recent publications (2000 onwards) where possible, however older publications and other sources have been consulted where there is an apparent lack of status or management information for some range States.

Tables summarising legal trade data since 2000 were produced for both species. An analytical commentary on the trade data and patterns, including whether any export quotas have been exceeded, is provided. Trends in illegal trade from the Elephant Trade Information System (ETIS) and in the illegal killing of elephants as documented by Monitoring the Illegal Killing of Elephants (MIKE) are summarised.

The term human-elephant conflict, abbreviated as HEC, is used to describe negative interactions between human and elephants which may arise as a consequence of, for example, habitat loss and conversion to plantation, crop raiding by elephants and seasonal elephant movements. It includes killing of elephants and human injury or death caused by elephants.

LOXODONTA AFRICANA - AFRICAN ELEPHANT

CITES HISTORY

Loxodonta africana was included by Ghana in Appendix III of CITES in February 1976. The full species was included in Appendix II in February 1977. All populations were transferred to Appendix I at the seventh meeting of the Conference the Parties (CoP7) in 1989, which entered into effect 90 days after that meeting on 18 January 1990. The populations of Botswana, Namibia and Zimbabwe were transferred to Appendix II in 1997, only allowing trade in certain specimens and under special conditions

* *The geographical designations employed in this document do not imply the expression of any opinion whatsoever on the part of the CITES Secretariat or the United Nations Environment Programme concerning the legal status of any country, territory, or area, or concerning the delimitation of its frontiers or boundaries. The responsibility for the contents of the document rests exclusively with its author.*

agreed by the Conference of the Parties at its 10th meeting. In 2000, the population of South Africa was transferred to Appendix II with similar restriction on the specimens to be traded and conditions under which trade could occur.

Trade

Apart from exports of stockpiled raw ivory from southern Africa, most legal trade is in wild-sourced sport hunted trophies. The number of tusks reported exported by range States between 2000 and 2007 is provided in Annex I. Nine countries have established export quotas for sport-hunted African elephant in compliance with provisions on Resolution Conf. 10.10 (Rev. CoP14) on *Trade in elephant specimens* (Annex II). Most countries with export quotas for sport hunted trophy tusks have maintained exports well within those quotas. The quota for Mozambique appears to have been exceeded according to exporter data in 2007; however data from the importing countries suggest that Mozambique did not exceed their quota in 2007. Mozambique regularly reports in excess of actual exports. Exporter data may in future be corrected in the light of replacement permits transmitted to the CITES Secretariat that annul permits from previous years which expired before the export could take place.

In addition to sport hunted trophies, South Africa and Zimbabwe exported elephant skins for commercial purposes to France, Germany, Hong Kong, Italy, Japan, the Republic of Korea and the United States. The trade in elephant skins is not reported in a manner that allows estimation of the number of individuals involved. Skins, being very thick, can be split into many pieces and it is therefore difficult to equate units of measurement into number of individuals.

Conservation Status

Two subspecies of the African elephant are currently recognised: Savannah elephants (*Loxodonta africana africana*), which occur predominantly in Eastern and Southern Africa, and Forest elephants (*Loxodonta africana cyclotis*), which occur primarily in the Congo Basin (Blanc *et al.,* 2007). In West Africa, elephants live in both forest and savannah and their taxonomic status is unclear (Blanc *et al.,* 2007). Recent phylogenetic analyses of African elephants indicate that their demographic history is more complex, and do not support the separation into two evolutionary lineages (Debruyne, 2005; Johnson *et al.,* 2007).

Continental overview

Population: African elephants occur in 37 range States across sub-Saharan Africa, with a total estimated range of over 3.3 million km^2, 31% of which is thought to occur within protected areas (Blanc *et al.,* 2007). Elephant distribution was reported to vary considerably between regions (Blanc *et al.,* 2007) and to be becoming increasingly fragmented across the continent (Blanc, 2008). The African elephant population is estimated to number >500,000 individuals (Definite + Probable[1]), with roughly 88% occurring in Southern and Eastern Africa (Blanc *et al.,* 2007; Annex III). Population estimates are currently available for 51% of the African elephants' range, with systematic surveys accounting for 29% of the range (Blanc *et al.,* 2007).

Conservation status: The species was considered Near Threatened in the 2008 IUCN Red list, on the basis of an inferred decline of 25% between 1979 and 2007 (Blanc, 2008). The overall population trend was considered to be 'increasing' as although populations may be declining in parts of their range, major populations in Eastern and Southern Africa are increasing (Blanc *et al.,* 2005; Blanc *et al.,* 2007; in: Blanc, 2008).

Threats: The main threats were reported to be loss and fragmentation of habitat, poaching for ivory and meat, and HEC (Stephenson, 2007b; Blanc, 2008; IUCN/SSC African Elephant Specialist Group, 2009). In addition, a widespread lack of institutional capacity, knowledge and resources was reported to have resulted in a general weakness in elephant conservation and management across large parts of Africa (IUCN/SSC African Elephant Specialist Group, 2009).

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[1] *African elephant population estimate data is categorised by level of certainty; definite, probable, possible and speculative. Categories are determined according to survey type and degree of reliability.*

Management: HEC and local overabundance of elephants were reported to be emerging issues affecting African elephant conservation and management at the first African elephant meeting that the CITES Secretariat organized in Mombasa in June 2008 (IUCN/SSC African Elephant Specialist Group, 2008). Root causes of HEC were stated to include incompatible land use practices, rural poverty, lack of land tenure and lack of ownership rights to wildlife, whilst a number of technical, institutional, socio-political and economic barriers were identified, which may limit the success of management strategies (IUCN/SSC African Elephant Specialist Group, 2008). The short-term field-based mitigation measures used to manage HEC to date were reported to have had limited success, and it was recommended that for long-term management, mutually beneficial strategies for people and elephants, coordinated at national, local and site levels were needed (IUCN/SSC African Elephant Specialist Group, 2008).

In range states where populations are growing through natural recruitment or by compression of their range, there is increasing concern over local overabundance and the adverse effects of elephants on vegetation and other species (van Aarde *et al.,* 2006; Balfour *et al.,* 2007; IUCN/SSC African Elephant Specialist Group, 2008). As there is no unique density of elephants that can serve as a definition of 'overabundance' for any particular area, it has been suggested that overabundance should be defined in terms of whether an area is meeting its land-use objectives or human defined values; hence a prerequisite for taking any management action should be the establishment of clear conservation and management objectives (IUCN/SSC African Elephant Specialist Group, 2008). The publication of a Review of Options for Managing the Impacts of Locally Overabundant Elephants (Balfour *et al.,* 2007) provides a summary of management options available and lessons learned (IUCN/SSC African Elephant Specialist Group, 2008).

Following a Decision agreed at the 14th meeting of the Conference of the Parties (CoP14) in 2007, African elephant range States have been working towards the development of a comprehensive *African elephant action plan* (IUCN/SSC African Elephant Specialist Group, 2008; CITES Secretariat, 2009; IUCN/SSC African Elephant Specialist Group, 2009). In support of this effort, the IUCN/SSC African Elephant Specialist Group compiled a 'Strategic Framework for an *African elephant action plan*' to be used by range States to identify elephant conservation and management priorities. The 'Strategic Framework' was discussed and adopted at the second African elephant meeting that the CITES Secretariat organized (Gigiri, March 2009), and will form the basis for a final *African elephant action plan* (IUCN/SSC African Elephant Specialist Group, 2009).

WWF have produced a Species Action Plan for the African Elephant (Stephenson, 2007b) which outlines the goal, objectives and key activities for their African Elephant Programme, and focuses conservation effort on priority landscapes.

Central Africa

Population: Central Africa's largest known populations occur in Gabon, Congo and the Democratic Republic of the Congo (DRC) (Annex IV), whilst poaching is thought to have virtually eliminated elephants form northern and eastern Central African Republic (Blanc *et al.,* 2007). Based on MIKE survey data, Blake *et al.* (2007) reported that the numbers and range of forest elephant populations were in decline.

Conservation status: In the 2008 IUCN Red List assessment, elephants in Central Africa were classified as Data Deficient, with populations thought to have declined since the 1970s (Blanc, 2008).

Threats: The main threats to elephants throughout the region were reported to be poaching for ivory and bushmeat (Blanc *et al.,* 2007) which reportedly continued within protected areas (Blake *et al.,* 2007), the dramatic expansion of road-building, which facilitates poaching (Blom *et al.,* 2005; Laurance *et al.,* 2006; Blake *et al.,* 2008) and HEC, including crop raiding (Blanc *et al.,* 2007). A widespread lack of institutional capacity and difficulties associated with monitoring forests were also reported to hinder conservation efforts in the region (Blanc *et al.,* 2007).

In the Gamba Complex, SW Gabon, human activity and infrastructure were found to be major determinants of elephant distribution, highlighting their sensitivity to human disturbance (Buij *et al.,* 2007). Illegal hunting in the area was reported to occasionally target elephants (Thibault and Blaney, 2003, R. Buij and M. Lee, pers. obs.; in: Buij et al., 2007). In Kahuzi-Biega National Park, eastern DRC,

the remaining population was reported to be facing a severe, unprecedented crisis from intense poaching for ivory and meat (Mubalama and Bashigg, 2006).

In the Dzanga-Ndoki National Park and the adjacent Dzanga-Sangha Dense Forest Special Reserve, SW Central African Republic, elephants were found to avoid areas close to roads and villages; poachers were found to use roads to penetrate the Park (Blom *et al.,* 2004; 2005). In Congo, Central African Republic and Gabon, movements of radio-collared elephants outside protected areas were found to be constrained by roads, reducing effective habitat availability and isolating populations (Blake *et al.,* 2008).

Desertification and drought were reported to threaten elephant populations in Chad (Blanc *et al*., 2007). Poaching in areas outlying the Zakouma National Park, which harbours Chad's largest population, is also a threat which has intensified since 2005 (Fay, 2007). An influx of refugees from DRC and Sudan was reported to be putting wildlife under considerable pressure in eastern Central African Republic and poaching was reported to be exacerbated by opening-up new areas for timber exploitation in Gabon (Blanc *et al.,* 2007). Central Africa's forests were also reported to be threatened by logging, and in NE Congo, lowland forests inhabited by elephants are threatened by mining for gold, diamonds, iron ore and coltan (Stephenson, 2007a).

Central Africa is thought to be the main source of ivory supplying Africa's unregulated domestic ivory markets (Courouble *et al.,* 2003; Hunter *et al.,* 2004; TRAFFIC, 2004; IUCN/SSC African Elephant Specialist Group, 2009). Large amounts of ivory originating from DRC was reported confiscated in recent years (Hakizumwami and Luhunu, 2005; in: Blanc *et al.,* 2007), and political instability in parts of Central Africa was reported to have facilitated the influx of arms and ammunitions across borders, leading to high levels of organised poaching and ivory trade (L. Usongo, pers. comm. in: Stephenson, 2007a). Blake *et al.* (2007) reported that poached elephant carcasses were found at all MIKE sites, even large, well-established National Parks, and that forest elephant numbers and range were severely threatened by hunting for ivory.

Management: In 2005, a regional elephant conservation strategy was developed (AfESG, 2005a), although it was reported that little movement had been observed in its implementation (IUCN/SSC African Elephant Specialist Group, 2009). Whilst a third of the elephants' estimated range was estimated to occur within protected areas, many of the parks and reserves were reported to lack adequate management or effective protection (Blanc *et al.,* 2007).

Eastern Africa

Population: Eastern Africa's largest known populations occur in the United Republic of Tanzania (hereafter referred to as Tanzania), Kenya and Uganda (Annex IV). Tanzania holds 80% of the regional population (over 100,000 individuals) with the main stronghold in the Selous ecosystem (Blanc *et al.,* 2007). In Kenya, "definite" elephant estimates are over 23,000, with over 10,000 occurring in Tsavo National Park (Blanc *et al.,* 2007). In the Amboseli ecosystem, the elephant population was reported to have increased 1979-2000, at an average rate of 2.2% per year (Moss, 2001) and now numbers 1,417 (Blanc *et al.,* 2007), and in Samburu and Buffalo Springs National Reserves, populations were reported to have increased at an average rate of 4.6% per year 1998-2003, nearing 700 individuals in 2003 (Wittemyer *et al.,* 2005).

The "definite" estimate for Uganda is 2,337 individuals (Blanc *et al.,* 2007) with Queen Elizabeth National Park and Murchison Falls Conservation area harbouring the largest numbers; 2,959 and 516 respectively (Blanc *et al.,* 2007). In Kidepo Valley National Park, NE Uganda, elephant populations were reported to have remained stable 1967-2000, varying between 200 and 500 individuals (Aleper & Moe, 2006). In southern Sudan, a new population of around 8,000 individuals was discovered in 2007 mainly in the Sudd, a vast swampy area, with other elephants occurring in the Boma National Park and Jonglai region (National Geographic, 2007). Rwanda's elephant population was reported to be small and fragmented, with the presence of elephants in Somalia unknown due to ongoing instability (Blanc *et al.,* 2007).

Conservation status: In the 2008 IUCN Red List assessment, elephants in Eastern Africa were classified as Vulnerable, with populations showing an overall decline since the 1970's due to poaching and human population growth (Blanc, 2008).

Threats: The most prominent threats to Eastern Africa's elephants were reported to be human population growth and loss/fragmentation of habitats, together with HEC (Blanc *et al.,* 2007). In Eritrea, where elephants form part of a single transboundary population straddling the border with Ethiopia, continued tensions between the two countries was reported to make research and conservation difficult (Blanc *et al.,* 2007); in the Tarangire-Manyara ecosystem, NE Tanzania, poaching was reported to be a serious problem, together with protection of migration corridors against human disturbance and land cultivation (Galanti *et al.,* 2006); in Samburu and Buffalo Springs National Reserves, Kenya, there was thought to have been limited impact of ivory poaching on the elephant population 1998-2003 (Wittemyer *et al.,* 2005); and in Mikumi National Park, Tanzania (which lost over half its elephant population to poaching in the decade prior to the 1989 ivory ban), the historic loss of adult females to poaching was found to have impaired group social functioning, elevated physiological stress and reduced reproductive output among remaining females (Gobush *et al.,* 2008). Ethiopia was reported to have the largest unregulated ivory market in Eastern Africa (Milliken *et al.,* 2002; in: Blanc *et al.,* 2007) but recent reports suggested that Ethiopia has made significant progress towards controlling its domestic ivory market (Milledge & Abdi, 2005; in: Blanc *et al.,* 2007).

Management: Tanzania has developed and implemented a national elephant management policy and Kenya was reported to be in the final stages of developing its own (Blanc *et al.,* 2007; IUCN/SSC African Elephant Specialist Group, 2008). Blanc *et al.* (2007) suggested that development of a regional strategy would be desirable.

Southern Africa

Population: Southern Africa has the largest elephant range area and holds the largest elephant populations on the continent (Blanc *et al.,* 2007). The greatest numbers occur in Botswana and Zimbabwe (Annex IV). In the African Elephant Status report of 2007, Blanc *et al*. (2007) reported that Southern African elephant populations had shown an average rate of increase of 3.88% compared to figures from the previous status report (Blanc *et al.,* 2003).

In the Sebungwe region, NW Zimbabwe, elephant numbers were reported to be relatively constant 1999-2006, at 14,000-16,000 elephants (Dunham, 2008); in Hwange National Park, NW Zimbabwe, the elephant population was reported to have more than doubled since 1986, reaching an estimated 44,492 elephants in 2001 (Chamillé-Jammes *et al.,* 2007); in northern Botswana, elephant population size and density did not change significantly 1996-2004, with an estimated population size of 120,292 (Junker *et al.,* 2008); in Addo Elephant National Park, southern South Africa, the fenced elephant population was reported to have increased 1976-2002 at a rate of 5.8 %, reaching 388 individuals in 2003 (Gough and Kerley, 2006); in Kruger National Park, NE South Africa, the elephant population increased at a rate of 4.6% per year 1998-2004, to over 11,000 individuals in 2004 (Young *et al.,* 2009); in Tembe Elephant Park, southern Mozambique, the elephant population in 2002 was estimated to be 179 individuals, with numbers thought to have increased since the early 1980s (Morley, 2006); in the Maputo Elephant Reserve, southern Mozambique, the elephant population in 2006 was estimated to be at least 311 (95% CI: 198-490) individuals, the population appeared to have remained stable since a 1995 survey and not suffered a major decline due to the civil war (Olivier *et al.,* 2009); in Kafue National Park, south-central Zambia, the elephant population was thought to have declined since 1991, with an estimated 1,555 individuals in 2004 (Guldemond *et al.,* 2005); and in Malawi, elephant populations were reported to be small and fragmented, with the long-term viability of several populations in doubt (Blanc *et al.,* 2007).

Conservation status: In the 2008 IUCN Red List assessment, elephants in Southern Africa were classified as Least Concern, with populations showing an overall increase since the 1970's, recovering from historical lows in the early 20th century (Blanc, 2008).

Threats: Human-elephant conflict and poaching were reported to be the main threats facing Southern Africa's elephants (Blanc *et al.,* 2007). Considerable amounts of carved ivory were reported to have been found openly for sale and export in Mozambique, 2005 (Blanc *et al.,* 2007). Three consecutive droughts in Zimbabwe 2002-2005 were reported to have caused a number of elephant deaths (Dunham *et al.,* 2006; in: Blanc *et al.,* 2007). Anthropogenic mortality in the Sebungwe elephant population, NW Zimbabwe, was reported to have increased 2001-2006, mostly due to poaching (Dunham, 2008).

In the Caprivi Strip (a narrow strip of land in NE Namibia surrounded by Angola, Botswana, Zambia and Zimbabwe), Chase and Griffin (2009) reported that civil war, veterinary fences and human activities in bordering countries had probably influenced the large variation in elephant numbers 1980-2005 and changes in elephant distribution and movements. A veterinary fence stretching135 km along the Botswana/Namibia border is thought to have severed seasonal movements of elephants throughout the region (Chase & Griffin, 2009). In the Zambezi Vally, NE Zimbabwe, implementation of a proposed corridor to link two elephant refuges (the Panyame and Mavuradonha wilderness areas) was reported to be threatened by recent political violence in the area, illegal killing of elephants and loss of suitable habitat (Osborn & Parker, 2003).

Management: Rising elephant populations, particularly in South Africa and Botswana, and their impact on vegetation and biodiversity, are a major management challenge (Blanc *et al.,* 2007; Balfour *et al.,* 2007). Options available to tackle local 'over-population' include translocation, birth control, culling, range expansion or simply doing nothing (van Aarde and Jackson, 2007; Stephenson, 2007b, Balfour *et al*., 2007). Some favour increasing elephant range area and linking protected areas (the creation of 'megaparks'), allowing natural sources and sinks to regulate elephant numbers regionally, reducing pressure on areas of highest elephant density (van Aarde *et al.,* 2006; van Aarde and Jackson, 2007). A number of transfrontier conservation areas have already been established, including the Kavango-Zambezi Transfrontier Conservation Area (KAZA TFCA), which holds nearly half the continental elephant population, including important populations in Angola, Botswana, Namibia, Zambia and Zimbabwe (Blanc *et al.,* 2007; IUCN/SSC African Elephant Specialist Group, 2008).

Van Aarde and Ferreira (2009) noted that as many major elephant populations span several countries, with movements across international borders, management decisions, might be better made at the level of the population rather than the country (i.e. using ecological units rather than political ones). The Southern African range states have developed a Regional Elephant Conservation Strategy, which aims to foster regional cooperation in elephant management and monitoring (Blanc *et al.,* 2007; IUCN/SSC African Elephant Specialist Group, 2008).

West Africa

Population: Elephant range in West Africa was reported to occur in small fragments scattered across the region (Blanc *et al.,* 2007). It was reported that many elephant populations were unlikely to be viable, including the small, fragmented populations of Côte d'Ivoire, Guinea Bissau, Nigeria and Senegal (Blanc *et al.,* 2007). The single largest population was reported to be the "WAPOK" (W-Arly-Pendjari-Kéran) complex, which straddles the borders between Benin, Burkina Faso, Niger and Togo (Blanc *et al.,* 2007).

In Guinea Bissau, elephants were "considered rare", with an estimated minimum population of 4-10 individuals, based on observed elephant tracks (Brugière *et al.,* 2006). In the Konkombouri Hunting Zone, part of the transfrontier WAPOK ecosystem, east Burkina Faso, elephant numbers were reported to have increased overall during 2003-2006, with a maximum of 821 ± 164 individuals in 2005 (Bouché, 2007a). However, these localised increases may be due to elephant movements across wider landscape scales.

Conservation status: In the 2008 IUCN Red List assessment, elephants in West Africa were classified as Near Threatened, with populations low but relatively unchanged since the 1970s (Blanc, 2008).

Threats: Threats reported to be pervasive throughout the region included human population pressure and agricultural expansion, encroachment into elephant habitat, crop raiding, HEC and poaching (Blanc *et al.,* 2007; Stephenson, 2007a). Political instability in Côte d'Ivoire was reported to make conservation efforts difficult, and also to cause elephants to move into neighbouring countries, exacerbating HEC in these areas (Blanc *et al.,* 2007).

Expansion of agriculture onto elephant migration routes was reported to be a major threat facing Mali's elephants (Barnes *et al.,* 2006; Blanc *et al.,* 2007); the most immediate threat to the small elephant population in Guinea Bissau was reported to be a road scheme through the remaining elephant range (Brugière *et al.,* 2006); HEC and crop-raiding was reported to be a growing threat in the Konkombouri Hunting Zone, east Burkina Faso (Bouché, 2007a); wildlife corridors were found to be no longer active in northern Ghana, mainly due to human pressure on land that was previously untouched (Bouché, 2007b);

and poaching and other human illegal activities were reported to threaten elephants on Nazinga Game Ranch, southern Burkina Faso (Hien *et al.,* 2007). A successful firearms collection programme in Sierra Leone was thought likely to reduce levels of poaching (Blanc *et al.,* 2007).

Management: A comprehensive regional strategy for elephant conservation (AfESG, 2005b) was reported to be used as a reference tool for the development of elephant conservation projects and programmes throughout the region (Blanc *et al.,* 2007). The strategy received government endorsement in 2005, with 12 ECOWAS (Economic Community of West African States) member countries agreeing to work together to protect elephant habitat, boost numbers in fragile populations and set up elephant 'conservation corridors' in important transboundary areas (Blanc *et al.,* 2007).

Large unregulated domestic ivory markets were reported to be still active in Nigeria, Côte d'Ivoire and Senegal (Courouble *et al.,* 2003; Blanc *et al.,* 2007). Legislation was often ambiguous and poorly enforced due to lack of resources, widespread corruption, poor collaboration and political instability, with very few seizures communicated to ETIS. Much of the ivory was reported to be illegally imported from Central Africa, and Water and Forest agents in West African countries were apparently often denied access to passenger and luggage clearance areas at ports of entry for controlling such trade (Courouble *et al.,* 2003).

Elephas maximus **- Asian elephant, Indian elephant**

Cites History

The Asian elephant has been listed on Appendix I since July 1975.

Trade

There is little reported legal commercial trade in Asian elephant. Only 35 carvings were reported from range States for commercial trade over the period 2000 to 2007. A further 104 carvings were reported in trade for educational, exhibition or personal purposes. Over the same period, a total of 182 live elephants have been reported as imports from range States, most reported as captive-bred specimens from Thailand. Live exports of wild origin are provided in Annex V.

Conservation Status

Three Asian elephant subspecies are currently recognised: *E. m. indicus* which occurs on the Asian mainland, *E. m. maximus* on the island of Sri Lanka, and *E. m. sumatranus* on the Indonesian island of Sumatra (Shoshani & Eisenberg, 1982). The taxonomic status is primarily determined by body size and colouration. Recent genetic analysis of mitochondrial DNA does not support the designation of the Sri Lankan subspecies (Fleischer *et al.,* 2001). Elephants on the island of Borneo may constitute a forth subspecies; Fernando *et al.* (2003) suggest the population is an indigenous, genetically distinct subspecies. However, on the basis of both historical and palaezoological records, Cranbrook *et al*., (2008) believe the population is derived from introduced individuals that originated from the now extinct Javan population.

Continental overview

Asian elephants occur in 13 range States across South Asia and South East Asia, with a total estimated range area of 486,800 km^2 (Sukumar, 2003). The species generally survives in highly fragmented populations with little or no possibility of genetic exchange (Sukumar and Santiapillai, 1996). Only around half of elephant habitat is considered as "wildland" or areas of undisturbed natural habitat, and only 16% of wildlands are protected (Leimgruber *et al.,* 2003). The current range is significantly reduced to 5% of an estimated historical range of nine million km^2 (Sukumar, 2006) with known extinctions in West Asia, Java and most of China. Loss of habitat has been the single most important factor in causing the species decline (Sukumar and Santiapillai, 1996). Gaps in knowledge of the species' distribution in South East Asia still exist.

In a recent assessment by IUCN, the continental population for Asian elephant is estimated at 41,410-52,345 individuals, with more than half of the population occurring in India (Choudhury *et al.,* 2008).

However, the accuracy of current range-wide estimates is questioned on account of problematic field surveys in difficult terrain, and a large variation in survey techniques (Blake and Hedges, 2004). Standardized survey methods established under the MIKE programme to help fill information gaps have now been described and applied (Hedges & Lawson, 2006). Population sizes and area of elephant range are summarised by range State in Annex VI.

Conservation status: The species was classified as Endangered in the 2008 IUCN Red list on the basis of an inferred population decline of at least 50% over the last three generations reflecting a reduction in habitat occupancy and quality (Choudhury *et al.,* 2008). The overall population trend is considered to be 'decreasing,' with the majority of populations across the range in decline, particularly in South East Asia. However, the Indian population is classified nationally at the lesser threat category of Vulnerable, and there is evidence that one large population in the Western Ghats of India is increasing (Choudhury *et al.,* 2008).

Threats: The main threats to Asian elephants were reported to be the loss, degradation and fragmentation of habitat caused by human population expansion and associated land conversion, and HEC (Sukumar, 2006; Choudhury *et al.,* 2008). Whilst poaching for a variety of products (bushmeat, leather, ivory) has been reported to be a threat to Asian elephant to a varying extent throughout the range (Choudhury *et al.,* 2008), recent CITES Secretariat missions to Asian range States suggests that poaching is not a significant threat, and this is supported by MIKE data which indicates low levels of illegal elephant killing in Asia (De-Meulenaer, pers. com) . HEC appears to be intensifying and the resolution and reduction of HEC is seen as key to conserving Asian elephants in many parts of the range.

Management: The IUCN/SSC Asian Elephant Specialist Group developed an Action Plan for the species conservation in 1990 (Santiapillai & Jackson, 1990). The Action Plan advocated provision for elephant conservation in National Conservation Strategies and included for each range State, key recommendations, including enforcement of national laws to protect elephants, establishment of protected areas, maintenance of forest corridors, and mitigating HEC. Sukamar (2000) suggested that many countries had been unable to respond adequately or quickly enough to address these recommendations. Management measures adopted by each range State, where available, are outlined below.

Fernando *et al*. (2008a) review the range of HEC mitigation measures practised in South Asia and recommend that a HEC umbrella strategy should be developed for Asian elephants, HEC mitigation actions should be based at a population scale (such as protected areas or landscapes) rather than at the site or village level, mitigation programmes should be monitored and documentation of mitigation techniques in a single publication would facilitate information sharing.

Protection of forest habitat is viewed as critical in conserving Asian elephants, and a "landscape approach" allowing the species to follow migration routes has been suggested as the most important consideration for their long-term conservation (Sukumar, 2003; Heffernan and Cuong, 2004). Blake & Hedges (2004) suggest that insufficient funds have been spent on the conservation of Asian (forest) elephants even in protected areas, and better information and investment are required to underpin science-based strategic plans for the species. Key elements for management were identified as the wider acceptance of uncertainties surrounding population estimates, new surveys and adoption of standardised methods, improved data sharing and cooperation between agencies to review conservation priorities, and immediate conservation efforts focused on viable populations (Blake & Hedges, 2004).

Viable populations of Asian elephants were estimated to require a minimum of 500 individuals, and those with over 2,000 are expected to be self-sustaining (Santiapillai & Jackson, 1990). Viable populations are thought to require 4,400 km^2 of habitat, assuming a carrying capacity of 0.5 elephants/km^2 (Sukamar, 1989). However, Sukumar (1995) suggested there is a high probability that populations of 100-200 individuals could survive in the short term (100 years), dependent on demography, sex rations and ecological pressures.

South Asian subregion

Bangladesh

Population: The Asian elephant in Bangladesh is now reduced to a small population of 150-250 individuals restricted to inaccessible areas in the south-east of the country, with the exception of some migrant elephants which periodically visit the north-east from India (Choudhury *et al*., 2008). IUCN Bangladesh conducted field surveys in 2001-2003, and found that the population had declined overall compared to surveys in the 1980s-90s (IUCN Bangladesh, 2009).

Conservation status: The population is classified as Critically Endangered by IUCN Bangladesh (Khan and Khan, 2004).

Threats: The IUCN Action Plan of 1990 recognised the main threat to *E. maximus* in the country as habitat loss for agriculture, with occasional HEC as a result of crop-raiding (Santiapillai & Jackson, 1990). Encroachment of human settlements into forest and elephant corridors along the India-Bangladesh corridor has continued to cause habitat fragmentation, and HEC appears to have escalated in some areas (Khan & Khan, 2004; IUCN Bangladesh, 2009).

Management: Two elephant reserves were planned by the Government of Bangladesh, Chittagong Tract and Cox's Bazaar (Sukumar & Santiapillai, 1996), yet these appear not to have been formally designated (World Database on Protected Areas, 2009). A project entitled "Action Research for Conservation of Asian Elephants in Bangladesh" was established in 2001 by IUCN Bangladesh. Recommendations include the maintenance of protected areas and measures to militate conflict such as alternative land-use management and establishment of sustainable extractive reserves (Khan & Khan, 2004).

Bhutan

Population: The existing population in Bhutan is estimated to number 250-500 individuals and is restricted to areas bordering India mainly in protected areas; however seasonal cross-border movements to India have been restricted as a result of habitat deterioration in both countries (Choudhury *et al*., 2008). Elephants were reported to occur in several reserves totalling 1,450 km^2, including the Manas and Namgyal Wangchuk Wildlife Sanctuaries, Phipsoo Reserve Forest, Shumar Wildlife Reserve and Dundsum and Mochu Reserve Forest, however this area was considered sufficient to protect only 150 resident elephants (Santiapillai and Jackson, 1990).

Threats: Habitat loss and human development activities were identified as the main threat to the species in the 1990 Action Plan (Santiapillai and Jackson, 1990). Habitat fragmentation and blockage of migration routes has continued, isolating a small population in Gedu, and destruction of crops and resulting HEC is an emerging problem (WWF, 2008).

Management: A project to determine the population status and magnitude of HEC is underway in Bhutan and in three areas, namely Samtse, Sarpang and Sandrupjongkhar, field and socio-economic surveys have been undertaken (WWF, 2008). The project will assess the extent of HEC in the country in prime elephant habitat and develop management plans for an isolated population in fragmented forest. The IUCN Action Plan recognised the 565 km^2 Manas Wildlife Sanctuary offered the best prospect for long term survival of the elephant in Bhutan, and recommended that the area be extended to incorporate Namgyal Wangchuk Wildlife Reserve (Santiapillai and Jackson, 1990). The Royal Manas National Park currently covers 1022 km^2 (World Database on protected Areas, 2009).

China

Population: Only a remnant population exists in the south of China in the Yunnan region (in the areas of Xishuangbanna, Simao and Lincang), with an estimated population range of 200-250 (Choudhury *et al*., 2008). However Zang *et al*. (2006) suggest a lower population size of only 165-213. There has been difficulty in estimating numbers in Yunnan's tropical forest habitats, compounded by the species migratory habits across national borders to Myanmar and Lao PDR (Santiapillai & Jackson, 1990). There have been few studies on the movement and the use of habitat of the Chinese population (Zhang and Wang, 2003).

Threats: The main threats to elephants in China identified by the IUCN Action Plan were killing for ivory handicrafts and other body parts for use in Traditional East Asian Medicines, deforestation and expansion of agriculture and human settlement, even within reserves (Santiapillai & Jackson, 1990). Habitat loss and poaching appear to have remained the key threats in China; and in some areas elephants have also been responsible for crop and property damage, causing serious HEC (Zhang and Wang, 2003). These threats are also apparent within protected areas, such as the Shangyong protected area within the Xishuangbanna National Nature Reserve (Feng & Zhang, 2005). Poaching has however been reduced due to local government measures to ban hunting and confiscate illegal guns (Zang *et al.*, 2006).

Management: Three protected areas have been established in Yunnan (Xishuangbanna, Simao, and Nangunhe) but it is recognised that conservation cannot be achieved only by protection, and the establishment of corridors to connect isolated areas is considered critically important in maintaining the population in China (Zhang, 2007). The small population of Simao has increased due to local government reforestation efforts (Zang *et al*., 2006). An integrated community development and elephant habitat conservation project is in practice in Simao, which has attempted to reduce conflict and promote tolerance by building trenches to protect farmland, provide salt ponds within forest as well as governmental compensation (Zhang and Wang, 2003). In Xishuangbanna, the local government has implemented measures to reduce HEC such as relocation of settlements and construction of barriers with limited success (Luo, 2007).

India

Population: India has the largest population of the Asian elephant, estimated at 26,390-30,770 individuals, which occurs in four areas; in the north-east, the north-west, central and southern regions (Choudhury *et al*., 2008). The largest populations and major strongholds are in the north-east in West Bengal and Assam, and in the south along the Western and Eastern Ghat mountain ranges. Populations of the south, central and north-west region are fragmented (Choudhury *et al*., 2008). Around 80% of all elephants in NE India occur on the north bank of the Brahmaputra river (3,100 individuals) and the central and western areas of the south bank of the Brahmaputra, with 2900 and 3000 individuals respectively (Choudhury, 1999).

Large stretches of contiguous habitat are available in India, some of which are connected by corridors but others are broken by anthropogenic barriers (Sukumar, 1989). Two areas with large contiguous elephant habitat of around 2,400 km^2 are the sub-regions of Periyar and Agasthyamalai in the southern Western Ghats, which are managed under the Kalakad–Mundanthurai Tiger Reserve (Varma, 2008b). Genetic analysis supports the four distinct units within India; the north/north-eastern region, central region, and two populations in southern India of Nilgiris and Anamalai-Periyar (Vidya *et al.,* 2005).

Conservation status: In India's 1994 Red List assessment, elephants were thought to number 17,000-22,000 individuals, and the species was classified as Vulnerable (Agrawal, 1994).

Threats: Rapid human expansion in India has led to habitat loss through encroachment, agricultural expansion, slash-and-burn shifting cultivation and development projects and the elimination of elephants in many areas (Santiapillai and Jackson, 1990; Choudhury, 1999; Venkataraman *et al.,* 2002). Migration patterns have also been disrupted (Santiapillai and Jackson, 1990). Habitat fragmentation is especially acute in India; the east-central populations are highly fragmented (Sukamar, 2006); a once contiguous population in the north-east has been separated into fourteen discrete populations (Choudhury, 1999), and eight populations in the south are separated from each other (Choudhury *et al*., 2008). Poaching has remained a problem and in southern India sex ratios have been skewed as a result of poaching for tusks of large males, the only sex to have tusks (Ramakrishnan *et al.,* 1998; Sukumar, 2006). Poaching since the 1970's has resulted in a skewed sex ratio of 1 male to 101 females in the Periyar Tiger Reserve in 1994-5 (Sukumar *et al.,* 1998). However, the current situation is that India has reported poaching for meat and ivory virtually eliminated (De-Meulenaer, pers. comm.).

HEC is prevalent in India (Sukumar, 2006). Natural habitat fragmentation has resulted in increased contact and has forced elephants into agricultural areas. A preference for cultivated crop leads to HEC, and *c*.200 people are killed each year by elephants in India (Sukumar, 2006).

Management: Key recommendations of the 1990 IUCN Action Plan were the maintenance of existing protected areas and corridors, extension of boundaries to include migration routes, addition of new protected areas and addressing poaching (Santiapillai & Jackson, 1990). The Indian Government initiated Project Elephant in 1992 to conserve viable elephant populations in designated reserves. Around 30% of the species' range is thought to occur within the protected area system in India, with additional animals in forest reserves (Sukumar, 2000). Ten protected areas occur in Assam, but protection is not considered adequate (Choudhury, 1999). Resolution of HEC is seen as critical in conserving elephants in India, a highly populous nation (Williams *et al*., 2001). Specific measures to mitigate HEC are likely to vary across the range. In the Rajaji National Park, specific measures proposed include reduction of train speeds to reduce elephant mortality and deterrent methods such as fences and flares (Williams *et al*., 2001). The capture of wild elephants for domestic use in India is no longer permitted (Agrawal, 1994).

Incorporation of the provisions of the 'Protected Elephant Movement Corridors' into the Indian Wild Life (Protection) Act was recommended to ensure legal protection of elephant corridors including those which may occur through cultivated land, and protection against new settlement or development (Choudhury, 1999). Translocation of adult males from populations with surpluses to increase genetically effective population sizes is proposed a as management option within some areas, such as the Periyar Tiger Reserve (Ramakrishnan *et al.,* 1998).

Nepal

Population: With an estimated population of only 100-125, elephants in Nepal are virtually restricted to only a few protected areas bordering India including the Royal Chitwan and Royal Bardia National Parks and the Parsa and Royal Suklaphanta Wildlife Reserves in the Terai lowlands (Choudhury *et al*., 2008). In the Bardia National Park in western Nepal, an increasing population of 50 seasonally visiting elephants was estimated (Flagstad, cited in Pradhan *et al*., 2007). A small population confined within Nepal's borders in the Parsa Wildlife Reserve and Bara Forest District was thought to be increasing in 1989, but numbered only a maximum of 21 individuals (Smith & Mishra, 1992). Sukamar & Santiapillai (1996) suggested viable populations could be maintained in the Shukla Phanta Wildlife Reserve and Royal Chitwan National Park.

Conservation status: The threat status of the Asian elephant in Nepal's red data book is Endangered (Biodiversity Profiles Project, 1995).

Threats: The Terai lowlands have been progressively cleared for timber and cultivation (Santiapillai & Jackson, 1990). Crop raiding within Terai settlements has become an increasing problem in areas with a high degree of forest fragmentation (Shrestha, 2007).

Management: The IUCN Action Plan of 1990 recommended expansion of the Royal Chitwan National Park to incorporate national forests to the east, which would result in a large reserve of 2,215 km^2 able to support a viable population (Santiapillai & Jackson, 1990). Protected areas appear to be the primary framework for management in Nepal; the Royal National Parks of Chitwan and Bardia cover an area of 932 km^2 and 968 km^2 respectively, with the Parsa and Royal Suklaphanta reserves covering 499 km^2 and 305 km^2 (Nepalese Department of National Parks & Wildlife Conservation, 2009).

Sri Lanka

Population: The Sri Lankan population is estimated to number 2,500-4,000 individuals with the species restricted to the lowlands in the dry zone (eastern half of the country and in the north) where it is still fairly widespread across most of the island, and a remnant population in the Peak Wilderness area (Choudhury *et al*., 2008). Highest densities were estimated to occur in the Ruhuna National Park (Sukamar & Santiapillai, 1996).

Conservation status: The 2007 IUCN Red List of Threatened species of Sri Lanka classifies the Asian elephant as Threatened (IUCN Sri Lanka and the Ministry of Environment and Natural Resources, 2007).

Threats: The main threat is loss of habitat through expansion of development activities (Choudhury *et al*., 2008). HEC is a particularly acute in Sri Lanka which has a large elephant and human population. Records of the Department of Wildlife Conservation indicate that a wild elephant's death is reported every two

days, mostly as a result of gunshot injury (IUCN Sri Lanka and the Ministry of Environment & Natural Resources, 2007).

Management: A network of protected areas has been established, however these are under pressure from development projects (Sukumar, 2000). The areas covered may be insufficient in size. The range of most elephants of the Yala protected area complex in Southern Sri Lanka includes unprotected areas (Fernando *et al.,* 2008b). Around 70% of elephants' range extends outside of protected areas in the country (Sri Lankan Department of Wildlife Conservation, 2009). Whilst food availability may not be a limiting factor outside protected areas, scattered resources extend elephant ranges, increasing the potential for HEC (Samansiri & Weerakoon, 2007). Workshops focusing on mitigation of HEC on the island have been held (Sri Lankan Department of Wildlife Conservation, 2009).

South-East Asian subregion

Cambodia

Population: The main populations in Cambodia are found in the Mondulkiri and Ratanakiri provinces in the south, but recent unpublished surveys by the Wildlife Conservation Society show encouraging results in the Keo Sema District (Choudhury *et al*., 2008). Elsewhere in Cambodia the species is restricted to small and scatted populations (Duckworth and Hedges, 1998). The countrywide estimate is 250-600 individuals (Choudhury *et al*., 2008).

Threats: The decline of the population size and range in Cambodia is attributed to poaching, habitat destruction and political turbulence, however with some areas depopulated as a consequence of war, growth of secondary vegetation could have feasibly benefitted the species (Santiapillai and Jackson, 1990).

Management: Several protected areas have been established and models of successfully managed reserves exist. The Seima Biodiversity Conservation Area in Mondulkiri is managed by the Forestry Administration using active law enforcement and land-use planning, with local community engagement and education of environmental issues, with reductions in poaching and encroachment (Pollard, 2007). Elephant status, distribution, conservation needs and migration routes are being defined in the Cardamom Mountains. Through a "Biodiversity Conservation Corridors Initiative" supported by the Asian Development Bank, a database of HEC throughout the Cardamoms Biodiversity Corridor has been established, and expected outcomes for 2009 include a rapid response team on HEC and distribution of a tool-kit to teach farmers how to prevent and respond to HEC (Asian Development Bank, 2008).

Indonesia

Population: In the Bornean province of Kalimantan, *E. maximus* has a restricted distribution, occurring only in the Upper Sembakung River catchment in the Tindung district (Choudhury *et al.,* 2008). The IUCN Action Plan notes that population sizes were unknown (Santiapillai & Jackson, 1990).

On the island of Sumatra, the endemic subspecies *E. m. sumatranus* occurs in fragmented and much reduced populations (Choudhury *et al*., 2008). The provinces of Riau, Aceh and Lampung were estimated to hold the largest populations (Tilson *et al.,* 1994). Forty discrete populations were documented in the 1980s, none of which were thought to contain more than 500 individuals, and whilst total population estimates of 2,800-4,800 (Tilson *et al.,* 1994) or 3,000 have been considered (Sukumar, 2006), difficult terrain means it is unknown how many of these populations remain extant (Blake & Hedges, 2004) and country-level population estimates are therefore problematic. Hedges *et al*. (2005) confirmed the disappearance of nine of twelve suspected populations in Lampung in 2002, which were thought to be a consequence of human expansion, land use change and HEC. Of the three extant populations, two occurred within the national parks of Bukit Barisan Selatan and Way Kambas, with populations of 498 in 2001 and 180 in 2002 respectively, and a third was thought to be smaller and probably not viable (Hedges *et al.,* 2005). A total population size for Indonesia was estimated at 2,400-3,400 (Choudhury *et al*., 2008).

Threats: The IUCN Action Plan identified the main threats to the Sumatran subspecies as habitat clearance exacerbated through government transmigration programs and an influx of settlers, and logging

(Santiapillai and Jackson, 1990). Habitat loss in Indonesia has recently accelerated as a result of rapid economic growth and expansion of palm oil and rubber plantation (Sukumar, 2006). Oil palm is vulnerable to raid by elephants (Santiapillai and Jackson, 1990). Habitat in Sumatra is under increasing threat of fragmentation through construction of roads and railways (Sukumar, 2006). Poaching was also identified as a threat in Bukit Barisan Selatan and Way Kambas National Parks (Hedges *et al.,* 2005). Crop raiding and HEC was found to be a growing problem in Way Kambas National Park (Nyhus *et al*., 2000). A Population Habitat and Viability Analysis (PHVA) determined that most elephants in Sumatra occurred in areas of Production Forest, which have the potential to be converted to other land uses, and that HEC on the island was escalating (Tilson *et al.,* 1994).

Management: The proposed 5,000km^2 Ulu Sembakung Nature Reserve in East Kalimantan recommended for full protection by the IUCN Action Plan (Santiapillai & Jackson, 1990) has not been formally designated (Indonesian Ministry of Forestry, 2009). A reserve covering 440,000 ha in the Sebuku-Sembakung region has support of central Government and international donors but may not have received the required provincial endorsement for designation, (Jepson *et al.,* 2002). It is proposed that strategies for conservation in East Kalimantan require review (Jepson *et al.,* 2002).

In Sumatra, whilst 28 protected areas with records of elephant occurrence covering 48,448 km^2 had been designated, much of that range was noted as sub-optimal elephant habitat (Santiapillai & Jackson, 1990). The PHVA considered the protection of suitable areas critical in the viability of Sumatran populations and proposed management measures including continual monitoring of protected areas, and one or two populations >300 individuals secured, (Tilson *et al.,* 1994). The use of trenches modified by cement barriers, grassland buffers and rivers as boundaries to crops was thought reduce the potential for HEC in villages surrounding Way Kambas (Nyhus *et al*., 2000). Guidelines on management practises for mitigating HEC in palm oil plantations in Indonesia and Malaysia have been developed (Fui & Bema, 2005).

Lao People's Democratic Republic

Population: In Lao PDR, elephants are distributed widely in both highlands and lowlands with an estimated 500-1,000 individuals (Choudhury *et al*., 2008). Two viable populations exist, one in the Xaignaboli Province and the other in Nakai Plateau with other smaller populations known to occur across the country (Duckworth & Hedges, 2004; Choudhury *et al*., 2008). An estimate in the Nakai Plateau of 132 individuals (95% CI = 120,149) in 2006 was determined from a DNA-based mark-recapture survey (Wildlife Conservation Society, 2007). Most of the population is restricted to protected areas or forest pockets (Khounboline, 2007). Estimates by villagers in the south of the country indicate that most of the herds are small, and these dispersed populations are not considered viable in the long-term (Khounboline, 2007).

Threats: Conversion of preferred riverine grassland habitats to rice cultivation and forest loss have caused declines (Santiapillai & Jackson, 1990). Current threats are poaching for ivory, habitat loss driven by logging, conversion for agriculture and hydropower projects and infrastructure development, and an emergence of HEC (Wildlife Conservation Society, 2007).

Management: Elephants are protected in the Nakai-Nam Theun National Protected Area which covers 3,532 km^2 (Wildlife Conservation Society, 2007). Management activities to reduce HEC in surrounding villages include the creation of artificial mineral licks to replace the natural licks and providing attractants away from crops (Wildlife Conservation Society, 2007).

Malaysia

Population: Estimates for Malaysia are 2,100-3,100 individuals (Choudhury *et al*., 2008). The species still has an apparently widespread distribution in Peninsular Malaysia, with the largest population likely to occur in the State of Pahang, and with smaller number occurring in States of Perak, Johor, Kelantan, Terengganu, Kedah and Negeri Sembilan (Choudhury *et al*., 2008). In Peninsular Malaysia the population was estimated to number 1,220-1,460 based on surveys in 2000-2002 (Malaysian Department of Wildlife and National Parks, 2005). Surveys in the Taman Negara National Park in 2008 by the Wildlife Conservation Society and the Government of Malaysia revealed the largest population in South East Asia,

estimated at 631 individuals (Oziar, 2009). Taman Negara is relatively large (4,343 km^2) and holds some translocated individuals from other areas (Malaysian Department of Wildlife and National Parks, 2005).

On the island of Borneo, elephants occur in the forested areas of Sabah in the south, centre and east (Ambu *et al.,* 2004). The distribution in 1990 was considered to cover barely 40,000 km^2 with much lower actual distribution (Santiapillai & Jackson, 1990). Recent surveys of the Sabah Wildlife Department suggest that the population minimum is 1,000 individuals with the largest numbers in the Kinabatangan, Lahad Datu and Tawau districts (Ambu *et al.,* 2004). Elephants occur in three protected areas in Sabah; Danum Valley, Lower Kinabatangan Wildlife Sanctuary and the Tabin Wildlife Reserve, half of the population inhabits areas designated as commercial forest reserves which allow timber production (Ambu *et al.,* 2004).

Threats: The main threat in Malaysia is habitat loss, which has recently accelerated as a result of rapid economic growth and expansion of rubber and palm oil plantations (Sukumar, 2006). HEC arises in areas where crop raiding occurs and poaching is a threat to a lesser degree in Peninsular Malaysia (Malaysian Department of Wildlife and National Parks, 2005).

Management: In Sabah, an elephant Conservation Plan completed in 1994 under a UN Development Plan was adopted by the Sabah Wildlife Department (Ambu *et al.,* 2004). Ninety percent of Sabah's elephants occur in 1.3m ha of managed units termed "elephant ranges" of the Lower Kinabatangan, Tabin, Kalumpang/Tawau Hills and regions of Deramakot, Ulu Segama and Kalabakan (Ambu *et al.,* 2004). The Lower Kinabatangan Wildlife Sanctuary and the Kulamba Wildlife Reserve reportedly require further measures including full or strengthened legal status; mitigation of human-animal conflicts; removal of bottlenecks to animal movements; and monitoring and patrolling (Ambu *et al.,* 2004).

For Peninsular Malaysia, the IUCN Action Plan recommended designation of new protected areas and protection by the highest level of governance of existing ones (Santiapillai & Jackson, 1990). The Royal Belum State Park in Perak which covers 1,175 km^2 and contains elephants was designated in 2003 (Malaysian Department of Wildlife and National Parks, 2005). Current policies include translocation of crop-raiding elephants and use of deterrents such as electric fencing. Other measures such as trenches, tractor patrols, or driving individuals off have had varying success (Malaysian Department of Wildlife and National Parks, 2005).

Myanmar

Population: It is estimated that Myanmar contains the second largest population of Asian elephants, with 4,000-5,000 individuals (Choudhury *et al*., 2008). Distribution throughout the country is wide, but in fragmented pockets of the Northern Hill Ranges, the Western Hill Ranges, Pegu Yoma in the central region, Tenasserim Yoma in the south, and in the east, Shan State (Choudhury *et al*., 2008). A number of protected areas and forest reserves harbour elephants. The Alaungdaw Kathapa National Park contains a density of 0.64 elephants km^{-2} (Varma, 2008a). Seven forest reserves of the Rakhine Yoma were found to have variable densities within different regions, from 0.008-0.2 km^{-2} (Varma *et al.,* 2008).

Threats: The main threats are offtake of live elephants for use in the timber industry and poaching for the trade in elephant products (Sukumar & Santiapillai, 1996). Whilst the capture of wild elephants is illegal, it still occurs and appears to be a major current threat (Shepherd, 2002; Shepherd & Hijman, 2008). TRAFFIC reported the illegal export of around 250 live elephants from Myanmar over a ten year period, mainly to Thailand, (Shepherd & Hijman, 2008). Calves and juveniles are now targeting for sale within the tourism industry (Shepherd, 2002).

The current captive population of around 6,000 work elephants is not self-sustaining due to low birth and high death rates, and small groups of elephants are captured in areas of HEC (Leimgruber *et al.,* 2008). It is hypothesized that around 100 wild elephants are required annually to supplement captive stocks which, if sustained, could significantly contribute to national declines or extinction (Leimgruber *et al*., 2008). Illegal trade in ivory and other products is reportedly widespread in markets along international borders (Shepherd & Hijman, 2008). Ivory from government or privately owned stocks can be legally sold, creating a loophole for laundering of illicit ivory (Shepherd & Hijman, 2008).

Management: The Asian elephant Action Plan considered that conservation areas in Myanmar were insufficient in number and extent and recommended implementation of an effective system (Santiapillai & Jackson, 1990). Whilst large tracts of relatively intact forests still occur in Myanmar, they are increasing under pressure and the management of protected areas, which cover >4.5%, is reportedly not effective (Rao *et al*., 2005). Shepherd & Hijman (2008) suggested that police and customs should cooperate internationally to end illegal cross-border ivory trade.

Thailand

Population: A relatively large population of 2,500-3,200 individuals occurs in Thailand, mainly along the border with Myanmar with other smaller, fragmented populations in the southern peninsular, in the Dong Phaya Yen-Khao Yai forest complex in the northeast and in a forest complex to the east comprising four protected areas; the national parks of Khao Khitchakut and Khao Cha Mao, and two wildlife sanctuaries, Khao Ang Runai and Khao Soi Dao (Choudhury *et al*., 2008). The population of *E. maximus* in Kao Yai National Park is one of the largest in Thailand, estimated to number 150 individuals (Lynam *et al.,* 2006; in: Kitamura *et al.,* 2007).

Conservation status: In Thailand's red data list, the Asian elephant is classified as Endangered (Nabhitabhata and Chan-ard, 2005).

Threats: The population has suffered declines as a result of habitat loss and survival was predicted to be tied to the protected area network (Sukamar & Santiapillai, 1996). Forest fragmentation has also occurred in northern Thailand. Whilst elephants occur in the Om Koi Wildlife Sanctuary which has lost minimal forest, they are absent from the Mae Tuen sanctuary contiguous with Om Koi, which lost half its forest cover 1954-1996 through agricultural expansion (Pattanavibool & Dearden, 2002). Poaching activity has been intensive and in the Huai Kha Khaeng Wildlife Sanctuary in Uthai Thani province, western Thailand, elephant densities were lower than expected by comparison to comparable habitat under adequate protection in India (Srikosamatara, 1993).

Management: Populations in Thailand are small and fragmented and Steinmetz *et al*. (2006) advocate site specific conservation approaches through collaboration with local people, who may provide insights into the extent and intensity of threats. In the Thung Yai Thung Yai Naresuan Wildlife Sanctuary, collaborative conservation planning between park staff and local people has been written into the park management plan (Steinmetz *et al*., 2006).

Viet Nam

Population: Only a small population of around 70-150 individuals exists in Viet Nam, which occurs in the central and southern regions in isolated areas in the provinces of Dak Lak, Nghe An, Quang Nam, Dong Nai and Ha Tinh (Choudhury *et al*., 2008). Heffernan & Cuong, (2004) estimated that there were only 59-81 remaining Vietnamese elephants, and with each group consisting of 30 or less individuals, a country-wide extinction was predicted. Cat Tien National Park in the south is thought to be a key area for recovery and survival of elephants (Heffernan & Cuong, 2004), however, genetic diversity of the remaining individuals is low (Vidya *et al.,* 2007). Varma *et al*. (2008) recorded the occurrence of a low viability population of only 11-17 individuals in Cat Tien National Park and its vicinity.

Threats: The main current threats in Viet Nam are HEC, capture for domestication, continuing forest destruction and degradation, poaching for ivory and little conservation awareness at local levels (Heffernan & Cuong, 2004). HEC was not reported to be intense in Cat Tien National Park (Varma *et al.,* 2008).

Management: The establishment of three elephant conservation areas was recommended by an Action Plan for Urgent Conservation Areas in Viet Nam, which has gained approval by the Vietnamese Government (Varma *et al*., 2008). Translocation of other isolated elephants into the Cat Tien National Park was recommended by Vidya *et al*. (2007).

Illegal trade

The Elephant Trade Information System (ETIS) is a comprehensive information system set up under CITES to track illegal trade in ivory and other elephant products (Hunter & Milliken, 2004). It comprises the world's largest collection of elephant product seizure records, with an estimated total of >322 tonnes of ivory seized throughout the world from 1989 onwards (Milliken *et al.,* 2007). The CITES MIKE programme provides information required for elephant range States to make appropriate management and enforcement decisions and to build capacity within range States for the long term management of the species.

Following the down-listing of African elephant populations from Botswana, Namibia, Zimbabwe and South Africa, the Conference of the Parties agreed to allow a conditional, one-off experimental sale of 50 tonnes of raw ivory from Zimbabwe, Botswana and Namibia at its 10th meeting in 1997 (CoP7) in 1997, followed by an agreement at its 12th meeting (CoP12) in 2002 for a second conditional one-off sale of 60 tonnes of raw ivory stockpiles from Botswana, Namibia and South Africa. Whilst opponents to the raw ivory trade allege that these legalised sales stimulate ivory demand and result in a surge of elephant poaching (summarised in Stiles, 2004), there is little evidence to support this claim (Stiles, 2004; Milliken *et al.,* 2007; Burn & Blanc, 2008). ETIS data indicated that the illicit ivory trade is most directly related to tangible market forces and degree of effective law enforcement, and hypotheses that CITES elephant discussions send 'signals' which lead to increased ivory trade could not be validated (Milliken *et al.,* 2007).

The most recent analysis of 12,378 seizure ETIS records, for the period 1989-2006, yielded an average of 630 seizures each year (range 289-1,008), involving an average of 17,883 kg of ivory each year (range 9,668-33,090 kg) (Milliken *et al.,* 2007). Five countries were most heavily implicated in the illicit ivory trade: Cameroon, China, the Democratic Republic of the Congo, Nigeria and Thailand (Milliken *et al.,* 2007).

When adjusted to reduce bias and the trend is smoothed out, the trend in volume of ivory seizures 1989-2006 exhibited a general decline 1989-1995 followed by a progressive increase peaking in 1998, declining again until 2004, before rising in 2005 and 2006 (Annex VII) (Milliken *et al.,* 2007). The increasing trend line in recent years was reported to be a serious cause for concern (Milliken *et al.,* 2007).

Large-scale ivory seizures (>1 tonne), thought to be indicative of greater involvement of organized crime in the illegal ivory trade, were found to have become more frequent and of larger scale over the period 1989-2006 (Milliken *et al.,* 2007). Such large-scale seizures were found to be primarily destined for China, Hong Kong SAR, Macao SAR and Taiwan, Province of China (Milliken *et al.,* 2007).

MIKE baseline data which includes surveys and levels of monthly reporting of illegal killing (as defined by the 54th meeting of the Standing Committee in SC54 Doc. 26.2 (Rev.1) was acquired from 51 sites in Africa and 18 in Asia (CITES Secretariat, 2007). When adjusted for factors influencing carcass counts (patrol effort, area and population size), the proportion of carcasses that were illegally killed in Africa was highest in Central Africa (63%) and East Africa (57%), with 33% and 19% elephants illegally killed in West and Southern Africa respectively (CITES Secretariat, 2007). In Asia, factors influencing carcass counts were found to be patrol effort, area and ivory trade regulations, but further data analysis is in preparation (CITES Secretariat, 2007).

A recent, preliminary analysis of the MIKE data collated on the African continent since 2000 suggest a slight decline in the period 2000-2004 in the proportion of African elephants that were illegally killed, followed by an ongoing increase during 2004-2008 (Burn & Blanc, 2008). The proportion of elephants killed illegally was found to be negatively related to proxy variables for conservation effort, good governance and social welfare, but there was no indication of a relationship between the proportions of elephants killed illegally and CITES ivory sale decisions (Burn & Blanc, 2008). Stiles (2004) also concluded that there was little evidence that the 1999 ivory auctions stimulated ivory demand or elephant poaching, with local market demand related more to wildlife management practices, law enforcement and corruption than the presence/absence of legal international ivory sales.

Annex I

(English only / únicamente en inglés / seulement en anglais)

Legal import/export of tusks of *Loxodonta africana* from Africa 2000-2007 (all sources, all purposes)

Exporter	Reported by	2000	2001	2002	2003	2004	2005	2006	2007	Total
EASTERN REGION										
Ethiopia	Importer									
	Exporter			4						4
Kenya	Importer	11			2					13
	Exporter	16	4					4		24
Tanzania, U.R.	Importer	3	12	38	17	16	12	46	39	183
	Exporter	62	68	82	89	70	107	127		605
Uganda	Importer					2				2
	Exporter									
Subtotal	Importer	14	12	38	19	18	12	46	39	198
	Exporter	78	72	86	89	70	107	131		633
WESTERN REGION										
Côte d'Ivoire	Importer	1	16	5	16	24	37	4	4	107
	Exporter									
Ghana	Importer							2		2
	Exporter									
Nigeria	Importer		1	10	3	8	5	2	5	34
	Exporter									
Senegal	Importer		2							2
	Exporter						6			6
Subtotal	Importer	1	19	15	19	32	42	8	9	145
	Exporter						6			6
CENTRAL REGION										
C. African Rep.	Importer	4	2							6
	Exporter	4	4							8
Cameroon	Importer	40	45	22	22	16	31	30	15	221
	Exporter	124	90	68		66	80	70		498
Chad	Importer				2					2
	Exporter			2						2

Exporter	Reported by	2000	2001	2002	2003	2004	2005	2006	2007	Total
Congo	Importer				6					6
	Exporter									
Congo Dem. Rep.	Importer				2					2
	Exporter									
Eq. Guinea	Importer	5		1						6
	Exporter	2	3	2	1	2				10
Gabon	Importer	8	4	26	8	15	18	3		82
	Exporter	20	33	37	24	25	37		8	184
Subtotal	Importer	57	51	49	40	31	49	33	15	325
	Exporter	150	130	109	25	93	117	70	8	702
SOUTHERN REGION										
Botswana	Importer	108	66	174	58	110	75	121	98	810
	Exporter	278	264	267	252					1061
Malawi	Importer									
	Exporter		10			2				12
Mozambique	Importer				4	12	20	27	30	93
	Exporter	3		14	13	44	58	58	93	283
Namibia	Importer	45	22	35	44	38	51	21	26	282
	Exporter	86	68	16	89	90	36	66		451
South Africa	Importer	25	28	86	25	11	14	14	9	212
	Exporter	77	97	92	67	97	96	82	120	728
Zambia	Importer		2		2			9	14	27
	Exporter							2	28	30
Zimbabwe	Importer	137	154	208	133	164	167	162	111	1236
	Exporter	448	541	335	439	323	483	539	295	3403
Subtotal	Importer	315	272	503	266	335	327	354	288	2660
	Exporter	892	980	724	860	556	673	747	536	5968
Grand Total	Importer	387	354	605	344	416	430	441	351	3313
	Exporter	1120	1182	919	974	719	903	948	544	7309

Annex II

(English only / únicamente en inglés / seulement en anglais)

Export quotas for tusks as sport hunted trophies 2000-2009 established in compliance with Resolution Conf. 10.10 (Rev. CoP14) on *Trade in elephant specimens*. The number of elephants included in the quotas is half (two tusks per elephant)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
CENTRAL										
Cameroon	160	160	160	160	160	160	160	160	160	160
Gabon	~	150	150	150	150	150	150	100	100	~
EASTERN REGION										
Tanzania, United Rep. of	100	100	100	200	200	200	200	400	400	400
SOUTHERN										
Botswana	360	360	420	420	420	420	540	600	660	800
Mozambique	20	20	20	20	80	80	80	80	80	120
Namibia	150	150	150	150	150	180	180	180	180	180
South Africa	86	86	120	120	120	200	200	200	200	300
Zambia	~	~	~	~	40	40	40	40	40	40
Zimbabwe	800	800	800	~	1000	1000	1000	1000	1000	1000

Annex III

(English only / únicamente en inglés / seulement en anglais)

African elephant continental and regional totals
(Source: Blanc *et al.,* 2007)

	Elephant Numbers						
REGION	Definite	Probable	Possible	Speculative	**Range Area (km^2)**	**% of Continental Range**	**% of Range Assessed**
Central Africa	10,383	48,936	43,098	34,129	975,079	29	52
Eastern Africa	137,485	29,043	35,124	3,543	880,063	26	45
Southern Africa	297,718	23,186	24,734	9,753	1,305,140	39	53
West Africa	7,487	735	1,129	2,939	175,545	5	66
TOTAL	**472,269**	**82,704**	**84,334**	**50,364**	**3,335,827**	**100**	**51**

African elephant population estimate data is categorised by level of certainty; definite, probable, possible and speculative. Categories are mutually exclusive and are determined according to the survey type and degree of survey reliability, which declines from 'definite' to 'speculative' (see Blanc *et al.,* 2007 for full explanation).

Annex IV

(English only / únicamente en inglés / seulement en anglais)

African elephant population by country

Source: Blanc *et al.*, 2007 www.african-elephant.org/aed/aesr2007.html

Region	Elephant Numbers				Range Area (km^2)	% of Regional Range	% of Range Assessed
	Definite	Probable	Possible	Speculative			
CENTRAL AFRICA							
Cameroon	179	726	4,965	9,517	118,571	12	45
Central African Republic	109	1,689	1,036	500	73,453	8	95
Chad	3,885	0	2,000	550	1,149,443	15	26
Congo	402	16,947	4,024	729	135,918	14	23
Democratic Republic of Congo	2,447	7,995	8,855	4,457	263,700	27	40
Equatorial Guinea	0	0	700	630	15,008	2	13
Gabon	1,523	23,457	27,911	17,746	218,985	22	94
SUBTOTAL	**10,383**	**48,936**	**43,098**	**34,129**	**975,079**	**29**	**52**
EASTERN AFRICA							
Eritrea	96	0	8	0	5,293	1	100
Ethiopia	634	0	920	206	38,365	4	68
Kenya	23,353	1,316	4,946	2,021	107,113	12	82
Rwanda	34	0	37	46	1,014	0	100
Somalia	0	0	0	70	4,526	1	68
Sudan*	20	0	280	0	318,239	36	0
Tanzania	108,816	27,937	29,350	900	390,366	44	66
Uganda	2,337	1,985	1,937	300	15,418	2	74
SUBTOTAL	**137,485**	**29,403**	**35,124**	**3,543**	**880,063**	**26**	**45**
SOUTHERN AFRICA							
Angola	818	801	851	60	406,946	31	5
Botswana	133,829	20,829	20,829	0	100,265	8	99
Malawi	185	323	632	1,587	7,538	1	89
Mozambique	14,079	2,396	2,633	6,980	334,786	26	77
Namibia	12,531	3,276	3,296	0	146,921	11	55
South Africa	17,847	0	638	22	30,455	2	100
Swaziland	31	0	0	0	50	0	100
Zambia	16,562	5,948	5,908	813	201,247	15	61
Zimbabwe	84,416	7,033	7,367	291	76,931	6	99
SUBTOTAL	**297,718**	**23,186**	**24,734**	**9,753**	**1,305,140**	**39**	**53**
WEST AFRICA							
Benin	1,223	0	0	0	13,673	8	51
Burkina Faso	4,154	320	520	0	19,872	11	72
Côte d'Ivoire	188	152	119	506	33,985	19	72
Ghana	789	387	241	12	23,301	13	42
Guinea	135	79	79	57	1,524	1	78
Guinea Bissau	0	0	7	13	1,346	1	100
Liberia	0	0	0	1,676	15,977	9	60
Mali	357	0	141	156	31,878	18	100
Niger	85	0	17	0	2,683	2	100
Nigeria	348	0	105	375	22,968	13	37

Region	Elephant Numbers				Range Area (km^2)	% of Regional Range	% of Range Assessed
	Definite	Probable	Possible	Speculative			
Senegal	1	0	0	9	1,090	1	100
Sierra Leone	0	0	80	135	1,804	1	59
Togo	4	0	61	0	5,444	3	69
SUBTOTAL	**7,487**	**735**	**1,129**	**2,939**	**175,545**	**5**	**66**
TOTAL	**453,073**	**102,260**	**104,085**	**50,364**	**3,335,827**		**51**

*Sudan: please note that this figure does not include recent survey data published by Fay *et al.* 2007 of an estimated minimum of 6,850 in Southern Sudan, although possibly double that number of elephants may exist.

Annex V
(English only / únicamente en inglés / seulement en anglais)

Legal import/export of wild-sourced live *Elephas maximus* in trade 2000-2007

Exporter	Purpose	Reported by	2000	2001	2002	2003	2004	2005	2006	2007	Total
Lao P.D.R.	**Z**	Importer	2							10	12
		Exporter									
Malaysia	**Q**	Importer			1						1
		Exporter			1						1
	Z	Importer	22	4		9	1				36
		Exporter	12	4			2				6
	-	Importer									
		Exporter						2			2
Myanmar	**Q**	Importer		5							5
		Exporter									
Pakistan	**Q**	Importer									
		Exporter		2							2
Subtotals		Importer	24	9	1	9	1			10	54
		Exporter	12	6	1		2	2			23

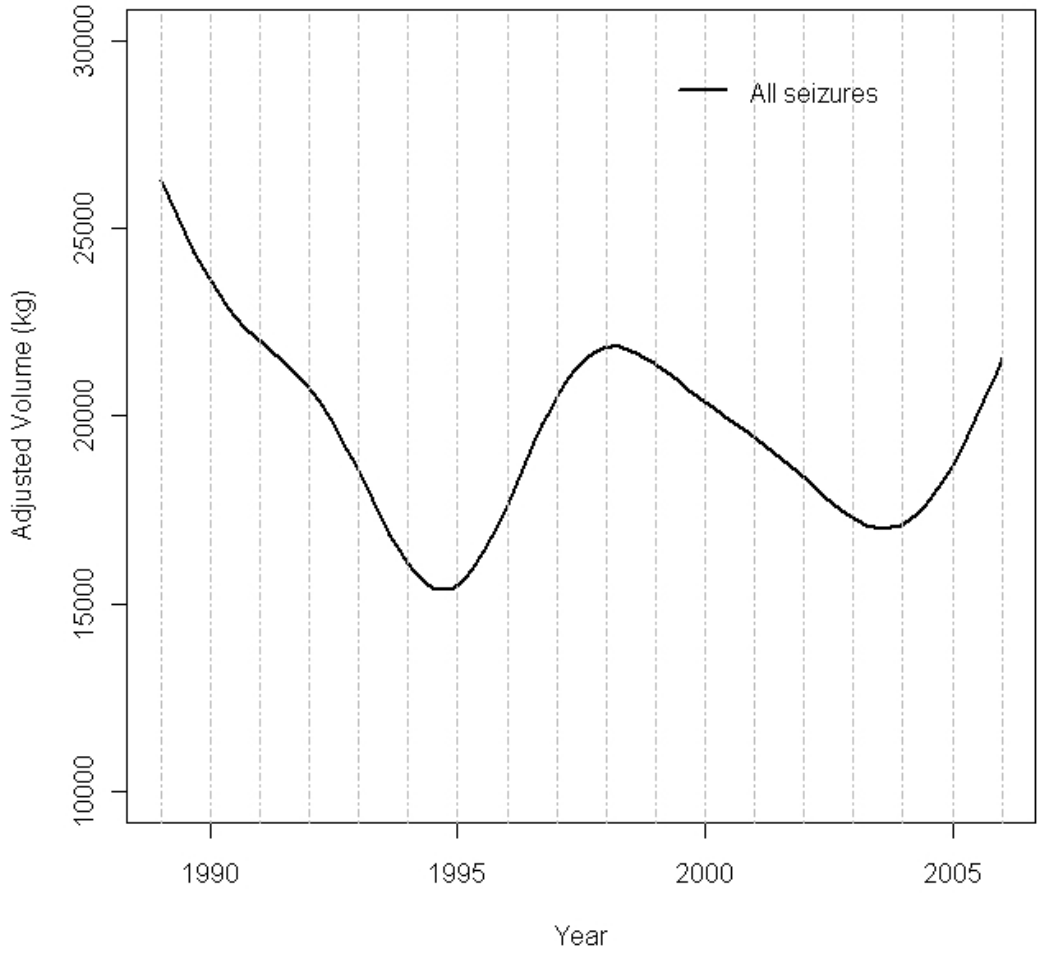
Asian elephant population and range by country
(Sources: Choudhury, 2008; Sukumar, 2003)

Range State	Population estimate (Choudhury, 2008)	Area of elephant range (km^2) (Sukumar, 2003)
India	26,390-30,770	110,000
Myanmar	4,000-5,000	115,000
Sri Lanka	2,500-4,000	>15,000
Indonesia	2,400-3,400	105,000
Thailand	2,500-3,200	25,500
Malaysia	2,100-3,100	45,000
Loa LDR	500-1,000	>20,000
Cambodia	250-600	>40,000
Bhutan	250-500	1,500
China	200-250	2,500
Bangladesh	150-250	1,800
Viet Nam	70-150	>3,000
Nepal	100-125	>2,500

Annex VII

(English only / únicamente en inglés / seulement en anglais)

The adjusted, smoothed trend in volume of ivory seized 1989-2006, based on 13,061 ETIS elephant product seizure records, as of 15 May 2008. Source: Milliken 2008, unpublished, updated from Milliken *et al.,* 2007.



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