CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA
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Fifteenth meeting of the Conference of the Parties
Doha (Qatar), 13-25 March 2010

<u>Interpretation and implementation of the Convention</u>

<u>Species trade and conservation issues</u>

<u>Elephants</u>

MONITORING OF ILLEGAL HUNTING IN ELEPHANT RANGE STATES

1. This document has been prepared by the Secretariat.

<u>Background</u>

2. The programme known as Monitoring the Illegal Killing of Elephants (MIKE) has been established under the supervision of the Standing Committee and in accordance with the provisions in Resolution Conf. 10.10 (Rev. CoP14) (*Trade in elephant specimens*). It prescribes that "the CITES Secretariat will provide an updated report on information collected, as part of this monitoring programme, at each meeting of the Conference of the Parties".

3. The Secretariat has provided progress reports at the 11th, 12th, 13th and 14th meetings of the Conference of the Parties (Gigiri, 2000; Santiago, 2002; Bangkok, 2004, The Hague, 2007 respectively). This is the first report to the Conference of the Parties that provides an analysis of data collected under the MIKE programme since the adoption of the baseline information in 2007.

4. The Secretariat has furthermore regularly presented information on the establishment, continuation and expansion of MIKE to the Standing Committee and its MIKE-ETIS Subgroup since 1999, with the Subgroup also reporting to the Standing Committee. Other documents relating to the MIKE programme are available on the CITES website.

5. MIKE data collection started in southern Africa in 2000, in central, eastern and west Africa in 2002 and in Asia in 2004. The present report is based on the most up-to-date information available to and collected by the MIKE programme. It summarizes the results of an analysis of the MIKE data collected in Africa and Asia until now, and of a detailed examination of the illegal killing of elephants in one MIKE site, Laikipia-Samburu in Kenya. The full technical papers on both analyses were circulated to the Technical Advisory Group (TAG) for comments and input prior to their finalization. Additionally, this report provides a summary of information on the implementation of MIKE by the Secretariat and by participating elephant range States, the latter based on the results of a questionnaire survey at the site and country levels.

6. In compliance with a request from the Standing Committee at its 58th meeting (SC58, Geneva, July 2009) to provide the Conference of the Parties with as up-to-date and complete information as possible (see document SC58 Com. 3), elephant carcass data continued to be collected in the course of 2009 and an updated trend analysis, undertaken in February 2010 for communication to the Conference of the Parties at the present meeting, is presented in this revision of document CoP15 Doc. 44.2.

MIKE data analysis: trends and factors influencing levels of illegal killing of elephants

MIKE data analyses of 2007 and 2008

7. A preliminary analysis of MIKE baseline information, collected between 2000 and 2007 in 51 MIKE sites in Africa and 20 in Asia, was approved by the Standing Committee at its 55th meeting [see document SC55 Doc. 10.2 (Rev. 1)]. Findings from the preliminary baseline analysis include the following:

    –   The MIKE baseline analysis examined 29 factors that could potentially influence levels of illegal killing, and identified five factors that strongly correlated with levels of illegal killing in Africa. These included ecosystem type (forests experiencing higher levels of illegal killing than savannah), actual levels of protection, ease of human access (e.g. through logging and mining roads), and the Corruption Perceptions Index (CPI) produced annually by Transparency International. The analysis further suggested that levels of illegal killing, statistically adjusted for effort and influencing factors, were highest in central Africa (where 63 % of carcasses were found to be illegally killed), followed by eastern (57 %), west (33 %) and southern Africa (19 %).

    –   Levels of illegal killing in Asia were found to be extremely low (lower than in any of the African subregions) and largely motivated by human-elephant conflicts. Out of the 29 examined factors, only the Corruption Perceptions Index was significantly related with levels of illegal killing.

    It was furthermore established that, based on information from the IUCN/SSC African and Asian elephant specialist groups, the MIKE programme monitored in its African sites between 35 and 43 % of the total estimated number of African elephants (African MIKE sites covering some 16 % of the range of African elephants) and in its Asian sites between 27 and 35 % of the estimated Asian elephant population.

8. In 2008, the MIKE Central Coordination Unit undertook a further analysis of MIKE data using information on 2,316 elephant carcasses from 47 African MIKE sites collected between 2000 and 2008 to establish trends in the level of illegal killing of African elephants, and identified some of the most important factors influencing this trend at the continental level. The results were presented to African elephant range States at the first African elephant meeting (Mombasa, June 2008), the MIKE Technical Advisory Group at its seventh meeting (TAG7, Nairobi, January 2009), and the MIKE-ETIS Subgroup of the Standing Committee. The analysis suggested the following:

    –   The successful conservation of elephants rested largely on the authorities responsible for elephant management at the national level, but that other factors at the national level could also have an influence.

    –   There were significant negative relationships between poaching levels and: (a) the level of effort devoted by range States to monitor their elephant populations (a proxy for conservation effort); (b) the Corruption Perceptions Index (a proxy for good governance); and (c) the Human Development Index of the United Nations Development Programme (UNDP) (a proxy for social and economic welfare).

    –   The analysis further suggested an ongoing increase in the rate of illegal killing of elephants in Africa, but no relationship was apparent between trends in rates of illegal killing and CITES decisions regarding elephants.

MIKE data analysis of 2010

9. The current document summarizes the findings of a more refined and updated analysis of carcass data than those mentioned above. In addition to information on global trends in the level of illegal killing of elephants since 2002, the analysis investigates a number of site- and country-level variables that are significantly associated with levels of illegal killing at MIKE sites. The full technical report, including explanations on the analytical and statistical methodology and references, is available as an information document at the present meeting and will be submitted for publication in peer-reviewed scientific literature.

Data sets and analytical approach

10. The data analysed consist of 6,566 carcasses of elephants that died between 2002 and 2009, recorded in 66 MIKE sites in Africa and Asia. The year of death was assigned to each and every carcass using standard carcass ageing criteria endorsed by the MIKE TAG. Carcass data for 2000-2001 were excluded because they were only available for six sites. Carcass data were aggregated by site and by year to derive an annual measure of illegal killing, calculated as the Proportion of Illegally Killed Elephants (PIKE). Because PIKE is the ratio of illegally killed elephants to all carcasses encountered, it is not strictly an estimate of the scale of poaching, but a relative indicator of poaching rates, which is assumed to be a reasonable proxy for the purpose of making comparisons. The fact that PIKE is a ratio relative to the total number of carcasses encountered also means that site-year combinations where no elephant carcasses were reported had to be excluded from the analysis. The table in the Annex to this document shows the data used in the analysis. Countries for which no carcass data were available and for which PIKE could thus not be calculated are Bhutan, Equatorial Guinea, Sri Lanka and Togo. The relationship between PIKE and a number of covariates (described below) was investigated through the use of hierarchical binomial logistic models fitted in a Bayesian framework. Such statistical models permit the estimation of "predicted" levels of PIKE, that is, the values of PIKE after adjusting for all the covariates included in the model, while allowing for the fact that some covariates exert their influence at the site level whereas others act at the national level.

Covariates ('influencing factors')

11. Covariates were used to determine the factors associated with levels of illegal killing. In addition, the inclusion of covariate data in the analysis allows for the removal of biases and confounding factors inherent in the data, thus resulting in more unbiased time trends. The baseline analysis employed a number of categorical factors as covariates. For the present analysis, more refined and quantitative measures of the significant influencing factors were identified than those used for the analyses of 2007 and 2008, both at the country and site levels. The covariates explored for the present analysis, with their source and the level at which they apply, are listed in the table below.

Table 2   Covariates explored in the MIKE analysis

Name	Description	Source	Level
cpi	Corruption Perceptions Index	Transparency International	Country
ps	Political Stability and absence of violence	World Bank	Country
ge	Government effectiveness	World Bank	Country
rq	Regulatory quality	World Bank	Country
rl	Rule of law	World Bank	Country
cc	Control of corruption	World Bank	Country
va	Voice and accountability	World Bank	Country
popgrth	Annual population growth rate	UN Statistics Division (UNSD)	Country
oda	Overseas development aid received per capita	UNSD	Country
gdp	Gross domestic product per capita	UNDP/UNSD	Country
edu	Educational attainment	UNDP/UNSD	Country
lifexp	Human life expectancy	UNDP/UNSD	Country
hdi	Human Development Index	UNDP	Country
est	Estimated elephant population size	AED/ elephant surveys	Site
dens	Estimated elephant density	Derived	Site
pf1	Probable fraction	AED/ elephant surveys	Site
npp	Net primary production	Imhoff et al 2004 - CIESIN	Site
people	Human population	ORNL 2006	Site
ftprint	Human footprint	WCS & CIESIN 2002	Site

12. The MIKE baseline analysis found Transparency International's Corruption Perception's Index to be strongly associated with levels of illegal killing of elephants. To investigate whether PIKE is specifically related to corruption, or whether it is in fact associated with a different aspect of governance, the World Bank's World Governance Indicators (WGI) were used in addition to the CPI. The World Governance Indicators measure six different aspects of governance, namely government

effectiveness (*ge*), voice and accountability (*va*), political stability and absence of violence (*ps*), regulatory quality (*rq*), rule of law (*rl*) and control of corruption (*cc*). The Human Development Index (HDI) of the United Nations Development Programme (UNDP) along with its component measures on life expectancy, educational attainment and gross domestic product (GDP), were also explored in this analysis. Other development-related country-level variables explored are the annual population growth rate and the amount of overseas development aid received *per capita*. Finally, a measure of the scale and regulation of domestic ivory markets was included in the form of the 'mean market score', calculated by the Elephant Trade Information System (ETIS) (see document CoP14 Doc. 53.2). In order to keep the analysis simple, and as year-to-year variation in most of these indices appears to be fairly modest over the range of years under consideration, the 2007 values for the above variables were used in the analysis.

13. Site-level variables that were explored were those accounting for the size of the site (*area*) and its estimated elephant population (*est*), obtained from the IUCN African Elephant Database and directly from range State governments and MIKE surveys. The *net primary production (npp)* at the site, namely the net amount of solar energy converted to plant organic matter through photosynthesis, measured in units of elemental carbon, was used as a quantitative proxy measure of ecosystem type, with higher values of *npp* denoting higher vegetation cover. The Human Footprint dataset of the Wildlife Conservation Society (WCS) and the Center for International Earth Science Information Network (CIESIN) (2005)[1] was used as a refinement of the "human access" and "land use type" covariates of the Baseline analysis. It is an index of human population pressure, including population density and population settlements, human land use and infrastructure (built-up areas, night-time lights, land use/land cover), and human access (coastlines, roads, railroads, navigable rivers). Human population size data (*people*) was obtained from the Landscan dataset (ORNL 2006)[2]. And finally, the "*probable fraction*" (*pf1*), a measure of the quality and precision of elephant population surveys (Blanc *et al* 2007)[3], was used as a proxy for conservation effort. The quality of elephant population estimates depends on factors such as budgets, the capacity, motivation and experience of survey teams, the appropriateness of the chosen survey method and, more generally, the amount of effort devoted by countries to know and conserve their elephant populations.

Factors associated with the illegal hunting of elephants

14. All country-level covariates investigated, except for the *Annual population growth rate* and the *Index of domestic ivory markets,* were significantly related to PIKE in their own right, but the variables *government effectiveness* and the *human development index* were found to be overwhelmingly influential: after including either of them in the model, all other country-level variables, including the CPI, became insignificant. Countries with low *government effectiveness* or low *human development index* scores tend to be associated with higher levels of elephant poaching, and poaching rates decline as government effectiveness and the *human development index* increase [Figure 1(c) and (d)]. This confirms the finding from previous MIKE analyses that governance and social welfare are exceptionally important predictors of poaching rates. It further suggests, however, that it may not be corruption per se that determines poaching rates, but rather the efficacy with which governments formulate and implement conservation policies.

15. At the site level, the most important explanatory variable was *net primary production*, with poaching being more intense where vegetation cover is greater [Figure 1(a)]. This may be due to the decreased probability of detection by law enforcement patrols in dense vegetation. Overall, the effect of human population size seems to be small, but its interaction with site *area* is important. At sites with low human population densities, poaching rates tend to be lower in larger sites [Figure 1(b)]. On the other hand, there is no evidence of an *area* effect at sites with high human population density. This may indicate that in areas of low human population density, the additional logistical

[1]   Wildlife Conservation Society (WCS) and Center for International Earth Science Information Network (CIESIN). (2005). *Last of the Wild Project,* Version 2, 2005 (LWP-2): Global Human Footprint Dataset (HF). http://sedac.ciesin.columbia.edu/wildareas/.

[2]   Oak Ridge National Laboratory (2006). *Landscan Global Population Database.* URL http://www.ornl.gov/landscan.

[3]   Blanc, J.J., RFW Barnes, G.C. Craig, H.T. Dublin, C.R. Thouless, I. Douglas-Hamilton and J. A. Hart (2007). *African Elephant Status Report 2007: An update from the African Elephant Database.* IUCN.

preparation required, the transport challenges, and the greater difficulty in locating elephants, with perhaps the increased probability of being caught in the process, tend to deter poachers from exploiting large sites.

16. The graphs in Figure 2, which originate from the analysis conducted in mid-2009, compare the effects of each of the two significant site-level variables on adjusted PIKE for countries with 'low' *government effectiveness* and 'high' *government effectiveness*. As can be seen from the figure, the effects on the levels of poaching of site area and vegetation cover are far more pronounced in countries with low government effectiveness than in countries with high government effectiveness. In other words, the strength of the relationships between poaching rates on the one hand and site area and vegetation cover on the other declines as governance increases. This suggests that improving government effectiveness may have a positive impact towards reducing poaching levels.
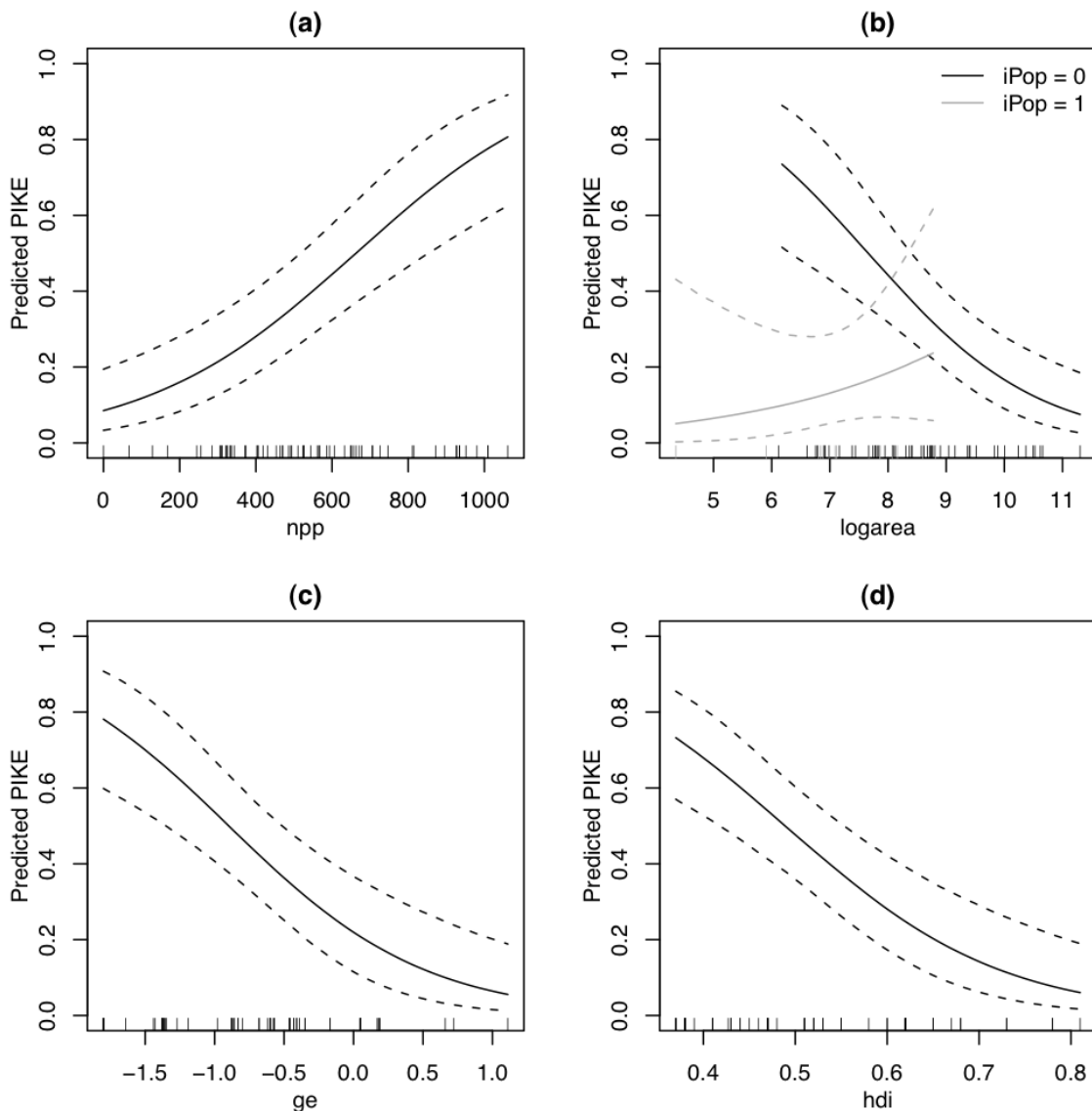

Figure 1   Relationship between PIKE and (a) net primary production, (b) site area, (c) government effectiveness and (d) human development index. All other covariates are set to their mean values, and year set to 2006. The short bars along the horizontal axis represent the distribution of data points.
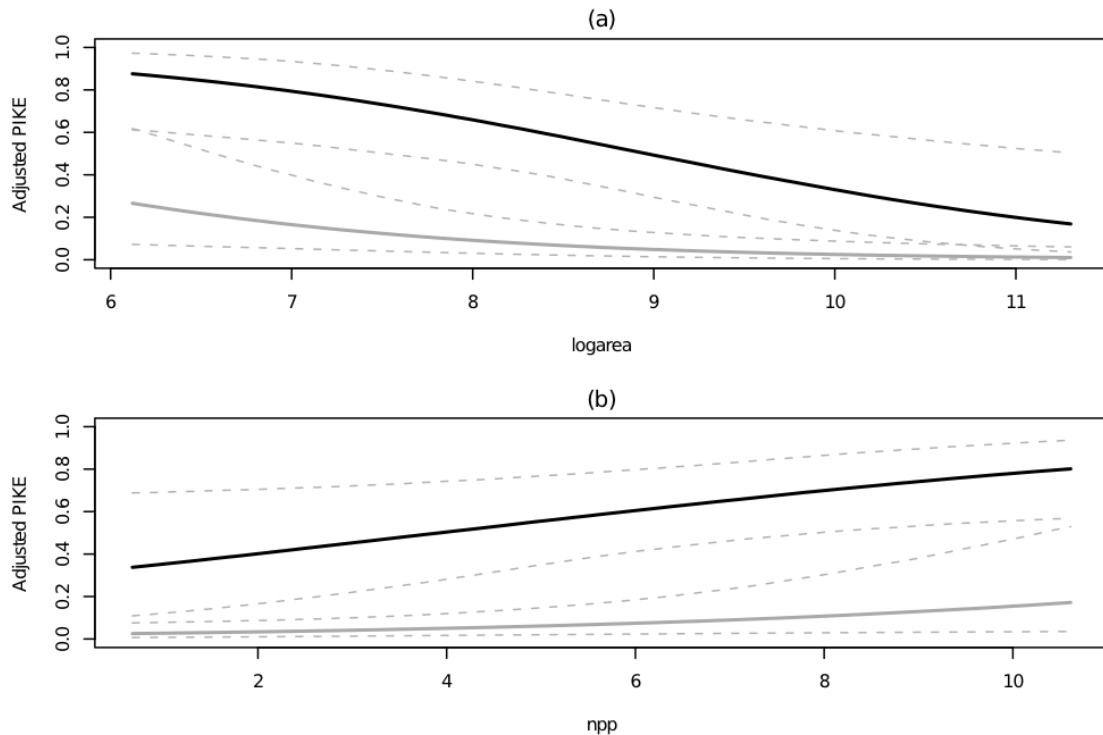
Figure 2   Effect of (a) site area and (b) net primary production on PIKE for a hypoyhetical country with high *government effectiveness* (grey line) and low *government effectiveness* (black line). All other covariates are set to their mean values and year is set to 2006. Results based on the MIKE analysis conducted in mid-2009.

17. Figure 3 shows the relative level of poaching (PIKE) in 2009 for individual sites as estimated by the statistical model, that is, after adjusting for the effects of the covariates. The overall average predicted PIKE for 2009 is 45%. At the sub-regional level, predicted PIKE levels vary considerably, with highest average levels in central Africa (69%) followed by west Africa (60%), and below-average levels in eastern Africa (42%), southern Africa (37%) and Asia (17%). These results support the MIKE baseline finding that levels of elephant poaching are highest in central Africa and lowest in Asia.

18. Figures 4 and 5 show the differences between measured and predicted values at individual sites and countries grouped and ranked by subregion (amalgamating south and southeast Asia) and after adjusting for all variables in the model. In Figures 4 and 5, countries and sites lying to the right of the vertical line and whose confidence intervals do not overlap zero can be interpreted to experience higher than predicted levels of poaching, whereas those lying to the left of the line and whose credible interval does not overlap zero experience lower than predicted poaching levels. In a sense, these differences, or "residuals" as they are formally called, give an indication of the fit of the model for individual sites and countries. Large positive or negative differences between measured and predicted values can be a reflection of poor data quality or of other variables, not included in the model, exerting an influence at specific sites or countries.
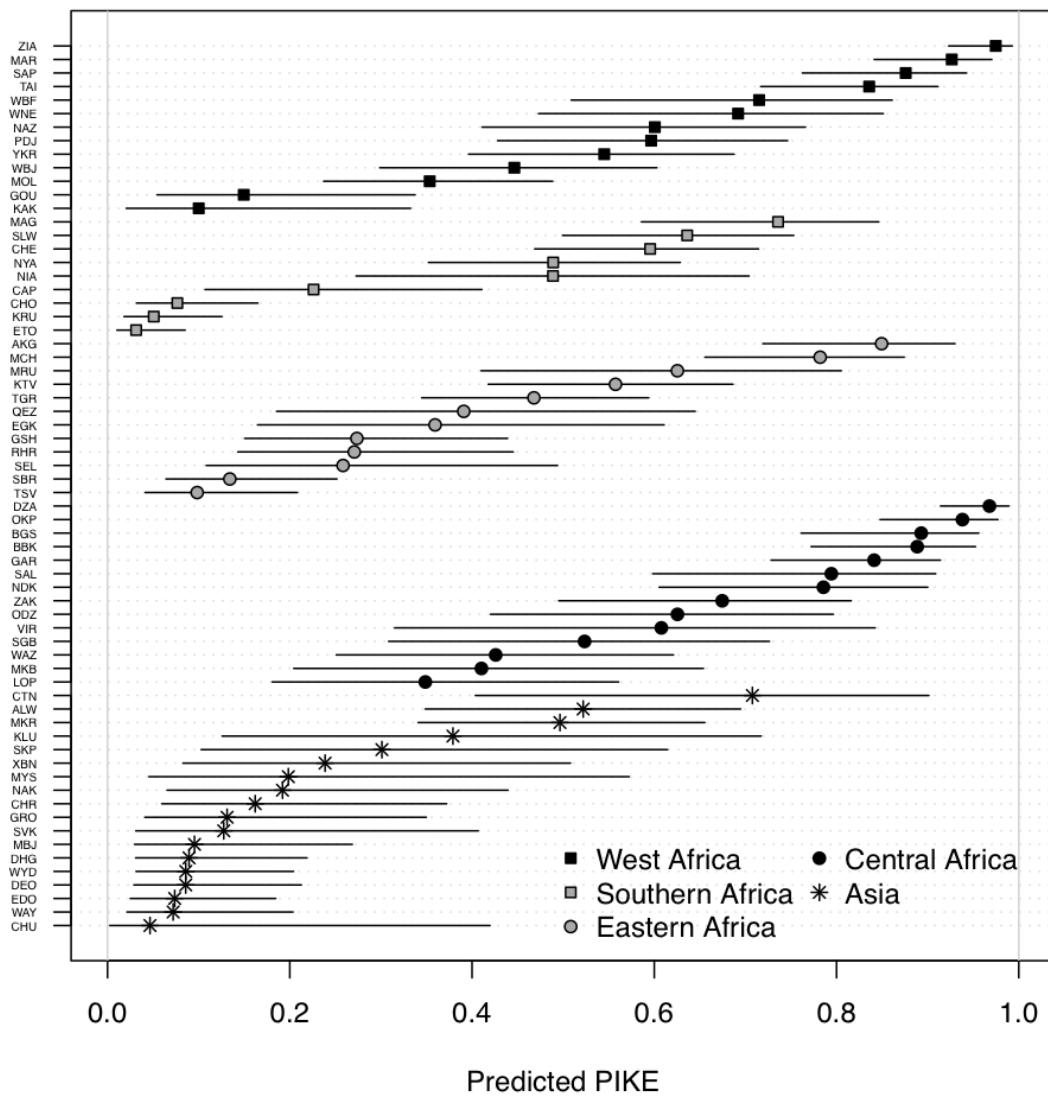
Figure 3   Relative levels of elephant poaching (PIKE) at the site level in 2009, as estimated by the statistical model, grouped by sub-region and ranked from highest to lowest.
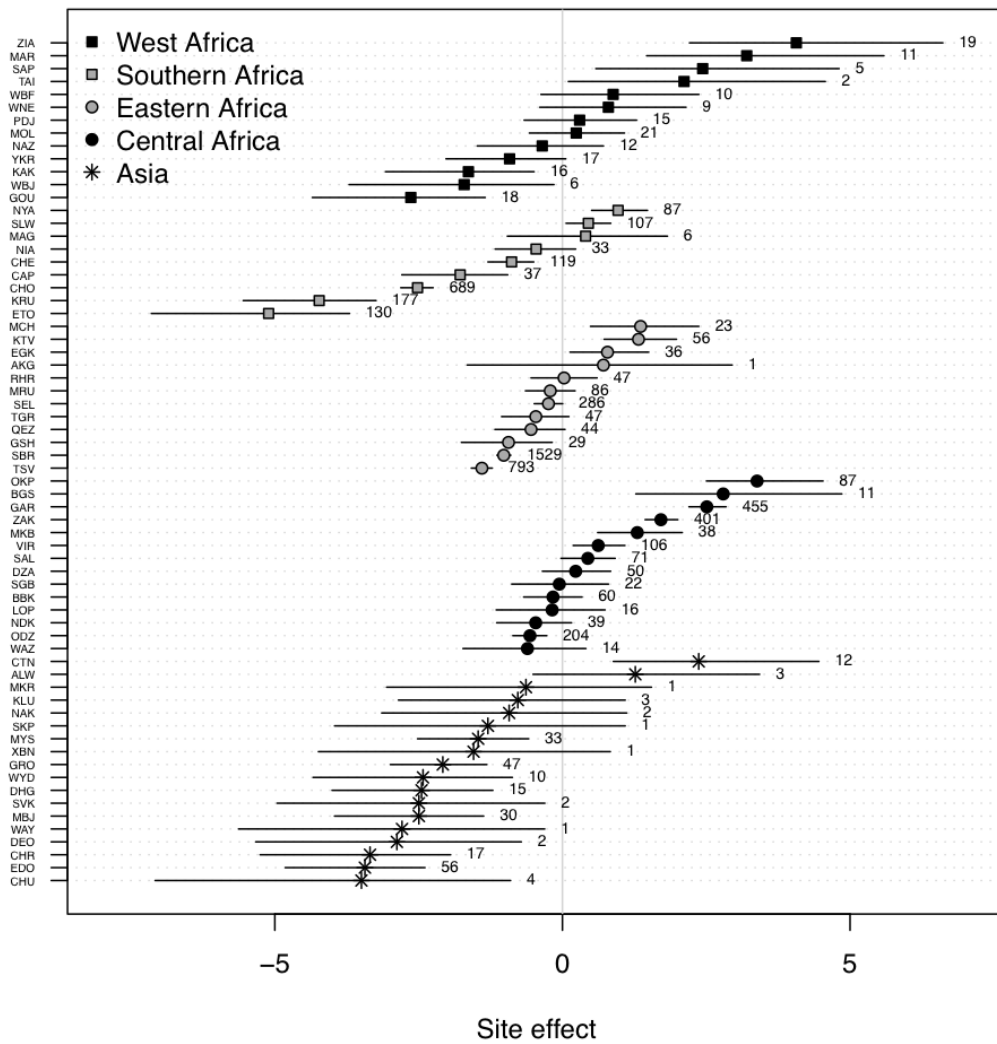
Figure 4 Site-level effects grouped by subregions and ranked, along with 95 % credible intervals (horizontal lines). Sites lying to the right of the zero line and in which the 95 % credible interval does not overlap zero can be interpreted to suffer from higher than predicted levels of elephant poaching. The numbers to the right of the confidence intervals represent total numbers of carcasses. It may seem strange to see estimates based on just one carcass at some sites. However, it should be borne in mind that a result of fitting hierarchical models is that there is a certain amount of sharing, or pooling of information across sites (and countries). The effect of this is that a mean at a site with few observations is a weighted mean of observations at that site together with observations from other sites. In any case, the wide credible intervals for these estimates reflect the uncertainty arising from small samples. The site codes are explained in the Annex.
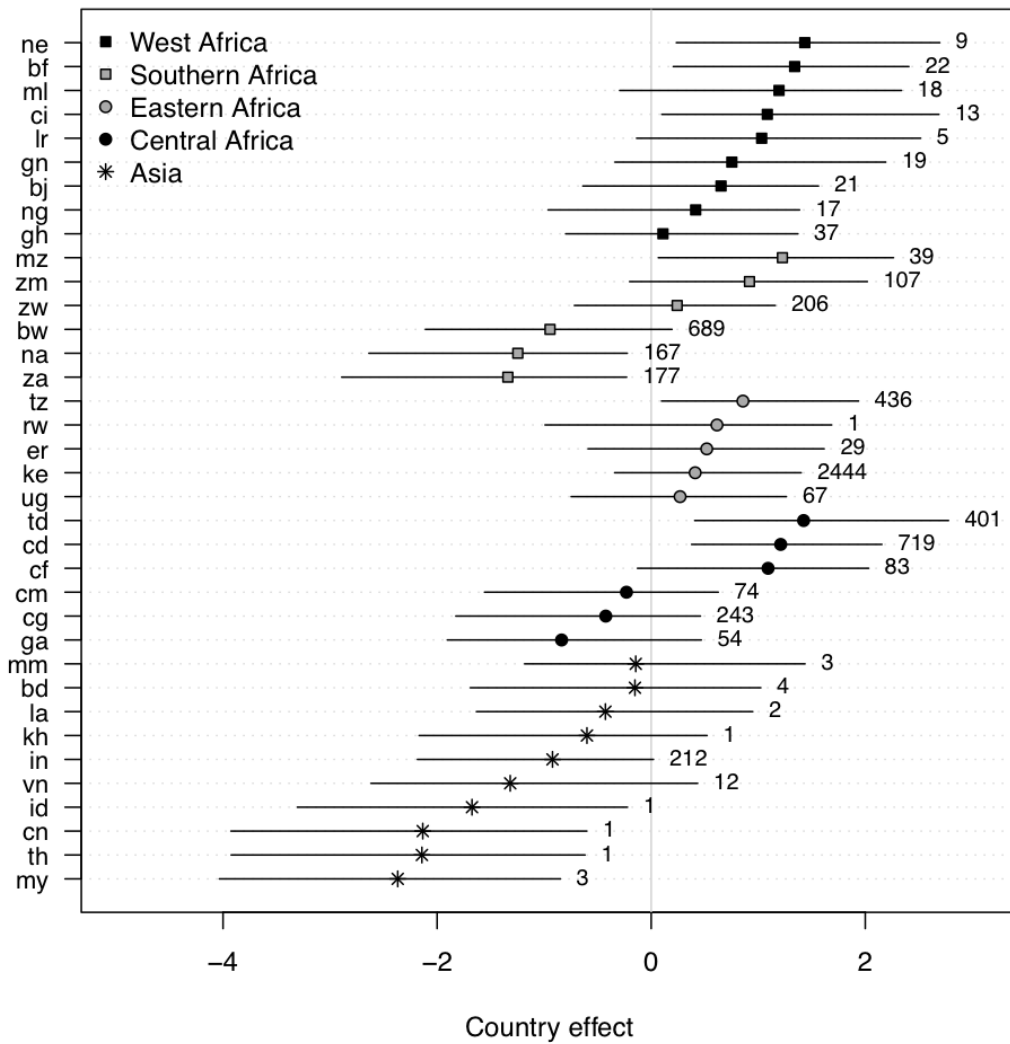
Figure 5   Country effects grouped by subregion and ranked, along with 95 % confidence intervals (horizontal lines). Countries lying to the right of zero and whose confidence interval does not overlap zero can be interpreted to suffer from higher than predicted levels of elephant poaching. The numbers to the right of the confidence intervals represent total numbers of carcasses. The country codes are detailed in the Annex.

Time trend

18. Averaging the effects of other covariates, the global time trend is shown in Figure 5. The trend suggests stable or declining PIKE levels between 2002 and 2006, followed by a steep increase, peaking in 2008 followed by a decline in 2009.
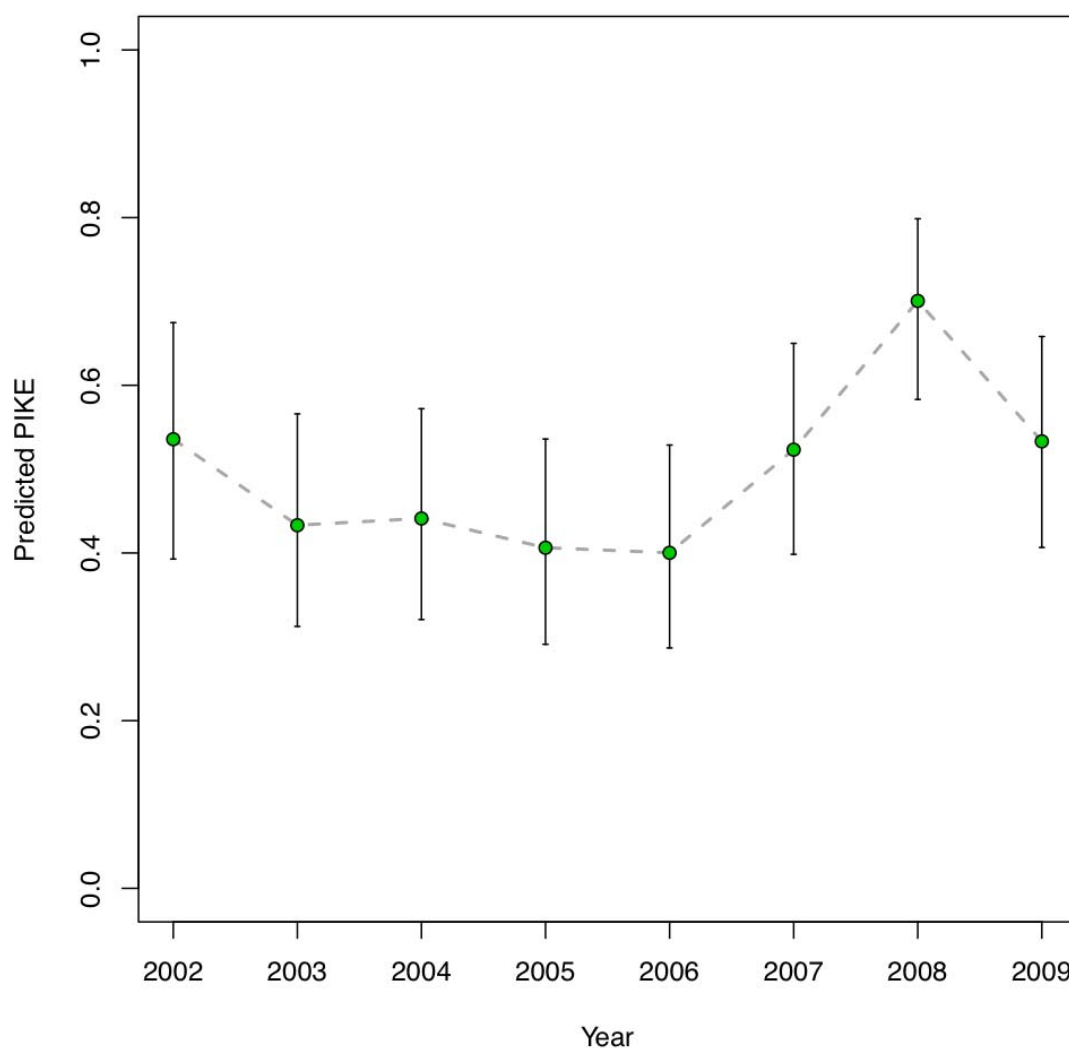
Figure 6   Trend in PIKE through time. All covariates other than year are set to their mean values.

19. One of the objectives of the MIKE programme is to determine whether trends in the levels of illegal killing of elephants are related to CITES decisions on trade in ivory. The trend chart in Figure 6 provides an opportunity to explore such relationships. In 2002, a one-off sale of stocks of raw elephant ivory from southern African range States was approved, subject to conditions, but trends in PIKE declined between that year and 2006. In 2006, the Standing Committee decided that some of the conditions for the sale had not been met and that it could not take place, but the levels of illegal killing of elephants began to increase thereafter. The sale was finally given the go-ahead by the Standing Committee in May 2007, and the sale of additional stocks was approved shortly afterwards at the 14th meeting of the Conference of the Parties (CoP14, The Hague, June 2007). By that time, however, the increase in PIKE was already underway. The sales of the ivory stocks took place in late 2008 at the time when PIKE levels were peaking, and poaching levels declined the following year. Based on the limited evidence available, no relationship between CITES decisions and the levels of PIKE can be inferred.

20. While the analysis presented here has a number of limitations (see COP 15 Inf. 40 and Inf. 41 for details), it should provide a reasonably good picture of trends in illegal killing of elephants, and the factors associated with it. Care is needed in interpreting the findings of this analysis. To infer from the data that there is an *association* between, say, governance and elephant poaching is not to claim a *causal* relationship. While there may well be reasons for believing that a causal relationship exists, analysis of the data available for this study tells nothing about the underlying causal processes and mechanisms that drive effective law enforcement and compliance. Put another way,

although it can be said that governance and human development are *correlates* of illegal activity, it is difficult to claim that they are *drivers* of that activity without knowledge of the underlying processes. While awaiting more detailed evidence of these processes to be assembled, however, it is expected that if human intervention can bring about improvements in governance and development, then a corresponding reduction in the relative rate of elephant poaching can be anticipated.

An analysis of the Proportion of Illegally Killed Elephants (PIKE) at the site level:
a case study from the Laikipia-Samburu MIKE site in Kenya

21. In order to explore the utility of MIKE monitoring and information for the local management of elephants, the MIKE CCU contracted the non-governmental organization Save the Elephants to undertake a detailed analysis of the illegal killing of elephants and PIKE in a well-researched MIKE site, namely Laikipa-Samburu in Kenya. This site is unique in its variety of land uses and management regimes, which enables a detailed study of factors associated with levels of PIKE within the site. This is largely due to the dedication of Save the Elephants to collect and verify data on elephant carcasses at the site through the use of informants from local communities. As a result of these efforts, the site boasts the highest carcass detection rates of any MIKE site. At the same time, however, the use of informal intelligence networks means that the level of effort devoted to searching for carcasses is difficult to quantify. The main findings of the study are summarized below. The full study is available as an information document at the present meeting and will be submitted for publication in peer-reviewed scientific literature.

PIKE in the Laikipia-Samburu MIKE site

22. Kenya began implementing the MIKE programme in June 2002, and has currently four MIKE sites, including Laikipia-Samburu. The Kenya Wildlife Service has been monitoring and recording elephant mortality of all elephant populations in the country since 1990, including in the Laikipia-Samburu MIKE site. The elephants' range covers a wide variety of habitats, land use types, and political boundaries that are managed by a variety of stakeholders and law enforcement entities, including national reserves (1.7 % of area), community conservation areas (9.4 %), undeveloped government-owned trust land (49 %), forest reserves (10.1 %), private ranches - some of which comprise private wildlife sanctuaries - (15.9 %), agricultural settlement (13.4 %) and urban centres (0.5 %). The African elephant population size in Laikipia-Samburu is approximately 6,350 (this is the average of an aerial census in 2002 and in 2008) (see Figures 7 and 8).

23. From 2002 to 2008, 1,124 carcasses were detected, averaging 160.6 (minimum = 93, maximum = 234) carcasses per year. Assuming a putative natural mortality of 5 % per year, the number of carcasses detected would represent approximately half of the expected number of deaths in the system, a level that simulations indicate would provide accurate estimates of the cause of death, assuming that carcass detection in relation to cause of death is random.
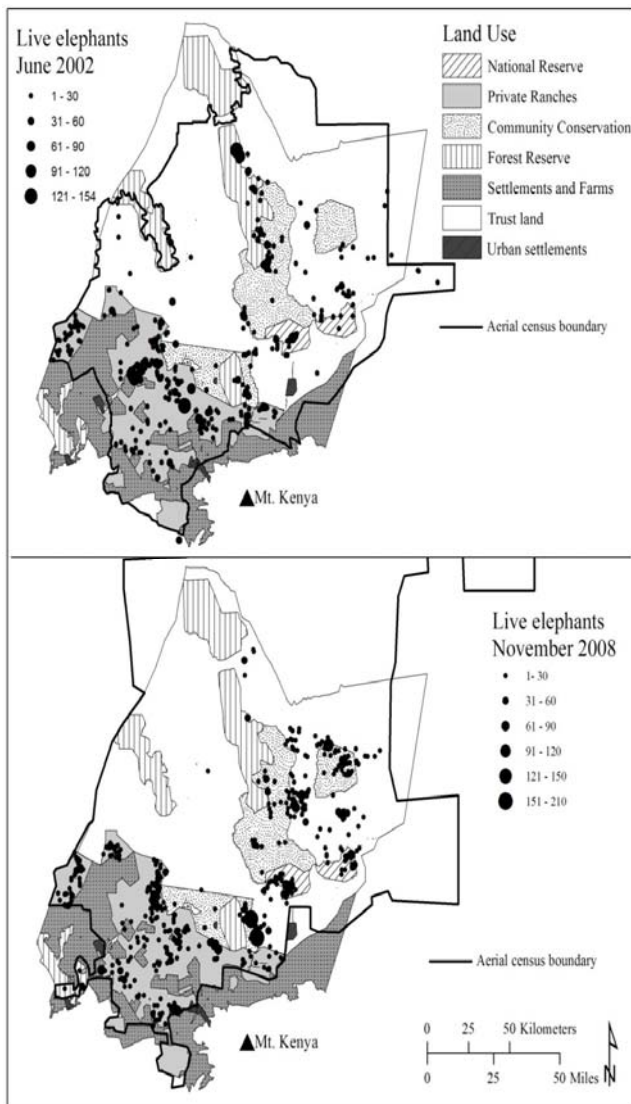
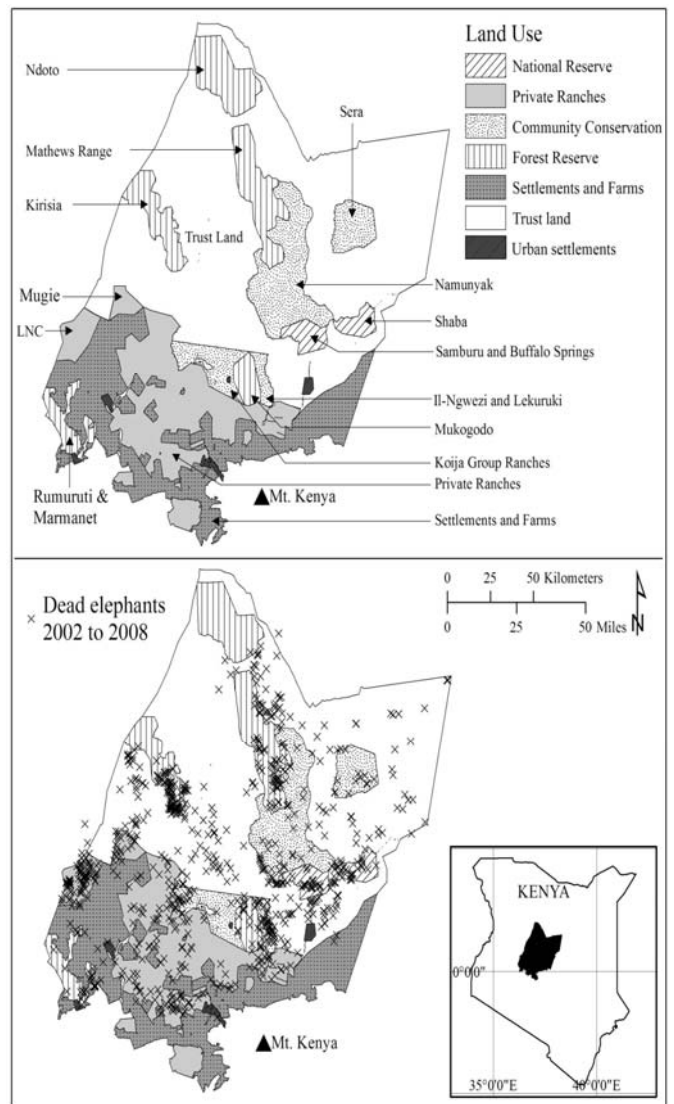Figure 7   Live elephant numbers and aerial survey boundaries of 2002 (top) and 2008 (bottom) census.

Figure 8   Land uses in Laikipia-Samburu Mike site (at the top) and the locations of the 1,124 elephant carcasses recorded between 2002 and 2008 (bottom).

24.   The most common cause of mortality was illegal killing (42 %), followed by natural (28 %) and unknown causes (23 %), with problem animal control (PAC) accounting for 7 % of deaths. Observed numbers of carcasses were greater than expected in trust land (+75 %), and lower than expected in national reserves (-46 %) and private ranches (-27 %). Carcass ratios in community conservation areas were close to MIKE site averages in similar land use types.

25.   The earlier 1990 to 2002 data set, compiled by the Kenya Wildlife Service, is considered a baseline for measuring changes in levels of illegal killing since the MIKE programme was initiated. During the 19 years of monitoring in the Laikipia-Samburu ecosystem from 1990 to 2008, the average PIKE was 35 %. Significantly elevated PIKE levels were recorded in 1993, 1998, 2004, 2005, 2007 and 2008, with 2008 showing the highest ever PIKE. Early returns from 2009 indicate that this trend is continuing and that a peak has not yet occurred. The results show that the illegal killing of elephants in the Laikipia-Samburu MIKE site has increased.
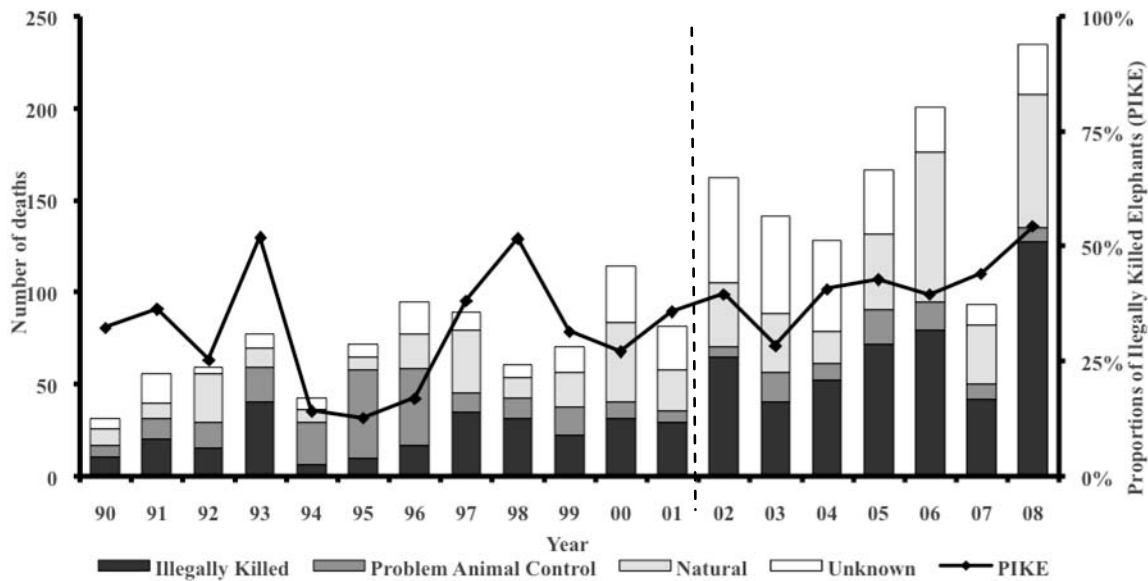
Figure 9. Carcass data recorded in the Laikipia-Samburu MIKE site from 1990 to 2002 as reported in [4]Thouless *et al*, (2008), and in the MIKE study from 2002 to 2008 (to the right of the broken line). The PIKE values are shown on the secondary y axis.

26. Within the Laikipia-Samburu MIKE site, PIKE varied from high in the poorly protected areas, such as Forest Reserves and Trust land, to low in the well protected areas such as national reserves, and ranches (some of which incorporate private wildlife sanctuaries). Community conservation areas which were in the process of getting started during the study period showed mixed results, with the longer established ones showing relatively low PIKE, and more recently established ones showing significantly higher annual PIKE values. This is thought to be because it takes a few years before conservation practices become established in this new form of land use. In the well established community conservation areas, an apparent trend towards lower PIKE was interspersed with flare-ups in illegal killing related to dissatisfaction of some of the parties involved.

27. Annual PIKE values were not well correlated across different land use categories, indicating that illegal killing was not synchronized. PIKE was specific to certain areas. Poaching surges in one land use did not necessarily mean poaching surges in other areas. In contrast, the number of carcasses showed much greater MIKE site-wide correlation, demonstrating much greater synchronicity in general mortality. This implies that ecological drivers are more consistent across the site, and the strong influence of drought and rain cycles on overall elephant mortality in the entire ecosystem.

28. Not all illegal killings were motivated by ivory. Some also took place in other situations broadly classified as Illegal Conflict, prompted at times in defence of livestock, to prove manhood, or to express dissatisfaction or defiance with landowners or wildlife authorities. Curiously few elephants were killed illegally in defence of crops given that in the crop-growing region in the south of the MIKE site, the Kenya Wildlife Service employed an active Problem Animal Control unit, legally empowered to shoot crop raiders, fence breakers or elephants judged dangerous. This amounted to a high proportion of the elephant mortality in that region.

29. Results from this study clearly indicate that areas with higher degrees of insecurity or political strife experienced higher levels of illegal killing. Secondly, illegal killing is higher where law enforcement is stretched, particularly in the less patrolled trust lands and forest reserves. This is exemplified by comparing the Samburu/Buffalo Springs National Reserves with the Shaba National Reserve, which is poorly managed and experiencing greater PIKE. Thirdly, it was clear that relatively well-protected

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4   Thouless, C. R., J. King, P. Omondi, P. Kahumbu, and I. Douglas-Hamilton (2008). *The Status of Kenya's elephants: 1990-2002*. Kenya Wildlife Service, Nairobi.

areas surrounded by insecure regions demonstrated much higher PIKE values than similar areas bordering on more secure regions. For example, two spatially isolated private ranches with relatively high protective investment, but bordered by politically volatile, insecure areas experienced significantly higher PIKE than the other private ranches that were all in one block.

30. Neither the elephant population size nor the area was significantly correlated with PIKE, indicating that the landscape and the land use management context are the critical aspects related to illegal killing.

Comparison of PIKE in Kenya from 1990 to 2002

31. The average PIKE value of 12 elephant areas in Kenya was 35.3 % in the national data set compiled by the Kenya Wildlife Service from 1990 to 2002. Areas with a high level of risk of illegal killing can conveniently be sorted from those with a low risk, depending on whether they fall above or below this average PIKE value. This separates the populations of Tsavo, Laikipia-Samburu, Amboseli, Mara, the Aberdares, Mount Kenya and Shimba Hills, all of which are known to be relatively well protected, from those of Marsabit, Turkana, Mount Elgon, Meru and the Eastern Province, all of which were known in that period to be poorly protected.

Comparison of PIKE across African and Asian MIKE sites

32. The PIKE values across the MIKE sites in Asia and Africa where more than 30 carcasses were recorded in the MIKE baseline of 2007 averaged 40 %. It emerged that PIKE averages from three sets of data (i.e. the current study in Laikipia-Samburu, the Kenyan dataset from 1990 to 2002, and the MIKE baseline data sets of 2007) all tended to lie between 30 and 40 %, and that sites with higher levels of PIKE tended to be those perceived to be suffering from high poaching activity. When the exercise was repeated in 2009 for a fuller set of data up to the end of 2008, the average PIKE had climbed both in the Laikipia-Samburu MIKE site and in the global MIKE dataset, suggesting a trend (see above for the MIKE data analysis of global trends and factors influencing levels of illegal killing of elephants).
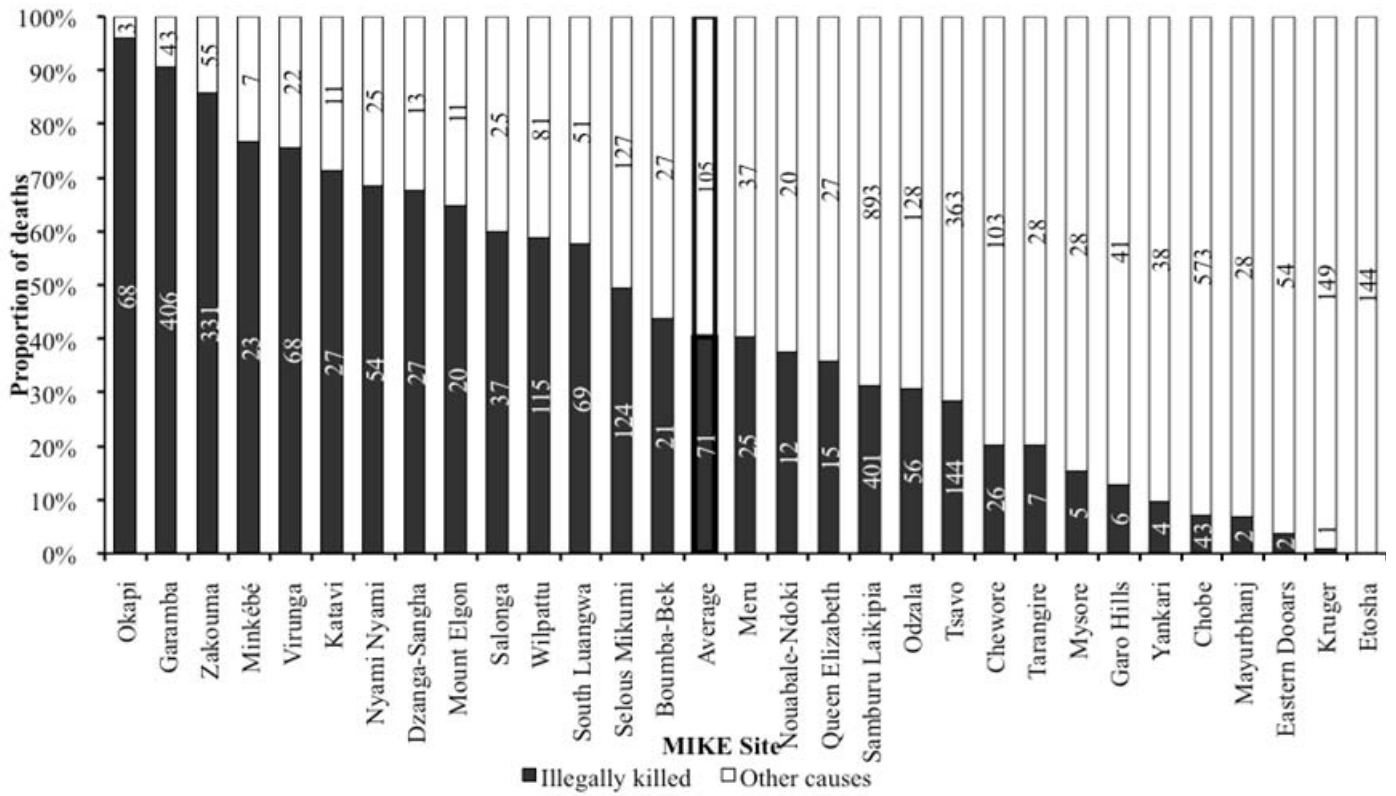
Figure 10   PIKE values across MIKE sites in Africa and Asia with a more than 30 carcass sample size.
(n values indicated on each portion of bar)

Conclusions

33. The analysis indicates that PIKE is a useful measurement of the level of illegal killing of elephants and that poaching in the Laikipia-Samburu MIKE site has significantly increased in recent years. The study also highlights the differences in poaching rates brought about by differences in management regimes and land use at this site.

MIKE/ETIS linkages and analysis of MIKE and ETIS data

34. Linking the MIKE and ETIS data is important, for example in providing a picture of ivory trade patterns, showing where elephant products are coming from and going to; in comparing the evolution of elephant poaching and levels of illegal ivory trade over time; and in analysing drivers of poaching and illegal trade in elephant products and the impacts of management measures. This now occurs through data collection, sharing of covariates and data analysis. A mechanism is in place to isolate ivory and elephant product seizures within the MIKE data collection process to ensure that all such records are reported to ETIS. MIKE and ETIS have cross-referred to and made use of similar influencing factors, with MIKE using key components of ETIS such as domestic ivory markets indexes and both applying comparable socio-economic and governance indices.

35. The ETIS team is now systematically invited to sub-regional and regional meetings organized by the MIKE programme, offering opportunities to elephant range States to interact with and learn about both monitoring systems. Similarly, in capacity-building activities organized by the programmes, MIKE and ETIS teach about each others' data-gathering routines and approaches whenever possible. Finally, ETIS receives substantial financial support for its training activities, ivory trade investigations and analysis through the EU Commission-supported MIKE project for Africa.

36. After the finalization of the analytical reports of MIKE and ETIS for CoP15, an integrated analysis of MIKE and ETIS data will be explored. Research is expected to focus on central Africa and the trade routing of ivory from source to interception or destination, as central Africa seems to remain the main region supplying the illegal international trade in ivory. The Conference of the Parties will be informed about the status and outcome of these research activities.

Implementation of MIKE in compliance with Resolution Conf. 10.10 (Res. CoP14)

37. In line with previous reporting by the Secretariat on MIKE to the Conference of the Parties, the present document summarizes information on the status of implementation of the MIKE programme, recognizing that this is not specifically required under the terms of the Resolution.

38. As outlined in Resolution Conf. 10.10 (Rev. CoP14), the Conference of the Parties directs the establishment, continuation and expansion of MIKE to meet the programme's objectives to: the elephant range States in both Africa and Asia and their Management Authorities; the Standing Committee; the CITES Secretariat; and the MIKE and ETIS Technical Advisory Group (TAG). Over the years, several other bodies have also been institutionalized at the site, national and international level, to implement and oversee the programme.

39. In practice, rangers in MIKE Sites, MIKE National and Site Officers, working closely with MIKE Subregional Support Units and their Subregional Support Officers, and partner NGOs have all played major roles in implementing the programme at the local and national levels. Their activities were supervised by MIKE Subregional Steering Committees. The global implementation of the MIKE programme has been managed and led by the Secretariat's MIKE Central Coordination Unit, with support from the TAG and under the auspices of the MIKE-ETIS Subgroup of the Standing Committee.

40. Although not always explicitly stated in the Resolution, it can be inferred that participating elephant range States should: (a) apply a standardized methodology for the reporting of illegal hunting by Management Authorities; (b) use a standardized methodology for monitoring incidents of illegal hunting in specific sites or areas; and (c) collect data in MIKE sites, in accordance with the agreed methodologies, on elephant population data/trends, incidence and patterns of illegal hunting and the effort and resources employed in detection and prevention of illegal hunting and trade. Furthermore, the MIKE officers and other officials, and the Management Authorities should participate in MIKE

capacity-building activities. Range States should make use of MIKE information to enhance the long-term management of their elephant populations, build the necessary institutional capacity, and provide more effective law enforcement. They should strengthen the regulatory measures required to support such enforcement. Finally, they should provide substantial funding to MIKE activities and help establish a system that can continue without external financial support.

41. Resolution Conf. 10.10 (Rev. CoP14) indicates that the Secretariat should undertake a substantial amount of work in the context of the MIKE programme. This includes *de facto*: establishing databases and reporting protocols for MIKE data; ensuring the selection of MIKE sites; managing the development of standardized methodologies for the collection, processing and analysis of MIKE data; overseeing training for officials and MIKE officers, and generally building capacity in range States to implement MIKE and manage elephant populations; communicating with elephant range States to ensure that MIKE data are collected and processed; and reporting to the Standing Committee and to the Conference of the Parties to CITES. Additionally, the Secretariat assesses whether and to what extent observed trends in illegal killing of elephants are related to changes in the listing of elephant populations in the CITES Appendices and/or the resumption of legal international trade in ivory. It should provide information to elephant range States and the Conference of the Parties to make appropriate management and enforcement decisions with regard to elephants, and to enhance the institutional capacity in elephant range States for the long-term management of their elephant populations.

42. Much of the activities assigned to the Secretariat must be undertaken in consultation with range States and with the TAG which the Secretariat is instructed to establish to provide technical oversight to both MIKE and ETIS. The Secretariat is also expected to seek substantial funding for MIKE activities and contribute to the establishment of a system that can continue without external financial support.

Implementation of MIKE by elephant range States

43. In accordance with Resolution Conf. 10.10 (Rev. CoP14), the MIKE programme has been deployed in 29 of the 37 African elephant range States (with current non-participating African elephant range States Angola, Ethiopia, Malawi and the Sudan expressing interest to join), and in all 13 Asian elephant range States.

44. All range States that are participating in the MIKE programme have invested considerable resources in its implementation in terms of manpower, the undertaking of MIKE routines, institutional arrangements and other resources. In order to evaluate the implementation by the elephant range States of some of the Resolution provisions and to determine challenges, the MIKE Central Coordination Unit conducted in 2009 an assessment of the status of implementation of the MIKE programme across all sites. Such an evaluation had also been requested by the MIKE Technical Advisory Group. The assessment was carried out in the form of an online questionnaire, distributed to MIKE Subregional Support Officers, as well as to National and Site Officers. The questionnaire consisted of over 60 standard questions divided into different sections, asking respondents to rate various aspects of MIKE implementation at MIKE sites, including:

   – Availability of funds and human resources to conduct essential patrolling operations;

   – Levels and coverage of patrol activity;

   – Human resources: staff turnover, recentness and levels of training in MIKE methodology;

   – Quality and level of data collection and data management;

   – Hardware and software resources: status of GPS units, computer hardware and power supply at the sites; and

   – The frequency and type of elephant population surveys conducted at each site.

45. By 5 October 2009, 77 questionnaires from as many sites in 39 range States had been returned to the MIKE Central Coordination Unit for analysis.

46. Two main benefits are expected from a detailed analysis of the questionnaire results. On the one hand, it will enable the MIKE programme to identify the capacity-building and resource needs of each site and tailor its efforts proportionally to these specific needs. The survey could be repeated regularly at very little cost, for example on an annual basis, to evaluate progress in the implementation of the MIKE programme, both on the part of the MIKE Central Coordination Unit and the Subregional Support Units, as well as on the part of the participating governments and site staff in the field.

47. On the other hand, it is expected that a suitable index generated from the responses to a number of specific questions in the survey will serve as proxy for the overall level of protection effort dedicated at each site. This proxy variable would be incorporated into routine MIKE analysis, and could prove to be an important explanatory variable, which would improve the reliability of analytical outputs by accounting for more of the variability and reduce some of the bias inherent in the data. It could also help to explore whether there is a relationship between the level of implementation of MIKE and levels of illegal killing of elephants. This information might be considered for the updated analysis of MIKE data, scheduled for February 2010, just prior to CoP15.

48. At the time of writing this document, the analysis of the survey responses had yet to be completed, but a preliminary analysis will be provided as an information document at the present meeting. It is nevertheless worth highlighting some of the more salient patterns apparent in the questionnaire responses. The following paragraphs summarize some of these findings.

49. More than half of all MIKE sites are in need of substantial additional funds to conduct essential site management operations, such as patrolling the site and undertaking basic law enforcement activities, whilst less than a tenth of all sites have their funding needs adequately met. While more than half of sites rely on donors to support essential operations, central and west African sites tend to be more donor-dependent than those in the other two African subregions. In Asia, sites tend to rely more heavily on national budgets, although it appears that there is more donor-dependence in Southeast Asia than in south Asia.

50. Notwithstanding the apparent differences in funding levels across continents, patrolling the sites is reported to be a more regular activity in Africa than in Asia. In about half of MIKE sites in Asia, teams are sent on patrol once a month or even less frequently, and only 15 % of the sites are being patrolled on a daily basis in that region. This is in contrast with Africa, and particularly with eastern and southern Africa, where patrols are reported to be a daily occurrence in 90 % of the sites. In central and west Africa, on the other hand, patrol teams in most sites are only sent to the field on weekly or monthly schedules. Patrol coverage tends to be patchy in both Africa and Asia, with about half the sites covering 50 % or less of the site area in any one year.

51. Regular patrols and extensive coverage of sites is essential for comprehensive data collection for the MIKE programme. Rangers are expected to complete patrol forms and carcass forms, and to use GPS units to record locations. Training is required for these tasks to be accomplished adequately, but more than half of the sites, in both Africa and Asia, report that less than a fifth of their ranger forces are trained in these or other data collection methods. Central Africa, southern Africa, south Asia and Southeast Asia report the lowest levels of ranger training in MIKE methodology. South Asia, southern Africa and central Africa boast the highest rate of usage of the MIKE carcass form, while central Africa has the highest rate of usage of the patrol forms, and Southeast Asia reports the highest average quality of form completion.

52. Training is important, but so is the retaining of trained staff. Staff turnover at sites and, to a lesser degree, at national offices, has been one of the problems hampering the effective implementation of the MIKE programme. In about half the MIKE sites, site officers have been in the post for two years or less. A net result of this is that MIKE data do not flow smoothly from the site level to the national office, and from there on to the Subregional Support Units. In the vast majority of MIKE sites (70 % of sites in Africa and 50 % in Asia), data only flow when the Subregional Support Officer visits the site personally. In most sites, data are only entered into the database irregularly if at all, and paper forms are not archived in a way that makes them easy to consult. As a result, during their field visits the Subregional Support Officers must find, digitize and verify all data in most of the sites in their respective subregions. As little data also seem to flow from the sites to the National MIKE Officers, it is perhaps not surprising that National MIKE Officers are hardly ever involved in data quality control,

or that they provide little feedback to the sites in their country. These problems are not necessarily alleviated through the use of information technology, as few sites enjoy reliable power supply or Internet connectivity. Computer maintenance is difficult in remote sites, and in many cases no action is taken when a computer fails. It will be up to the visiting Subregional Support Officer to try to fix problems. A number of computers supplied by the MIKE programme are currently out of order, and of those that remain may be ridden with viruses and malware, as routine antivirus updates are not regularly performed by the site staff.

Implementation by the CITES Secretariat

53. Since the previous report by the CITES Secretariat to the Conference of the Parties in 2007, the MIKE programme has undertaken activities in all of the areas mentioned in paragraphs 41 and 42 above. These focused mostly at the global level, enhancing the overall development of the MIKE programme, and on Africa, where MIKE was able to progress considerably with support from the European Commission. Thanks to support from Australia, France, Japan, the United Kingdom of Great Britain and Northern Ireland and the United States of America, the MIKE programme could be maintained in Asia but not at the same level as in Africa. Examples of recent relevant activities are mentioned below.

Technical and scientific issues

54. A detailed review of the system to collect and analyse MIKE data, as conceptualized in 2000, took place in 2007. It identified ways to strengthen significantly the management, analysis and use of MIKE data from a technical and scientific perspective. The new analytical approaches were applied for the current analysis of MIKE data, as well as those undertaken in 2007 and 2008.

55. The TAG was asked to provide inputs on all relevant technical and scientific aspects of the MIKE programme, largely based on the MIKE CCU's evaluations, proposals and research questions. These included: suitable hardware and software solutions for MIKE data collection, storage and analysis; better analytical and statistical approaches for handling MIKE data; the development of a Standardized Analytical and Reporting Framework (SARF) for MIKE; quantifying law enforcement efforts in MIKE sites; identification of quantifiable, independently gathered and robust explanatory variables at the site and country levels; the validation the MIKE site 'sample'; and resolution of technical problems in certain MIKE sites. Several TAG task forces and workshops are helping to address these issues.

56. In line with MIKE's aim of simplifying data collection while improving analytical capability, the MIKE databases and reporting forms that were used in MIKE sites are being replaced by Management Information SysTem (MIST). MIST is a versatile, user-friendly and multi-species data collection and reporting system. It has analytical features well beyond the requirements for MIKE, and enables seamless transfer of data on wildlife observations, carcasses and illegal activities to the National Offices and on to a central MIKE database. Originally developed in 2000 for Uganda's National Parks with support from the German Technical Cooperation (GTZ), it is currently used in the Democratic Republic of the Congo, Ghana, Kenya, Rwanda and Uganda, and in most elephant range States in Southeast Asia. Countries which expressed particular interest to have the system installed include Botswana, Cameroon and the United Republic of Tanzania.

57. MIST is dependent on GPS coordinates for all observations, whereas, in reality, in many MIKE sites GPS units are unavailable, broken down, or simply not being used. Technical and practical solutions, such as deploying cheaper and more user-friendly GPS Receiver Data Loggers that automatically track positions and store location details, continue to be explored.

58. The development of a single African and Asian elephant database (modelled after the existing African Elephant Database) has been initiated by IUCN's Elephant Specialist Groups with support from MIKE, the US Fish and Wildlife Service and other donors. It will enable the MIKE programme to have timely access to the latest and most reliable and detailed elephant survey information in all MIKE sites.

59. Appropriate, cost-effective, and sustainable computer hardware solutions are also being deployed at the sites, with the procurement of solar-powered workstations that run exclusively on robust and secure free and open source software.

60 To contribute to the further development of the MIKE programme and ensure its sustainability, the CITES Secretariat initiated discussions with the TAG about the current and long-term monitoring and analytical potential of MIKE, and possible technical and scientific evolutions regarding its coverage, design, outputs, effectiveness, practicality and simplification.

61. The CITES Secretariat organized and supported research in several relevant areas, including ivory trade in selected countries (by TRAFFIC; relevant to ETIS), elephant meat trade (by IUCN), PIKE (by Save the Elephants), etc.

Capacity building

62. Training and capacity-building activities focused mainly on: elephant population survey techniques in compliance with MIKE standards; MIKE information collection and monitoring routines; managing, analysing and compiling MIKE data; Law Enforcement Monitoring; and using and applying MIST.

63. MIKE Subregional Support Units assisted with the implementation of the MIKE monitoring routines in range States and sites through a variety of communications, site visits, on-the-spot training, technical support, such as fixing MIKE hardware and software, helping with MIKE data collection or extraction, etc. Strong, ongoing interactions between the Subregional Support Officers and the National and Site Officers were critical in achieving and maintaining an adequate standard in data quality control responsibilities, ensuring that MIKE data could be collected and facilitating the uptake of the new aspects of the MIKE programme. The capacity of MIKE Site and National officers in Africa was further enhanced by supporting their logistics (e.g. commuting to MIKE sites or travelling for collecting MIKE data) and communications (e.g. the use of faxes, telephones, etc.), and providing computer hardware and software, GPS, etc.

64. In the last two years, MIKE has supported or co-funded elephant surveys in central (Bangasou, Central African Republic), eastern (Laikipia-Samburu, Kenya) and west Africa (Sapo National Park, Liberia), and in Southeast Asia (Cardamom Mountains, Cambodia; Kluang District - Endau Rompin, Malaysia), and several more are in their planning stages. Objective survey priorities were established in consultation with the TAG, taking account of the TAG's recommendation that a five-year interval for elephant population surveys would be adequate for the purposes of the MIKE programme as it would not affect the statistical validity of MIKE analyses, which monitor trends in levels of illegal killing rather than trends in elephant populations.

Organizational and reporting issues

65. The organizational structures for implementing the MIKE programme at site, national, subregional and continental levels were maintained and, in the case of Africa, actively reinforced. They include MIKE Subregional Steering Committees, MIKE National Officers and MIKE Site Officers, four MIKE Subregional Support Units in Africa and equivalent consultants in south and Southeast Asia, and management through a MIKE Central Coordination Unit. With the assistance from Asian elephant range States, donors and NGOs such as WCS, the MIKE Central Coordination Unit continued its concerted efforts to re-establish MIKE Subregional Support Units in south and Southeast Asia and expand the programme in Asia.

66. At its 57th meeting (SC57, Geneva, July 2008), the Standing Committee agreed with recommendations of the MIKE Central Coordination Unit to re-establish a MIKE-ETIS Subgroup. The MIKE Central Coordination Unit provided the Subgroup with Terms of Reference and quarterly progress reports since 2008.

67. Meetings of the MIKE Subregional Steering Committees were organized practically every year in each of the six MIKE subregions (eight in Africa and two in Asia). New Terms of Reference for these committees were finalized early in 2008 and applied to their operation.

68. The minutes of the sixth and seventh meetings of the Technical Advisory Group for MIKE (TAG6, March 2008, Entebbe; TAG7, January 2009, Nairobi), organized by the MIKE programme, are available from the CITES website. The eighth meeting will take place in Nairobi in December 2009. New Terms of Reference for the MIKE-ETIS TAG have been in place since 2009.

69. The MIKE Subregional Support Units in Africa operate as subregional MIKE secretariats. In addition to their capacity-building activities, they facilitate collaboration and communication, assist in ensuring the long-term sustainability of MIKE, and act as subregional motivators of the programme. To the extent possible, they ensure that MIKE maintains a systematic and standardized approach of sufficiently high quality in the countries and sites concerned. The MIKE SSUs also provide interlinkages with NGOs, experts and decision makers in the area of elephant management. The MIKE Central Coordination Unit provides global management and guidance.

70. In addition to regular reporting to the Conference of the Parties and the Standing Committee, the MIKE programme disseminated information via a variety of other forms and formats, such as the MIKE page on the CITES website, presentations to MIKE stakeholder meetings, Subregional Steering Committees and African elephant meetings, media contacts, articles in *Pachyderm* (the technical publication of the IUCN/SSC African Elephant Specialist Group), etc.

71. Thanks to the European Commission's support to the MIKE programme in Africa, and in compliance with Decision 14.79, the Secretariat convened the first and second African elephant meetings (Mombasa, June 2008 and Gigiri, March 2009), addressing *inter alia* the establishment of an *African elephant action plan* and an African Elephant Fund, CITES Decisions and policies regarding elephants, and conservation strategies for the management of elephant populations, including MIKE.

72. The MIKE programme collaborated closely with the Convention on the Conservation of Migratory Species of Wild Animals (CMS) in west Africa to synergize and coordinate elephant conservation activities. This included the organization of a joint MIKE/CMS meeting in Accra, Ghana, in April 2009 to review west African transboundary areas of importance to African elephants and MIKE sites, and to draft a number of relevant field conservation projects.

Support for the MIKE programme

73. The Secretariat is particularly grateful to the following donors for contributing to the implementation of the MIKE programme in Africa and Asia over the past three years in compliance with Decision 14.76: Australia, France, Japan, the United Kingdom of Great Britain and Northern Ireland, the United States of America and the European Commission. For Phase II of the MIKE programme (2007-2011), USD 4,666,929 have been donated by the European Commission for the implementation of MIKE in Africa and for supporting related elephant management activities (including the organization of African elephant meetings in compliance with Decision 14.79 and the implementation of ETIS). For the same period, the Secretariat has obtained to date a total of USD 583,259 for the implementation of MIKE in Asia from the donors mentioned in paragraph 53 above.

74. Substantial contributions in-kind have been provided by most if not all participating elephant range States, *inter alia* by dedicating staff as National and Site officers, and contributing from national budgets or seeking external funding for various costs, including staff time, transportation, *per diems*, meeting costs, elephant surveys, etc. Significant support and invaluable collaboration were provided by other stakeholders such as local communities, local NGOs and international NGOs including WCS, Fauna and Flora International (FFI), TRAFFIC and the World Wide Fund for Nature (WWF), and from international institutions such as IUCN and the United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC).

Conclusions and final remarks

75. The analysis of MIKE data concerning the illegal killing of elephants in 65 MIKE sites in Africa and Asia, collected from 2002 to 2009, shows that poaching levels declined or remained stable between 2002 and 2006, followed by a steep increase, peaking in 2008 and a decline in 2009.

76. The most important predictors of levels of poaching in elephant range States were found to be the national government effectiveness, as measured by the World Bank, and the Human Development Index calculated by the United National Development Programme: countries with low government effectiveness or low Human Development Index scores have higher levels of elephant poaching, and poaching rates decline as government effectiveness and the Human Development Index increase. At the site level, the most important explanatory variable was net primary production (vegetation cover), with poaching being more intense where vegetation cover is greater. In sites with low human population densities, poaching rates tend to be lower in larger sites, but in sites with high human population densities, there appears to be no relationship between site area and poaching levels. The effects of vegetation cover and site area on levels of poaching are far more pronounced in countries with low government effectiveness than in countries with high government effectiveness. Poaching levels are highest in central Africa and lowest in Asia. Based on the limited evidence available, no relationship can be inferred between CITES decisions and levels and trends of poaching as estimated by the Proportion of Illegally Killed Elephants.

77. The results also show how poaching levels differ at the country level and between sites within countries. This suggests that intrinsic factors at the national and local levels can go a long way towards explaining poaching rates. Care is needed, however, in interpreting the results of the analysis. Although important relationships are inferred between relative levels of poaching and governance and development, the analysis does not shed any light on the causal processes linking these factors with poaching rates. It is nevertheless expected that if human intervention can bring about improvements in governance and development, then a corresponding reduction in the relative rate of elephant poaching would follow. The detailed analysis of the PIKE in the Laikipia-Samburu MIKE site in Kenya illustrates the differences in poaching rates that exist within this site, and how they relate to local differences in management regimes, land use, insecurity or political strife, and law enforcement.

78. The MIKE programme demonstrated that, even with relatively limited data, it is able to provide robust information on trends in levels of illegal killing of elephants, and a reasonably good picture of the factors associated with the observed trends, in compliance with MIKE's objectives laid out in Resolution Conf. 10.10 (Rev. CoP14). It also identified the MIKE sites and elephant range States that are experiencing, or are more likely to experience, high levels of poaching. This allows to focus attention on major problem sites and range States, and provides indicators against which to monitor the success of remedial measures in the long term. Following the trade in 102 tons of legal stocks of raw ivory from Botswana, Namibia, South Africa and Zimbabwe to China and Japan late in 2008, it will be important for the MIKE programme to continue monitoring trends in the levels of illegal killing of elephants in Africa and Asia.

79. The relationship between trends in the illegal trade in ivory, as documented by ETIS, and elephant poaching levels recorded through the MIKE system, merits closer investigation. While mirroring patterns in supply and demand for illegal ivory, the two trends may be subject to different time lags and dynamics, and may diverge as a result. While ETIS can help elucidate trade routes and levels of illegal trade in ivory, MIKE provides information on the sources of illegal ivory, trends in poaching and poaching 'hotspots'. A close collaboration between the two programmes is required to provide a complete picture of patterns in the illegal killing of elephants and the illegal trade in ivory.

80. An analysis of the status of implementation of the MIKE programme reveals that major challenges in MIKE implementation remain in many participating elephant range States and sites. These include:

    –   donor-dependency and insufficient funding for undertaking basic patrolling and law enforcement activities in MIKE sites;

    –   low patrol coverage; coping with the complexity of the MIKE data recording routines; staff turnover;

    –   training and involving new staff in implementing MIKE; and

    –   technical and organizational difficulties in ensuring that reliable MIKE information is recorded, stored, transferred and analysed for feedback to data providers, site managers, elephant range State governments and the CITES community.

Generally, the above challenges appear to be greatest in central and west Africa and in Southeast Asia, regions which arguably might benefit most from MIKE capacity-building activities and the information that MIKE can provide to help improve elephant conservation and site management.

81. It is expected that many of the challenges indicated above will be alleviated through a simplification of the data collection and reporting routines, and perhaps also through an expansion of the scope of monitoring to ensure that data collected can be analysed at the site and national levels, and usefully utilized for adaptive management at the local level. To this end, the MIKE programme has, in collaboration with its TAG, identified and begun the deployment of robust and low-cost technologies for the capture, storage, analysis and transfer of MIKE data. This involves, for example, the deployment of MIST, a time-tested and user-friendly conservation area management information system that is broadly applicable to all wildlife and the full range of management activities in sites and protected areas, and not only to elephants and the illegal killing thereof.

82. The MIKE programme has furthermore continued to implement a variety of capacity-building activities and initiatives during the last three years, ranging from supporting elephant surveys and facilitating logistics and communications of site officers to providing training in all aspects of MIKE, including law enforcement monitoring. It will be indispensable for these capacity-building and training activities to continue in order to ensure a successful implementation of a simplified and more effective MIKE system.

83. In addition, an ongoing and, where possible, expanded capacity-building effort will be required if the consistency, commitments and long-term sustainability of MIKE are to be ensured. Experience has shown that successful implementation of wildlife monitoring programmes requires close and constant supervision on the ground and support over long periods of time before they can become self-sustaining and locally institutionalized. An international wildlife monitoring system with the objectives and characteristics of MIKE further requires strong and effective central coordination to ensure that procedures, data formats and analysis remain compatible across sites, countries and continents.

84. Currently, support for these activities is mainly provided through a MIKE Central Coordination Unit, four Subregional Support Units in Africa and consultants in Asia. The existing Units are adequately funded until 2011 only; and efforts to re-establish MIKE Subregional Support Units in Asia are ongoing but have not yet been successful. The absorption of the activities of these Units within the regular CITES budgets and structures is an objective that remains under active consideration, but that looks difficult in the face of declining budgetary provisions at the Secretariat. If this were to remain the case, it would seem that the MIKE programme would continue to depend heavily on external funding which, for institutionalized long-term monitoring programmes, is not advisable.

85. Partnerships with experienced non-governmental organization that work in MIKE sites and, where existing, with local stakeholders and strong site-based government agencies, have proven to be essential for providing oversight for the adequate conduct of MIKE at the site level. These local partnerships are also important because of the Convention's limited institutional capacity to undertake *in situ* conservation activities and address issues that are not directly related to international trade in CITES-listed species.

86. Although the objectives, scope and general *modus operandi* of MIKE are specified in Resolution Conf. 10.10 (Rev. CoP14), it seems important to explore ways to develop and strengthen the MIKE system further and render it as sustainable, useful and relevant as possible. This is one of the reasons why the Secretariat proposes to review the Resolution in consultation with the MIKE-ETIS Subgroup of the Standing Committee and TRAFFIC. The MIKE programme and the TAG have therefore also initiated discussions on the system's technical future in terms of coverage, design, outputs, effectiveness, practicality and simplification. This addresses issues such as the minimum activities and information required to meet MIKE's current objectives, and the scientific conditions under which MIKE could operate in a more pro-active manner to help predict circumstances and situations that might encourage elephant poaching, or to asses quickly the seriousness of illegal killing of elephants and the impact of remedial measures.

87. The sustainability of MIKE as a long-term monitoring and capacity-building tool depends on long-term commitments from all the participating elephant range States to continue implementing the

scheme, and to allocate financial and staff resources to sustain it after external funding has ceased. This includes maintaining an adequately trained and equipped cadre of MIKE-trained rangers and staff in each site; ensuring that data of sufficient quantity and quality are collected for meaningful analysis and effective decision-making; and absorbing the costs of continuing MIKE monitoring activities through recurrent budgets or funding strategies. The evaluation of the implementation of the MIKE programme in range States suggests that this is likely to remain challenging in the foreseeable future for a considerable number of sites and countries.

Recommendations

88. The Conference of the Parties is requested to take note of this report, recognizing that the MIKE programme provided information on trends in the illegal killing of elephants and on factors associated with the observed trends, and that its further implementation will require substantial resources, as well as a strong commitment from elephant range States and all other stakeholders.

89. As explained in document CoP15 Doc. 18, the Secretariat proposes to adopt a decision providing for a review of Resolution Conf. 10.10 (Rev. CoP14) to update and, where necessary, amend the sections referring to MIKE and ETIS in consultation with the MIKE-ETIS Subgroup of the Standing Committee and TRAFFIC.

Proportion of illegally killed elephants (PIKE) and total numbers of carcasses encountered (in brackets) for each site-year combination. Blanks reflect site-year combinations for which no carcass reports were received. Where zero carcasses were reported, "- (0)" is shown.

Sub-Region	Country	Site	2002	2003	2004	2005	2006	2007	2008	2009
Central Africa	Cameroon (cm)	Boumba-Bek (BBK)	0.00 (5)	0.68 (19)	0.71 (7)	1.00 (3)	0.00 (12)	0.00 (1)	0.00 (1)	0.25 (12)
		Waza (WAZ)		0.33 (3)	0.50 (2)	0.50 (2)	0.33 (3)	0.00 (1)	0.00 (2)	1.00 (1)
	Central African Republic (cf)	Bangassou (BGS)		1.00 (3)	1.00 (8)					
		Dzanga-Sangha (DZA)		- (0)	- (0)	0.89 (9)	0.50 (2)	0.50 (2)	0.63 (27)	0.30 (10)
		Sangba (SGB)	- (0)	0.10 (10)	0.00 (1)	- (0)	- (0)	- (0)	1.00 (8)	1.00 (3)
	Chad (td)	Zakouma (ZAK)		0.65 (34)	0.86 (35)	0.27 (11)	0.67 (60)	0.97 (160)	0.94 (86)	0.80 (15)
	Congo (cg)	Nouabale-Ndoki (NDK)		0.63 (8)	0.29 (14)	0.75 (4)	0.00 (5)	0.00 (1)	0.25 (4)	0.00 (3)
		Odzala (ODZ)		0.05 (38)	0.53 (36)	0.00 (73)	0.00 (1)	0.97 (36)	0.53 (17)	1.00 (3)
	Democratic Republic of Congo (cd)	Garamba (GAR)		0.96 (114)	0.89 (197)	0.90 (86)	0.94 (34)	0.50 (14)	1.00 (4)	1.00 (6)
		Kahuzi-Biega (KHB)		- (0)	- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
		Okapi (OKP)		1.00 (20)	0.90 (10)	0.95 (22)	1.00 (5)	1.00 (11)	0.67 (3)	1.00 (16)
		Salonga (SAL)		0.00 (2)	0.64 (56)	0.25 (4)	- (0)	- (0)	- (0)	0.22 (9)
		Virunga (VIR)		- (0)	- (0)	0.44 (9)	0.33 (3)	0.00 (15)	1.00 (63)	0.69 (16)
	Gabon (ga)	Lopé (LOP)		0.57 (7)	0.25 (4)	- (0)	0.00 (1)	- (0)	0.00 (1)	0.67 (3)
		Minkébé (MKB)		0.73 (11)	0.92 (13)	0.50 (6)	- (0)	- (0)	1.00 (4)	0.75 (4)
Eastern Africa	Eritrea (er)	Gash-Setit (GSH)	0.00 (3)	0.33 (3)	0.00 (1)	- (0)	0.14 (7)	0.50 (4)	0.40 (5)	0.50 (6)
	Kenya (ke)	Meru (MRU)					0.50 (14)	0.27 (11)	0.38 (13)	0.54 (48)
		Mount Elgon (EGK)		0.86 (7)	0.71 (7)	0.00 (1)	0.40 (5)	0.50 (2)	0.50 (2)	0.83 (12)
		Samburu Laikipia (SBR)	0.38 (159)	0.18 (195)	0.31 (128)	0.17 (160)	0.14 (96)	0.24 (97)	0.51 (278)	0.26 (416)
		Tsavo (TSV)		0.22 (82)	0.29 (65)	0.28 (60)	0.17 (88)	0.20 (56)	0.33 (79)	0.17 (363)
	Rwanda (rw)	Akagera (AKG)				- (0)	- (0)	0.00 (1)	- (0)	- (0)	- (0)
	Uganda (ug)	Murchison Falls (MCH)	- (0)	1.00 (10)	0.50 (2)		1.00 (2)	0.50 (2)	0.50 (2)	0.60 (5)
		Queen Elizabeth (QEZ)	0.00 (3)	1.00 (1)	0.38 (8)	0.00 (1)	0.18 (11)	1.00 (4)	0.44 (9)	0.43 (7)
	Tanzania (tz)	Katavi (KTV)		0.75 (12)	0.75 (20)	0.50 (6)	1.00 (2)	1.00 (2)	1.00 (9)	0.80 (5)
		Ruaha Rungwa (RHR)		0.10 (10)	0.17 (6)	0.67 (15)	0.89 (9)	0.00 (2)	0.67 (3)	0.00 (2)
		Selous Mikumi (SEL)		0.22 (9)	0.18 (11)			0.42 (103)	0.59 (90)	0.67 (73)
		Tarangire (TGR)		0.14 (7)	0.00 (11)		0.25 (4)	0.20 (5)	0.40 (5)	0.87 (15)

Sub-Region	Country	Site	2002	2003	2004	2005	2006	2007	2008	2009
Southern Africa	Botswana (bw)	Chobe (CHO)	- (0)	0.00 (59)	0.07 (73)	0.05 (153)	0.10 (111)	0.14 (101)	0.04 (113)	0.18 (79)
	Mozambique (mz)	Cabora Bassa (MAG)	0.00 (1)	0.33 (3)	1.00 (2)					
		Niassa (NIA)			0.00 (14)		0.33 (3)		0.88 (16)	
	Namibia (na)	Caprivi (CAP)	0.00 (1)	0.25 (8)	0.00 (6)	0.25 (4)	0.40 (5)	0.00 (5)	- (0)	0.00 (8)
		Etosha (ETO)	0.00 (24)	0.00 (18)	0.00 (4)	0.00 (25)	0.00 (15)	0.00 (25)	0.00 (14)	0.00 (5)
	South Africa (za)	Kruger (KRU)	0.00 (1)	0.00 (2)	0.00 (18)	0.00 (35)	0.00 (51)	0.03 (34)	0.00 (18)	0.06 (18)
	Zambia (zm)	South Luangwa (SLW)	0.25 (4)	0.63 (8)	0.65 (23)	0.25 (4)	0.77 (35)	0.00 (11)	0.88 (8)	0.43 (14)
	Zimbabwe (zw)	Chewore (CHE)	0.37 (19)	0.30 (10)	0.21 (14)	0.00 (20)	0.12 (17)	0.79 (14)	0.08 (13)	0.58 (12)
		Nyami Nyami (NYA)	0.67 (3)	0.29 (7)	0.82 (11)	0.83 (6)	0.67 (3)	0.50 (10)	0.90 (20)	0.85 (27)
West Africa	Benin (bj)	Pendjari (PDJ)	0.00 (1)	0.50 (2)	0.33 (3)				0.00 (1)	0.88 (8)
		W du Bénin (WBJ)	0.00 (1)	0.00 (1)	0.00 (3)					0.00 (1)
	Burkina Faso (bf)	Nazinga (NAZ)	0.00 (1)	- (0)	0.00 (2)	0.00 (3)	0.00 (1)	- (0)	1.00 (4)	1.00 (1)
		W du Burkina (WBF)	0.00 (1)		0.00 (1)				1.00 (6)	1.00 (2)
	Côte D'Ivoire (ci)	Marahoué (MAR)						1.00 (8)	1.00 (1)	1.00 (2)
		Taï (TAI)				1.00 (2)				
	Ghana (gh)	Kakum (KAK)	0.50 (2)	0.00 (6)	0.00 (5)			0.00 (1)	1.00 (1)	1.00 (1)
		Mole (MOL)	0.00 (1)	0.50 (2)	0.25 (8)	1.00 (3)	- (0)	0.80 (5)	1.00 (2)	- (0)
	Guinea (gn)	Ziama (ZIA)	- (0)	1.00 (1)	1.00 (2)	- (0)	- (0)	1.00 (1)	1.00 (4)	1.00 (11)
	Liberia (lr)	Sapo (SAP)						1.00 (1)	1.00 (1)	1.00 (3)
	Mali (ml)	Gourma (GOU)	0.00 (3)	0.00 (1)	0.00 (1)	0.00 (2)	0.00 (3)	0.00 (2)	0.00 (2)	0.25 (4)
	Niger (ne)	W du Niger (WNE)	1.00 (1)	0.25 (4)	1.00 (2)	- (0)	- (0)	- (0)	- (0)	1.00 (2)
	Nigeria (ng)	Sambisa (SBS)		0.33 (3)	0.50 (2)					
		Yankari (YKR)	0.00 (6)	0.25 (4)	0.60 (5)	0.00 (2)			*	*
	Senegal (sn)	Niokolo-Koba (NKK)	- (0)	0.00 (1)						

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*   *Data for Yankari in 2008 and 2009 were excluded due to unresolved discrepancies in the data reported.*

Sub-Region	Country	Site	2002	2003	2004	2005	2006	2007	2008	2009
South Asia	Bangladesh (bd)	Chunati (CHU)					0.00 (1)	0.00 (1)	0.00 (1)	0.00 (1)
	Bhutan (bt)	Samtse (SCH)			- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
	India (in)	Chirang-Ripu (CHR)		0.00 (1)	0.00 (2)	- (0)	- (0)	0.00 (1)	0.00 (8)	0.00 (5)
		Deomali (DEO)				- (0)	0.00 (2)	- (0)	- (0)	- (0)
		Dihing Patkai (DHG)		- (0)	0.50 (2)	0.00 (1)	0.00 (1)	0.00 (3)	0.20 (5)	0.00 (3)
		Eastern Dooars (EDO)		0.00 (4)	0.00 (12)	0.13 (8)	- (0)	0.00 (15)	0.07 (15)	0.00 (2)
		Garo Hills (GRO)		0.00 (6)	0.10 (10)	0.00 (2)	0.00 (4)	0.09 (11)	0.17 (6)	0.38 (8)
		Mayurbhanj (MBJ)		- (0)	0.00 (12)	0.12 (17)	0.00 (1)	- (0)	- (0)	- (0)
		Mysore (MYS)		- (0)	- (0)	0.13 (30)	0.33 (3)			
		Shivalik (SVK)		- (0)	- (0)	0.00 (2)	- (0)			
		Wayanad (WYD)		- (0)	0.00 (2)	0.13 (8)	- (0)			
	Nepal (np)	Royal Suklaphanta (SUK)			- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
South East Asia	Cambodia (kh)	Mondulkiri (MKR)		- (0)	- (0)	- (0)	0.00 (1)	- (0)	- (0)	- (0)
	China (cn)	Xishuangbanna (XBN)					- (0)	0.00 (1)		
	Indonesia (id)	Bukit Barisan Selatan (BBS)			- (0)	- (0)	- (0)	- (0)	- (0)	- (0)
		Way Kambas (WAY)			- (0)	- (0)	0.00 (1)	- (0)	- (0)	- (0)
	Lao People's Democratic Republic (la)	Nakai Nam Theun (NAK)	1.00 (1)	- (0)	- (0)	- (0)	0.00 (1)	- (0)	- (0)	
	Malaysia (my)	Gua Musang (GMS)					- (0)	- (0)	- (0)	- (0)	- (0)
		Kluang (KLU)					- (0)	- (0)	0.00 (1)	- (0)	0.50 (2)
	Myanmar (mm)	Alaungdaw Kathapa (ALW)		- (0)	- (0)	- (0)	1.00 (2)	- (0)	- (0)	1.00 (1)
		Shwe U Daung (SHW)		- (0)	- (0)	- (0)	0.00 (1)	- (0)	- (0)	0.00 (1)
	Thailand (th)	Kuibiri (KUI)					- (0)	- (0)	- (0)	- (0)	- (0)
		Salakphra (SKP)					0.00 (1)	- (0)	- (0)	- (0)	- (0)
	Viet Nam (vn)	Cat Tien (CTN)					- (0)	- (0)	- (0)	- (0)	1.00 (6)