CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

_____

Sixteenth meeting of the Conference of the Parties
Bangkok (Thailand), 3-14 March 2013

Interpretation and implementation of the Convention

Species trade and conservation

Elephants

MONITORING THE ILLEGAL KILLING OF ELEPHANTS – ADDENDUM

1. This document has been prepared by the Secretariat.

2. This addendum presents an update on trends in the illegal killing of elephants based on data received since the submission of document CoP16 Doc. 53.1 in early October 2012, and estimates of the numbers of elephants illegally killed at reporting MIKE sites in Africa using recent population estimates from the IUCN African Elephant Specialist Group.

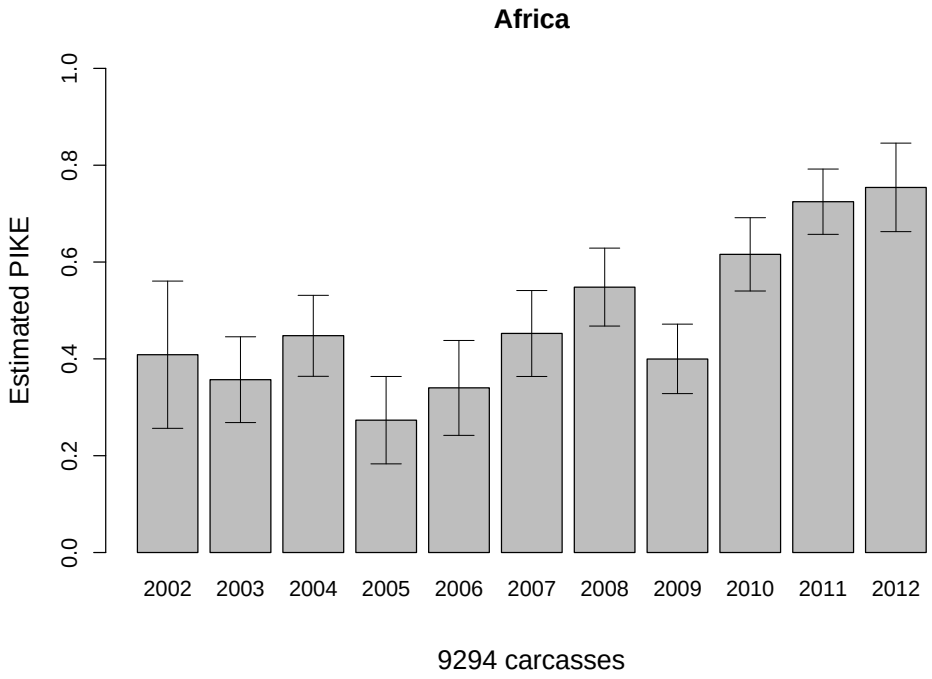
3. Carcass data for the first six months of 2012 were requested from elephant range States participating in the MIKE programme, and a total of 678 carcass records corresponding to that period were received from Parties (670 from Africa and eight from Asia). In addition, and in compliance with recommendations from the Standing Committee made at its sixty-second meeting (Geneva, July 2012), countries participating in the MIKE programme were requested to submit any outstanding carcass records from previous years. A total of 49 outstanding records were received from Africa and 1,389 from Asia.

4. With the inclusion of the new data, the total number of elephant carcass records available to the MIKE programme for the period 2002-2012 amounts to 10,940, an increase of 4,374 records over the number included in the analysis submitted to in 2010 to the 15th meeting of the Conference of the Parties [see document CoP16 Doc. 44.2 (Rev. 1)]. These 10,940 records correspond to carcasses found over the period 2002-June 2012 at 51 MIKE sites in Africa and 25 sites in Asia in 38 elephant range States (27 in Africa and 11 in Asia). It is important to emphasize that the estimates for 2012 are only provisional, as they only cover the first six months of the year. Data from the second half of 2012 are needed in order to obtain final PIKE estimates for the entire year.

Africa

5. Figure A1 shows the updated trend in PIKE at African MIKE sites. The PIKE value for the first half of 2012 (0.754) appears to show a slight increase over the value recorded in 2011, but the difference is not statistically significant. It can only be concluded, therefore, that PIKE levels in the first half of 2012 remained at similar levels to those recorded in 2011.

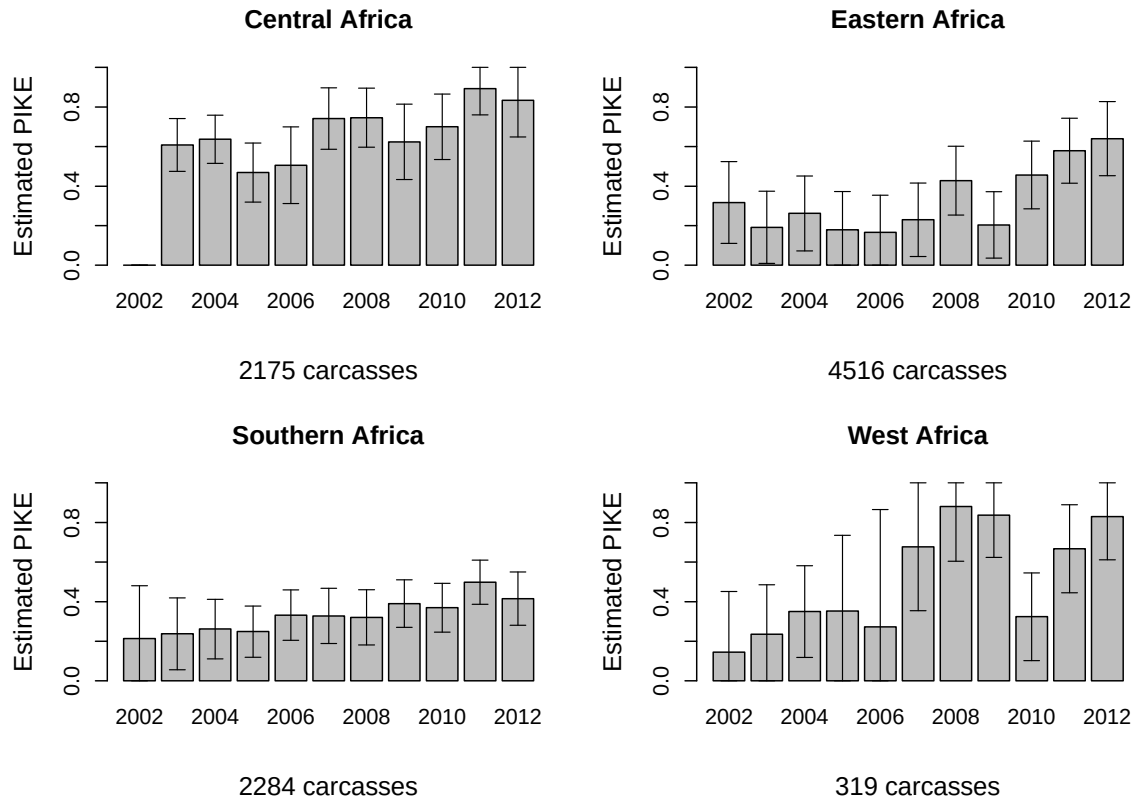
Figure A1. *PIKE trends in Africa with 95 % confidence intervals. The estimate for 2012 is based on six months of data. The number of carcasses on which the chart is based is shown at the bottom of the figure.*



6. At the subregional level (Figure A2), PIKE values appear to have slightly increased in the first half of 2012 over 2011 levels in Eastern and West Africa, and to have slightly decreased in Central and Southern Africa. Nevertheless, none of these differences are statistically significant, and PIKE remained at comparable levels to 2011 in all subregions.

7. While the number of records for West Africa remains low, and confidence intervals, as shown by the error bars in Figure A2, are rather wide compared to other subregions, an upward trend in that subregion is becoming increasingly apparent.

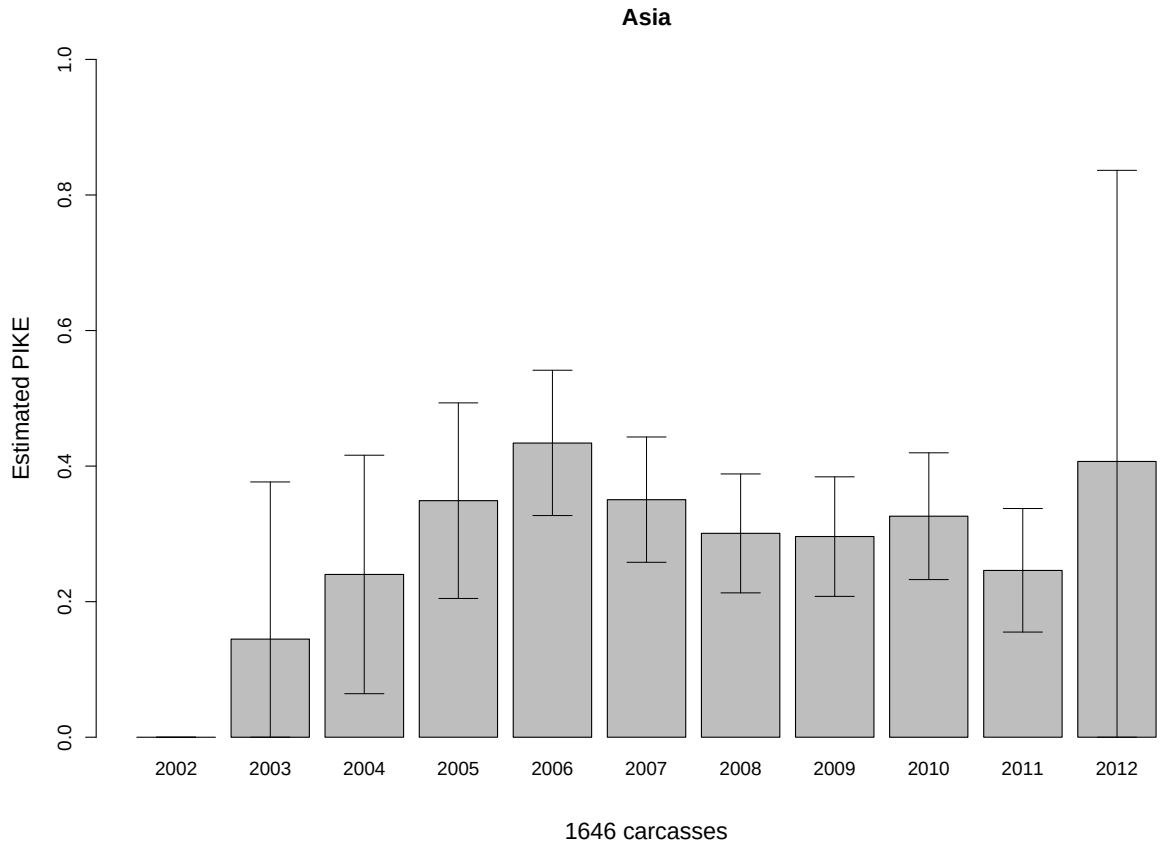
Figure A2. Subregional *PIKE trends in Africa with 95 % confidence intervals. The estimate for 2012 is based on six months of data. The numbers of carcasses on which the charts are based are shown at the bottom of each chart.*



Asia

8. With a total of 1,646 carcass records for Asian sites in the MIKE database, it is now possible—for the first time—to derive a more reliable trend. As can be seen from Figure A3, that trend is considerably different to the African one, with seemingly increasing levels of illegal killing of elephants between 2003 and 2006, followed by stable or declining levels up to 2011. However, the width of the error bars in the years from 2003 to 2005 is indicative of the small number of carcasses found and reported in those years, and no trend can be inferred for that period. The confidence intervals are narrower from 2006 to 2011, and the stable or declining PIKE levels in that period can be inferred with more confidence. As suggested by the width of the error bar for 2012, the PIKE value for the first half of that year is based on only a small number of carcass records (eight) and should therefore not be used to infer any change from 2011. It should also be noted that over 90% of the Asian carcasses were reported by India, which harbours about half of the Asian elephant population. As a result, the trend is more reflective of trends in India than in Asian range States as a whole. There remain insufficient of records from Southeast Asia to derive meaningful trends in illegal killing of elephants for that subregion.

Figure A3. *PIKE trends in Asia with 95 % confidence intervals. The estimate for 2012 is based on six months of data. The number of carcasses on which the chart is based is shown at the bottom of the figure.*



Estimation of the scale of illegal killing of elephants in Africa in 2011

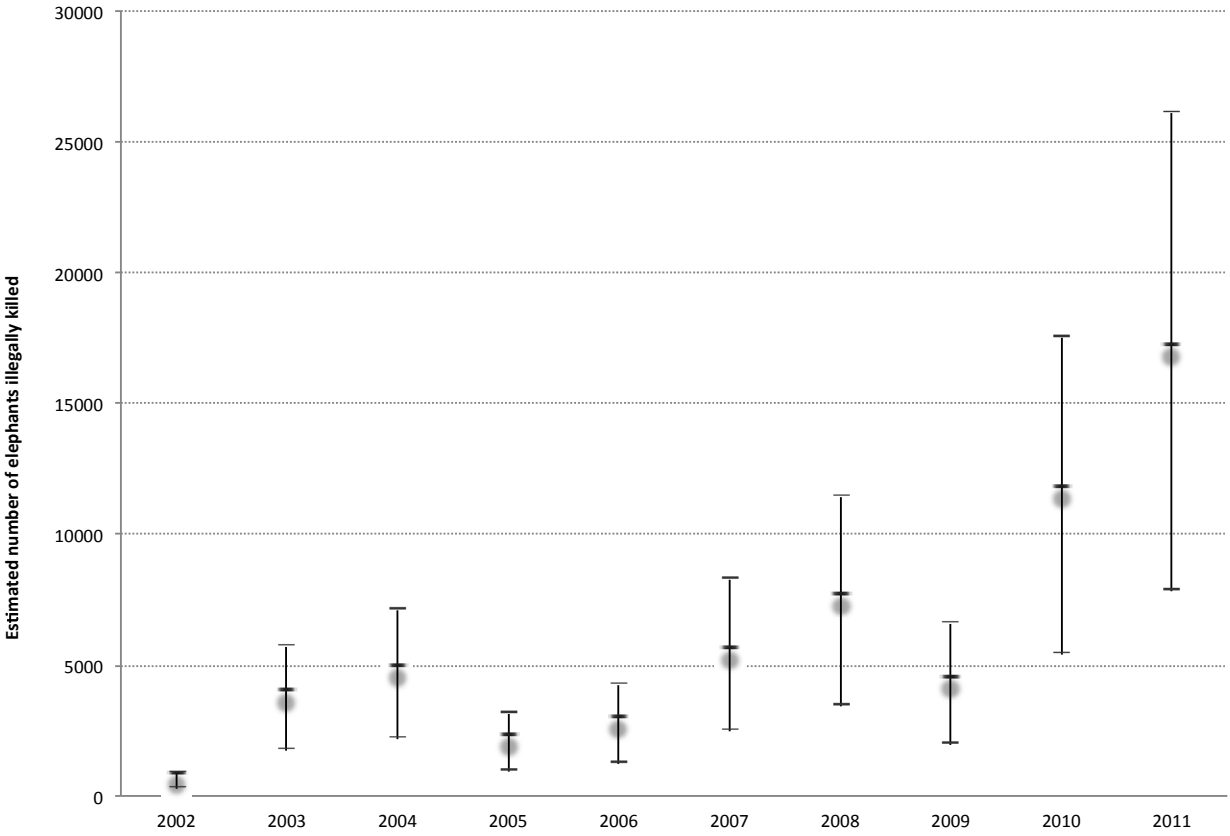
9. The population data used to estimate the percentage of the total population killed in MIKE sites, as reported in document COP16 Doc. 53.1, have been updated recent data from IUCN's African and Asian Elephant Database. These updated population figures have been used to calculate absolute numbers of elephants killed illegally at reporting MIKE sites in Africa.

10. It is worth emphasizing that the method used to estimate the number of elephant killed, as described in SC62 Inf. 1, depends on parameters that are subject to considerable uncertainty, such as natural mortality rates and population size. It further assumes that the PIKE estimate for each and every site is an accurate indicator of actual levels of poaching. While this is likely to be the case in well-patrolled sites where large numbers of elephant carcasses are found every year, the same may not be true in sites with poor patrolling and small elephant populations. For these reasons, some caution is needed when interpreting the results presented below.

11. The range of natural mortality rates used in the analysis are associated with particularly high levels of uncertainty, and are the reason why the minimum and maximum estimates presented below differ by a factor of nearly four. Actual natural mortality rates are likely to be on the lower side of the ranges used, particularly in non-drought years (Wittemyer, pers. comm.). Thus the estimates below are likely to overestimate the numbers of elephants killed illegally. However, the demographic and social consequences of poaching are likely to affect natural mortality rates in ways that cannot be predicted at present.

12. Figure A4 illustrates the trend in estimated numbers of elephants killed illegally at reporting MIKE sites across Africa between 2002 and 2011 (see map in Figure A5), with estimated minimum and maximum bounds. The estimate for 2011 is nearly 17,000, with a range of 7,800 to 26,000. Estimates for 2012 could not be calculated, as a number of covariates needed to model PIKE values (see document SC62 Inf. 1) for 2012 were not available at the time of writing. If the provisional PIKE levels for the first half of 2012 hold for the entire year, it can be expected that similar numbers of elephants will have been killed in 2012.

Figure A4. Trend in the estimated number of elephants killed illegally at reporting MIKE sites in Africa, with estimated minimum and maximum bounds. While the range between minimum and maximum estimates increases as the point estimate increases, the extent of this variability in relation to the estimate remains approximately constant in time.



13. The estimate of 17,000 elephants killed at 44 reporting MIKE sites in 2011 represents 7.4% of the total estimated population of 230,000 at those MIKE sites. Healthy elephant populations usually grow at rates that range between 4% and 5%, with a theoretical maximum of 7%[1]. Thus the estimated level of illegal off-take in 2011 is not sustainable, and will likely lead to significant population declines in many African MIKE sites, particularly if current poaching levels continue over a number of years.

14. As the above estimate elephants killed illegally refers only MIKE sites, the number killed across Africa must be higher than 17,000. However, it would only be possible to derive continental estimates using these methods if PIKE data were available across the entire range of the species. It is important to note, however, that the estimated elephant population at those 44 MIKE sites represents more than 40% of the continental 'definite' plus 'probable' elephant population estimates in the IUCN African Elephant Status Report in 2007. Furthermore, a large proportion of the remaining 60% are found in places where poaching levels are likely to be comparatively low, such as Northern Botswana, where more than 100,000 elephants are estimated in addition to the approximately 30,000 found in the Chobe MIKE site. It would therefore be inappropriate to infer that the estimate of 17,000 illegally killed elephants at MIKE sites in 2011 represents some 40% of the total number of elephants killed in Africa in 2011.

15. No estimates of numbers killed have been produced for Asia, as the quality of information available on the status of elephant populations in that continent is limited, with very few exceptions.

16. As noted in previous MIKE reports, the properties of the PIKE index need to be better understood before firmer inferences can be made from it. In this regard, the CITES MIKE programme has commissioned a number of studies to investigate the reliability of PIKE-based inferences. The results of one these studies, which examined the on-site reliability of PIKE, have been submitted for publication in the peer-reviewed

[1] *Hanks, J. & McIntosh, J.E.A., 1973. Population dynamics of the African elephant (Loxodonta africana). J. Zoology, London, 169(1), pp. 29–38.*

scientific literature. A second manuscript, which looks for potential biases associated with the spatial distribution of carcasses, is in preparation.

Figure A5. Map of African MIKE sites showing those that reported carcasses in 2011 (dark grey) and those that did not (white).