CITES MIKE PROGRAMME

MINUTES OF THE 4th TECHNICAL ADVISORY GROUP (TAG) MEETING

HELD IN WINDHOEK, NAMIBIA, ON THE 9th and 10th DECEMBER 2003

In Attendance :	Martin Tchamba, TAG member for C. Africa Iain Douglas-Hamilton, TAG member for E. Africa Colin Craig, TAG member for S. Africa Moses Kofi-Sam, TAG member for W. Africa Raman Sukumar, TAG member for S. Asia Zhang Yue, TAG member for S.E. Asia Richard F. W. Barnes, TAG Specialist member Kenneth P. Burnham, TAG Specialist member Holly T. Dublin, TAG Specialist member Nigel Hunter, MIKE Director and Chair of the Meeting Edison Nuwamanya, MIKE Support Officer for E. Africa Philip Stander, MIKE Support Officer for S. Africa Sani Massalatchi, MIKE Support Officer for W. Africa Philippe Bouché, MIKE Support Officer for W. Africa Arun Venkataraman, MIKE Support Officer for South Asia
Absent with Apologies :	Hugo Jachmann, TAG Specialist member Sebastien Luhunu, MIKE Support Officer for C. Africa Geoffrey Howard, IUCN EARO Programme Coordinator
Invitees:	Rene Beyers, Resource Specialist Bob Burn, Resource Specialist John Hart, Wildlife Conservation Society Tom Milliken, ETIS Director Swanne Swannepoel, Cybertracker Technical Specialist Julian Blanc, AED Manager, AfESG
Rapporteur :	Linda Yeo, MIKE Programme Support

1. Minutes of the last meeting

The Chair thanked the members who have contributed with comments on the draft minutes of the last meeting. The clarification on TAG roles was noted by the members. It was confirmed that the minutes would be posted to the MIKE website.

2. Matters Arising

The Chair then went through the list of matters arising out of the last TAG meeting. While noting that many of the items would be dealt with under the main agenda, the following actions were recorded :

2.1 Relationship of power, effort, covariates and time

The relationship of effect size, power, effort, covariates and time is still an important issue yet to be clarified. The Director apologized that this had not been worked on as intended due to the presence of other activities. It was recommended that the relation analysis be continued with the relevant TAG members and that a paper be tabled in time for deliberation at the next TAG meeting. [Action : Nigel Hunter]

2.2 Measuring Information Network Effort

It was recommended at the last TAG meeting that further research was needed on the use of proxy measures of information network effort for capturing information in sites where routine patrols are not active. It was recommended that the research on proxy measures by Dr Douglas-Hamilton be continued and that a paper be tabled in time for deliberation at the next TAG meeting. [Action : Iain-Douglas Hamilton]

3. Progress Report

3.1 Africa and South Asia Sub-regions

The technical progress reports for the four African subregions and South Asia which have been jointly prepared by the SSOs and their respective subregional TAG member were circulated to the TAG. The following main issues were flagged for discussion.

a) Carcass Mortality Data

The uncertainty of pinpointing the exact cause of death was discussed. For instance, natural mortality as a cause of death needs to be worked out as a function of population trends. There are also no hard and fast rules for categorizing cause of death between say 'conflicts' or 'poaching'. Each category depends on the policy of the wildlife departments. The definition of what is illegal killing would vary from country to country. For example, conflict killing in Sri Lanka may be considered as illegal killing but would not be considered so in Botswana. It is important to acknowledge this uncertainty and if uncertain, to assign the cause of death as 'unknown' to avoid a bias. However, it was recognized that as experience in carcass data collection grows, there will be need to help the field staff in attributing the cause of death to the 'illegal', 'legal' and 'unknown' categories. Nevertheless, there was concern raised that such uncertainty should be tackled at the analysis level rather than at the entry into carcass form level. Bob Burn highlighted the availability of mechanisms to record uncertainty in the cause of death rather than to force the field staff to make a judgment to fit a category. For instance in the Bayesian Network analysis, a distribution of possible "Year of death" could be assigned to incorporate the uncertainty of causes of death.

It was suggested that the eventual spatial mapping of 'conflict' or 'poaching' areas may also help in identifying the underlying causes of death of carcasses detected. It was also recommended that the ratio of carcasses found over time would be an important part of the analysis as the fraction of carcasses found in reality would be small compared to the real figures on the ground.

b) LEM data flow

The training on LEM and population surveys has been provided. However the use of GPS and LEM forms, particularly patrol and monthly forms were still of mixed quality. There is currently a major drive by the SSOs to reinforce the need to get this as routinely as possible. With the provision of computer systems to all sites and funding assistance from the USFWS, the first training on data management was delivered during June/July this year. A further round of data management training will be provided in January 2004, when the Site Officers will bring their own data.

In spite of the data management training, the provision of equipment and the site visits by SSOs, etc. getting the LEM data collected and flowing on a routine systematic basis is still a problem. In order to try and get on top of this, a site log monitoring tool has been developed, in which the status of data flow from each site was illustrated and explained to the meeting. The Director reported that this was proving very useful in revealing where the bottlenecks and constraints were. The reasons for the above situation included poor communication between National Officers and Site Officers, on-site tensions between staff and NGOs, lack of realization that undertaking no patrols and/or finding no carcasses was still a data point and should trigger a monthly report, patrols striking when bonuses, paid under a project, finish, dealing with great variance in the human resources involved in MIKE, high turnover of Site Officers, etc. These problems cut across all subregions.

To overcome this current problem, the MIKE secretariat have held Sub-regional Steering Committees and flagged these issues with the respective Wildlife Directors. The SSOs are revisiting the sites in order to unlock individual site problems. It is thought that having access to computers and carrying out site analysis will help to demonstrate the usefulness of the information. It is intended to use the database training in January 2004 to reinforce the message. The situation and progress made would be reviewed at an SSO meeting scheduled for February 2004.

The importance of having the range State Governments fully commit to the capacity building initiatives of MIKE was recently emphasized at a MIKE Sub Group teleconference meeting held in November. The Director has been requested by the Sub Group to prepare a report for the Standing Committee meeting which should, where necessary, highlight any country still considered to be not fully committed to overcoming capacity building problems. Where that situation prevails, the report should go on to highlight the efforts made so far and identify what is still required.

c) Aerial and Forest Surveys

Of the savanna sites, Zakouma (Tchad), Comoe (Cote D'Ivoire), Babah Rafi (Niger), Yankari (Nigeria), Sambissa (Nigeria), Sengba (CAR), Caprivi (Namibia) and possibly Waza (Cameroon) would need an updated survey. Of these, Comoe remains problematical because of civil strife. The others are planned for 2004, but lack of budget is becoming a constraint.

Of the forest sites, surveys are ongoing in Nouabale-Ndoki (Congo Brazzaville), Dzanga-Sangha (CAR), Boumba-Bek (Cameroon), Salonga (DRC), Minkebe (Gabon) and Bangassou (CAR). Sapo (Liberia), Kahuzi Biega (DRC) and Elgon (Kenya/Uganda) need updates, but Sapo and Kahuzi-Biega face security problems. Elgon (Kenya), Ziama (Guinee) and Monte Allen (Equatorial Guinee) are planned for 2004.

Both sites in Togo, i.e. Keran and Fosse aux Lions have revealed no elephants except maybe one or two in Fosse for a short period (usually November). Alternative site of Fazao may perhaps be chosen for analysis.

d) MIKE Site Boundaries & Representativeness

The current aim is to complete the digital mapping of all MIKE sites by February 2004, which would clarify the boundaries of sites such as Chawore, Nyami Nyami, Cabora-Bassa and Kruger in the Southern Africa subregion. [Action : SSOs]

Arun Venkataraman, the SSO for South Asia, went though the list of sites in South Asia nominated for MIKE monitoring. A large number of sites operate their patrol on a beat system (a beat = 5 sq km) using routine routes, thus rendering the Patrol movement form redundant. Some sites can have up to 250 beats giving rise to a large work load in data entry. Therefore, apart from a one-time GPS logging for the creation of GIS patrol route layers, regular GPS monitoring of patrol movements would not be required. The MIKE forms in South Asia would be adapted in a way that can be cross-referenced with existing patrol diaries used on sites. This fact would be incorporated in the development of the MIKE database for South Asia. The TAG recommended the data analysis team to first review the adapted forms to ensure that higher level analysis are not compromised. [Action : Venkataraman, Beyers, Tony Robertson]

There were discussions on the site representativity of the sites selected in India. It was noted that it was India's intention to have a MIKE process in all the elephant reserves. Based on the original design of MIKE, two factors had emerged which led to a need for the data analysis team to re-do the clustering analysis based on the approved scenario 3 option (1998 MIKE Design Document). Firstly, Asia as two subregions had been pooled as one. Secondly, there was some confusion over site names and characteristics, e.g. the two Bhutan sites were in fact one and the same. Bob Burn now has the data to conduct a re-evaluation of the cluster analysis on a subregional basis. Only those sites selected for the Scenario 3 option would be included in the subregional and regional analysis in order to avoid undue bias.

Other site specific issues noted were that the sites in Sri Lanka (Willpatu and Yala) extend beyond the boundary of the National Parks into protected areas. In Bhutan, originally the Royal Manas National Park was proposed but due to insurgency problems, the Samchi Forest Division was nominated in its place by the range State.

3.2 Central Coordinating Unit

In his report to the TAG, the following main issues were flagged by the Director.

a) MIKE/ETIS Technical Advisory Group

The Director reported that the following recommendations were submitted to the MIKE/ETIS Sub-Group at the teleconference meeting of 26th November 2003 :

1) That MIKE and ETIS should have one TAG, but the normal modus operandi will be to have a Sub-TAG for MIKE and a Sub-TAG for ETIS. This does not preclude having a full TAG meeting for MIKE and ETIS, when required.

2) That the current TAG be expanded by 4 persons to accommodate ETIS needs and to accommodate better Asian representation, and that these 4 persons fall under the globally recognized category.

3) That Professor Anil Gore, Dr Liz Bennett and Dr Esmond Martin be appointed to the TAG to fill 3 of these vacancies.

4) That the appointments of the current TAG members be approved for a further 2 years. All current TAG members have signaled their willingness to continue in their capacties.

5) That the ETIS Sub-TAG shall consist of Dr Holly Dublin, Dr Hugo Jachmann, Prof. Anil Gore, Dr Liz Bennett, Dr Esmond Martin and one other person to be appointed. That Robert Burn attends as a co-opted member. Nigel Hunter and Tom Milliken attend as ex-officio members.

6) That the MIKE Sub-TAG shall consist of the current 10 members plus Prof. Anil Gore and Dr Liz Bennett. That Robert Burn and Rene Beyers attend as co-opted members. Nigel Hunter and Tom Milliken attend as ex officio members.

7) That these recommendations take effect from 1st January 2004.

The MIKE Sub-Group had agreed, at the Deputy Secretary General's suggestion, that the *modus operandi,* set out in the terms of reference for the MIKE TAG (Notification No. 2000/025) would apply to the ETIS Sub-TAG.

These recommendations were duly adopted by the MIKE Sub-Group subject to the members, who were not present in the teleconference meeting, concurring within 14 days of the minutes being provided to them. No response from any such members would be recognised as concurrence.

The process for the appointment of TAG members was clarified by the Director as follows. Subregional TAG members are nominated by the range States. Global TAG members are nominated by the CITES Secretariat. All categories of nominations go to the MIKE Sub-Group for approval. The current chair of the MIKE Sub-Group is South Africa, and remaining Sub-Group members comprise of Cameroon, China, Malaysia, USA and Tanzania.

In noting the above decisions by the MIKE Sub-Group, the TAG requested the Director to clarify the exact scope of the terms "co-opted" and "ex-officio". [Action : Hunter]

It was also requested that the curriculum vitaes of the new TAG members be circulated to the TAG for information. [Action : Yeo]

b) Continuation of MIKE Database Development

The Director gave an overview on the main developments that have taken place in the MIKE database. Since the last TAG meeting in April, the main focus of the database development was on finalising version 1.0 of the site database. Two further main developments in the database have taken place.

Firstly, the database has been split in three separate files. One file now contains the data, one file contains the interface and one file includes a startup procedure. The interface is thus effectively separated from the data and data structure which includes the tables and relationships. This configuration makes it possible to continue developing the interface without having to update the whole database each time a change to data entry forms or reports or queries are made. Updating the interface simply involves replacing the old interface file with a

new one leaving the data intact. It was also decided to have all queries for extracting and exporting data in a separate file. This will make it easier to edit existing queries or add new ones. External connections, particularly GIS, are established with queries in this file instead of the original tables. This prevents direct access to the data using external connecting software.

The approach taken above reflects the need for flexibility in the development of the MIKE programme. Changing the data structure of the database (i.e. changing the underlying tables or relationships) however is more complex and a programme is currently being developed that would enable the data structure to be upgraded more easily.

Secondly, a multiple security measures was introduced to protect the integrity of the data. Different passwords were assigned to different levels within the MIKE hierarchy (patrol leader, site officer, national officer, sub regional support officer). Each password grants specific access rights in accordance with responsibilities at that level. A distinction is also made between a data entry mode and a data editing mode. When editing data, the user is prompted to give a general reason for editing and a specific reason for editing a particular field. The database keeps track of all editing operations. The system is transparent in the sense that the user is informed about previous edits. During the database training workshop for SSO's (module 2) and the workshops for national and site officers (module 3), there was valuable feedback received from the users and much of that was incorporated in version 1.0. Remaining items were reserved for the next version upgrade.

c) MIKE/MIST Integration

The Director further reported on the progress of integrating the MIST database in Uganda with the MIKE database. MIST is a protected area management tool which has a patrol data module, similar in concept to the MIKE system. A MIST programmer, was contracted by MIKE to modify MIST in such a way that all relevant MIKE patrol and carcass data would be included in MIST. These data are first entered in MIST and then transferred to MIKE through an export/import routine. The reporting (monthly and annual reports) in the MIKE database would be kept so that there is a clear distinction between MIST for data entry (and local output) and the MIKE database for generating MIKE reports. The MIST field forms have been adapted and training of both site officers and field staff regarding these changes is ongoing.

d) GIS Development

On the linkage between the MIKE database and ArcGIS, the Director reported that the software for this is currently being developed by a GIS specialist. The software automates the link and creates a geodatabase in ArcGIS containing the following layers: patrol waypoints, patrol route, illegal activities observed by patrols and carcasses (patrol and non-patrol). The patrol route is created by connecting patrol waypoints.

Other layers for the site such as a grid, protected area boundaries, road network, settlements, park infrastructure, hydrography can be added to the GIS and form the background for LEM data display and analysis. At this stage, it is being assumed that the user has little or no knowledge of GIS and everything is kept as automated and as simple as possible. The user first selects a patrol in the MIKE database, clicks on a button which establishes a link in the background and opens a map window displaying patrol routes and observations. The map window includes a legend and a basic toolbox.

e) UTM / Lat Long Conversion

The Director reported that work is currently in progress on a programme that converts UTM coordinates to Lat Long in the MIKE database for those sites that use UTM with their GPSs.

3.3 Early Warning Indicators from Carcass Data

The Director flagged to the TAG that he would like to use the carcass data from the forest surveys to provide potential early warning indicators on illegal killings. The potential for this was illustrated through a preliminary analysis carried out on the field data from different sites collected in between surveys in the Central African forests. The question whether carcass monitoring in forests in between surveys is viable was debated.

There followed extensive discussion on the probability of carcass detection rate which is dependent on the decay rate of carcasses. Field data would be required for creating the model detection curves of the carcass life to determine how long the carcasses remain detectable and to calculate the changing probability of detecting carcasses as they decay. What is certain is that zero carcass does not mean no poaching has taken place.

It was noted that savannah carcass data is routine information. However, in the context of forest carcass data, it is high priority that these field data be collated to determine if they could be used as corroborative information for analysis and whether they may serve as early warning indicators to CITES.

The TAG agreed that this approach was very helpful and supported the Director's recommendation to set up a taskforce comprising Barnes, Dublin, Hart, Douglas Hamilton, Burnham and Burn. [Action : Carcass Data Taskforce]

4. Analytical Strategy

4.1 Data Analytical Strategy – Bob Burn

Bob Burn of the University of Reading, Statistical Services Centre, next gave a short presentation of the revised data analytical strategy for MIKE, annexed hereto in Appendix I.

It was noted that determining causality (assessing the effects of factors that may influence the incidence of illegal killing and the analysis of global/regional trends) would be difficult, however, the data structure is in place to measure: a) the numerical and spatial elements of illegal killing of elephants, and b) monitor trends in illegal activities.

The proposed use of Bayesian network models for analysis at the global level would not only enable complex patterns of causal relationships to be explored, but also facilitate the incorporation of data of varying quality or with varying degrees of uncertainty.

It was noted that feedback loops are not permitted in Bayesian networks. Feedback can however be accommodated by introducing a time variable and using dynamic Bayesian networks.

The TAG agreed to adopt the draft analytical strategy with the recommendations that:

i. The next step is to for the Director to formulate hypotheses.

ii. Anticipating a time-frame on trend analyses and other outcomes might lead to misunderstanding. The statement that it may take years of data before they can manifest trends needs to be reformulated to explain the technical relevance.

iii. Modify region/sub-regional phrases to meet the general reference.

iv. The training programme must address the language (French) element.

v. The role of statistics as early warning systems is recognized, this is different to longer-term trend analyses – changes in the wording should fix this.

vi. The site level questions in Appendix 2 be removed as cross reference (see para 4.2 below).

The TAG further agreed that the Director and Burn would work together on the hypotheses implicit in the draft analytical strategy, as well as the above recommendations and provide the Director with the final draft for circulation to the TAG members. [Action : Burn, Hunter]

4.2 Site level questions – Nigel Hunter

The site level questions as annexed in Appendix 2 of draft analytical strategy were discussed. It was felt that the question structure is too complex and detailed and that it is difficult to separate what analyses need to be done at site level versus regional and national levels. Similarly, the questions could be relevant to a wide spectrum at site, national, regional and global levels. Therefore, reformulating this table to address the needs at each level is needed.

The TAG agreed that the table of site level questions be removed as a cross reference in the draft analytical strategy. The questions should be reformulated to be of interest to site, national, regional and global levels; particularly with regards to the questions which are useful at each level, the information which is required for each level of analysis and output, and what tools are available to site and national officers to carry out such analysis. The TAG further recommended the SSOs to discuss the list of questions with the site & national officers. Feedback should be given to the TAG at the next meeting. [Action : SSOs, Hunter]

4.3 Measuring Law Enforcement Effort – Rene Beyers

The TAG next considered the paper "MIKE Law Enforcement Analysis Strategy at the Site Level" prepared by Hugo Jachmann & Rene Beyers in July 2003, annexed hereto as Appendix II.

It was agreed that the paper is a commendable effort and an essential foundation towards developing the analytical structure. In particular, it stimulated discussions by TAG members, resulting in constructive comments and suggestions towards improvement of the analytical structure, which are summarized as follows.

It was recognized that when measuring effort, the variable effort, should be proportional to the distance moved and to the time spent in the field. Time in the equation on page 5 refers to the period over which effort is measured (month, year, etc.), not to time spent in the field. The latter may be included as follows:

Effort = .cf. log(pm). distance covered. time spent in the field

Some hypothetical examples should be tested to see if the equations throughout this paper give sensible results.

Prof. R. Sukumar raised concerns over the use of "unit area" in the measure of effort but reported back the following day that, after reading the text carefully, he was satisfied with its use.

Bob Burn pointed out that the correction factor *Cf* is part of the detection probability and this was further discussed. He agreed that detection probability influences patrol search effort and habitat is one of the factors affecting this probability and hence effort. Therefore a habitat correction factor was applied.

Burn also added that it would be very difficult, if not impossible, to combine different measures of effort (e.g. patrol search effort, investigations and intelligence etc.) into one measure of effort even at the same site. For example, if a number of carcasses are found, some by patrols, others by investigations, there is no obvious way of calculating a combined C/E measure. For the purposes of statistical analyses, it may be better to use regression modelling with catch as response and the various effort measures as explanatory variables. This approach needs to be explored by analysing real data.

It was recommended that attention be given to the possible inclusion of visibility when using the grid system, as when using GPS technology during patrols. A habitat correction for visibility was not taken into account for the grid system in this paper.

Prof. Sukumar suggested that the relationship between detection probability of an illegal activity and habitat (as influenced by its visibility) may be non-linear. Thus, a simple linear scaling of the visibility in the form of an index seems arbitrary. Catch probability would presumably also depend on other variables than habitat such as sound, footprints, visible disturbance to vegetation, etc.

It was felt that the need for confidentiality, though valued by the TAG, leads to an approach that may be too focused. A broader approach that includes active detection (C/E) of carcasses needs to be considered.

When assessing data from Road Blocks, there is a need to differentiate between Fixed and Random road blocks. Observation Posts must also be included as a type of LEM. The suggestion that Tourism has very little influence on poaching was accepted and therefore need not be included.

There was general agreement that language use and varied interpretation of words like "catch" and "encounters" led to confusion. This must be clarified and terminology must be defined. Despite some confusion over these terminologies, the TAG agreed that the primary measure of catch is the finding of illegally killed elephants. Once that is in place, then secondary variables such as encounters with poachers and other forms of catch come into play.

The concern of duplicate data was raised. MIKE staff are aware of this problem and it has been discussed with field staff. So far, the problem has not emerged as a real one.

Iain Douglas-Hamilton commented that the methods that had been proposed for capturing patrol effort were too complex and had led to a patrol form that was impractical. At present few patrol data forms were being filled out correctly in East Africa. The method had evidently been successful in Luangwa Valley for detecting changes in elephant mortality but the approach was too complicated for general application and could only be applied in areas where

patrolling was carried out intensively with a high degree of supervision. In fact, such conditions did not apply to a majority of MIKE sites in Africa and therefore the method should evolve to a more user friendly protocol.

The meeting agreed that the baseline data from South Luangwa may not be universally transferable to all MIKE sites. Hugo had also made this observation in the paper. Variations in the ecology, personnel structures, management systems and funding may contribute to significant differences.

Douglas-Hamilton further commented it was essential to test other proxy parameters of effort, in a trial analysis on a limited quantity of data, in order to find out what degree of data precision was necessary to allow comparisons of carcass data between different sites. Data forms for measuring effort could only be evolved and improved after such trial analyses have taken place.

John Hart suggested a number of coarse level rank orders that might be used as measures of effort, to be collected at site level rather than for individual patrols.

Beyers described a method for recording patrolling density on a grid square basis where grids were scored according to how often they were crossed by patrols. This would allow comparisons to be made on the spatial relationship of effort to carcasses recovered or various illegal activities found by the patrols.

Douglas-Hamilton also suggested that carcass data should not be included under the category of "Law Enforcement Monitoring", as the term in this context is misleading. Carcasses are often described as being detected by LEM, or as part of the LEM database, when in fact they can be located by air survey, local knowledge (village meetings, intelligence informants), patrols, herders, problem animal control, research and tourism.

In conclusion, the TAG noted that the paper prepared by Jachmann and Beyers has stimulated questions which has led the meeting to recommend that a Law Enforcement Task Force be formed. It was agreed that subject to budget availability, the Director would put together this taskforce and plan a workshop to take the points raised here further. He should consider to invite experts on law enforcement to be included in this taskforce. He would also look into the suggestion that available data be tested before the taskforce meets. [Action : Nigel Hunter]

4.4 Genstat 6.0/7

In addition to the ArcView GIS software, Microsoft Office software (Access, Excel and Word) and the custom MIKE database management system, a general purpose statistical package should be installed on all sites. The Genstat system (NAG, Oxford, 2003) was approved by the meeting for this purpose, subject to an initial evaluation of its suitability.

An agreement has been signed with the suppliers of Genstat (NAG/VSN) for the supply of the software at the cost to MIKE of US$500 per licence in perpetuity. Version 7 of Genstat is released around October 2003 and Bob Burn will be meeting with the programming team to discuss the inclusion of special statistical extensions to its functionality for the MIKE process. The linkage to the computer program DISTANCE (Buckland *et* al, 2001) for land transect work may be difficult, but linkages to ArcGIS and ArcView 8 series should be made. [Action : Bob Burn]

4.5 Measuring Information Network Effort

A list of the areas involving heavy community effort which could be included as possible MIKE sites for information networking was given below :

West Africa
- Babah Rafi (Niger)
- Gourma (Mali)

Central Africa
- Sangba (CAR)
- Bangassou (CAR)
- Bomba-Bek (Cameroon)
- Monte Allen (Equitorial Guinee)
- Kahuzi-Biega (DRC)
- Virunga (DRC)
- Okapi (DRC) – suggested by John Hart

Southern AFrica
- Cabora-Bassa (Mozambique)
- Chewore (Zimbabwe)
- Nyami Nyami (Zimbabwe)
- Caprivi Conservancy (Namibia)

East Africa
- Gash Setit (Eritrea)
- Samburu/Laikipia (Kenya)
- Akagera (Rwanda)
- Selous (Tanzania)

The meeting agreed that this list be looked at again as a dynamic list when the Law Enforcement Taskforce has been able to meet and investigate the issues arising out of measuring law enforcement effort thoroughly.

5. Population Survey

5.1 Recommendations from the MIKE Dung Count Taskforce meeting in Washington DC, 27 – 29 Oct

The Director expressed gratitude to the US Fish and Wildlife Service for making available the venue for the MIKE Dung Count Taskforce meeting recently concluded in Washington DC.

The presentation by Dr Holly Dublin giving an overview and summary of the recommendations from the taskforce is annexed hereto in Appendix III. Following discussions on the various dung count parameters, the TAG accepted the recommendations by the taskforce, and in particular, flagged the following issues :

a) Dung decay

On the issue of how to determine a "representative" sample for decay experiments, the TAG cautioned against the recommendation to find a concentration of elephants (and therefore dung) and establish dung decay plots by moving dung to a "control" plot and then following them under known conditions as local conditions at the site where a dung pile actually falls e.g. dung beetle activity may not be reproduced entirely in control plots. This is a feasible option but should only be a method of last resort.

b) Defecation rate

On the recommendation to use 18 dung piles per day as defecation rate, the TAG suggested that additional studies be carried out in at least 3 sites with stable forest conditions, 1 in South Asia, 1 in Central Africa (Lope or Garamba) and 1 in Southeast Asia in order to compare their variation over animals within sites and variation between sites, as well as the actual values obtained.

c) Recces and Transects

It was noted that the status of the use of recce transects within MIKE is unclear, particularly whether there has been a clear decision on the use of "recce" counts or not in the current Central Africa forest surveys that are underway.

The need for a clear distinction on terminology was flagged and John Hart explained that the surveys in the current Central African forest are designed based on line transects using DISTANCE 4 software. The first level analysis of the survey data will utilize only the line transect data. However, the survey teams have added data collection on recces to their survey design which are linked to the transect lay out produced by DISTANCE. The objectives of adding recces are :

- To provide a basis for testing correlation of encounter rates on transects with simpler data collection methods. (This harkens back to Barnes "poor man's survey design")
- To provide a basis for testing and possibly reducing overall survey variance (as per Peter Walsh)
- To provide a basis for collecting systematic data on human sign and other fauna (specifically great apes) that might only be rarely encountered on transects, and thus difficult to analyze.
- To provide systematic data on vegetation and other spatial data for verification of the site base map.

It is anticipated that the recce data will be especially useful in developing higher-level spatial analyses of the data, in interpreting the transect results, in providing a better picture of the sites to the national administrations, and in motivating the excitement and discipline of the field teams.

Two different data collection modes for recces are being used : "Guided Recces" or "Comprehensive recces" and "travel recces".

Comprehensive recces are 2.5km on either side of the 1km transect. They allow teams to collect analyzable data on bonobos, a species which is known to occur in patches that might easily be missed by strict line-transect. These recces follow the same

orientation as the transects but can deviate by <40 degrees. The decision was made to include comprehensive recce to the sampling design in order to convince potential MIKE site partners, particularly the Max Planck Institute team who has particular interest in bonobos and had designed their own survey. In Dzanga-Sangha, comprehensive recces are 500m at end of the transect while in Nouabale-Ndoki, these are 1km long.

Travel recces are the lines of travel between transect locations. During travel recces, field teams are encouraged to investigate areas of special interest to elephants, apes the overall protection of the park, including evidence of major human activity, major habitat change and poaching evidence that are in their general direction of travel.

The TAG agreed that the design for MIKE forest surveys in Central Africa per se should focus on the design approved by the TAG, which is to use data from line transects only for dung density and travel recces for law enforcement data only. Any law enforcement data from these travel recces must feedback into the MIKE LEM database which will be used in the measure of law enforcement effort. The use of comprehensive recce or guided recces for improving precision is still under investigation. It is agreed that the if any complementary research is to be done to determine whether comprehensive recces can help improve precision, this would be done under the scrutiny and supervision of Dr Ken Burnham and Bob Burn, as wrong analysis could lead to a wrong conclusion.

The TAG accepted the recommendation that standardised information from the use of recces should be clarified in the dung count standards.

d) Retrospective Estimation of Dung Decay Rates - Logistic Regression Model

The retrospective estimating of dung decay rates (Laing, *et al,* 2003) aims to derive animal density from dung density through an estimation of the mean time to decay of dung piles present at the time of the survey. In the design of the decay experiment, it would be advisable to conduct decay experiment prior to each survey with a visit to the study area to identify and mark all fresh dung piles found. The actual duration of the decay experiment would depend on the requirement that at least 90% of dung piles are expected to decay by the end of the experiment. Repeat visits are required over the period to identify more fresh piles: at least 5 or 6 visits in order to try and obtain a representative sample of fresh dung piles on each visit. A minimum of 50 fresh dung piles is recommended counting all visits together, i.e. a minimum of about 10 per visit.

Prof R. Sukumar flagged whether the logistic regression model would be precluded in the Asian habitats where seasonal variation could cause a possible bias as decay rates may have to be estimated for dung piles not necessarily present at time of survey. It was agreed that Dr Ken Burnham, Prof. Sukumar and Bob Burn would follow up on this issue and provide their feedback to the TAG members. [Action : Burnham, Sukumar, Burn]

Burn flagged that he has been working on a simplification of the calculation for dung decay rate in the logistic regression model and will provide this to the TAG members. [Action : Burn]

The recommendation by the taskforce to adopt the logistic regression model in the design of MIKE forest surveys was accepted by the TAG.

In the context of the forest site in Ghana (Kakum) where the Barnes' rainfall model had been developed, it was agreed that the rainfall model could be continued. However, the TAG recommended that it would be good to compare the results of both the rainfall and the logistic regression models at Kakum.

In the context of the current forest surveys in Central Africa, it was agreed that this logistic regression model would be used in Bangassou, Mont Alen and Bomba Bek, as these surveys have not yet started. It was suggested that for all sites currently undergoing surveys (Salonga, Minkebe, Dzanga Sangha, Nouabale Ndoki), it would probably still be useful to implement the logistic regression model in preference to any rainfall model. Discussions focused on the time interval required between sampling and it was agreed that Burnham and Burn would work with John Hart and Steve Blake under the facilitation of the Director to determine how best to get the retrospective dung decay studies underway. [Action : Burnham, Burn, Hart, Blake, Hunter]

e) Dung Count Standards

The final output of the draft of dung count standards would be submitted at the next meeting for approval. [Action : Dung count taskforce]

5.2 Classification of MIKE Sites (Population/Area) to determine appropriate population survey approaches

Following the suggestion at the last TAG meeting that the Southeast Asian sites be classified in relation to population levels and area sizes to enable a discussion of the appropriate design of population estimation surveys, the Director presented a draft site matrix of the population and area of these sites.

He noted that there is a need to carry out reconnaissance surveys in these sites as the elephant numbers of some sites are unreliable.

It was agreed that a column for the source of population estimates and the survey methodology should be added to the site matrix and this be resubmitted at the next meeting for discussion. [Action : Hunter, SSO for Southeast Asia]

5.3 Report from the WCS Workshop : Monitoring Asian Elephant Populations and Assessing Threats, 3 – 7 Nov 2003, Karnataka

Arun Venkataraman next proceeded to give an overview of the recent WCS workshop in Karnataka the objective of which was to evaluate an array of rigorous sampling-based methods for monitoring Asian elephant populations and factors affecting their conservation, keeping in mind the recent scientific advances and knowledge gained from the monitoring of African and Asian elephants.

The manual production time will be one year. The content of each chapter will be decided by two editors, Ullas Karanth and Simon Hedges.

Current methods such as block counts and registration used in South Asia may need validation by experts. Discussions on the demographic parameters from capture-recapture sampling suggested that camera-trapping may not be a viable option for estimating population numbers as the number of cameras needed is very high, it would be better to rely on visual IDing.

Camera traps to estimate abundances was suggested for Cambodia as the population numbers there are low, however, the issue of cost effectiveness would still be a factor.

It was noted that the workshop concentrated on the monitoring methods and innovations possibly available. However, the relevance to MIKE is not that clear as there was as yet no critical evaluation nor comparison of the methodologies to be used in different situations, particularly in regards to estimating population numbers and cost effectiveness.

It was agreed that although the TAG was represented at the workshop by Dr Richard Barnes, the output of the workshop on monitoring methodology is independent and not an endorsement of any method for use in MIKE sites. MIKE would decide in due course whether the manual would be useful for assisting the development of appropriate methods as an alternative to line transect dung counts. It was agreed that the IUCN AfESG initiative to develop a dung count "cookbook" should be encouraged as that is a short term need for MIKE now.

6. New Technology

6.1 Cybertracker Technology

Swanne Swannapoel, the technical officer from CyberTracker, South Africa was invited to the meeting to give a detailed presentation of the Cybertracker. The CyberTracker is a free software (Greenware) developed for PalmOS handheld computers that allows non-literate users to carry out data collection using an icon-based interface rather than text interface or written methods. Hardware (palm top with GPS units) are not part of the CyberTracker. The software allows users to export data for advanced analysis using for e.g. Excel or ArcView. However constraints still exist on the connectivity between the palm-top and GPS, nevertheless, there is dialogue with Garmin on linkage.

Following discussions on the technical and longer term funding prospects of the CyberTracker, it was agreed that the expectation that MIKE was going to adopt CyberTracker technology should not be created in the dialogue with the Central African CyberTracker team (Jean Marc Froment). The TAG needs to consider the compatibility issues, hardware and budgetary requirements before a commitment can be made about CyberTracker. It was proposed that Martin Tchamba and Sebastien Luhunu to present their evaluation of the use of CyberTracker in the Central African sites and provide a structured proposal for the use of CyberTracker.

It was also agreed that the CyberTracker software may not be the most useful for assisting the line transect forest surveys and that other softwares, such as ArcPad, should be evaluated. There was also the need to ensure that the hardware platform was appropriate.

In conclusion, the Director proposed that he would hold an inter-meeting dialogue with Tchamba, Luhunu, Rene Beyers, Philip Stander and Julian Blanc on the evaluation of the CyberTracker. [Action : Hunter, Tchamba, Luhunu, Beyers, Stander, Blanc]

6.2 Vodafone collaboration

The Director reported that he was still awaiting Vodafone's formal response to the proposal (submitted in collaboration with FFI) for providing Research and Development in terms of improving the technical ability to move data and information from sites with no current telephone or internet links. Since it was at least 8 months since the proposal was submitted, FFI had agreed to put pressure on Vodafone to give a response one way or the other.

Iain Douglas Hamilton gave the TAG an update on where Save the Elephant is collaborating with Vodafone and four telecommunication companies on the design on elephant collars using cellular technology. Field trials are being undertaken and there is scope for collars on smaller animals.

7. MIKE Forms

Human Elephant Conflict Form

The TAG next considered the draft form on Human Elephant Conflict (HEC) to the MIKE process. The form was produced in response to request by range States and is recommended as a voluntary form and has been shared with Richard Hoare and Hugo Jachmann. The chief aim is to provide information on what is happening in the conflict zones and to help motivate the data collection.

There was discussion whether the form actually falls within the remit of the MIKE objectives under Resolution 10.10 (Rev.). The Director explained that the range States have asked for guidance in this area and the form was produced in the context that the overall goal of MIKE is to provide information needed for range States to make appropriate management and enforcement decisions. It is intended as a voluntary form and data collection on HEC would not be part of the analytical strategy nor fed into the MIKE database. However, several concerns were raised by the TAG on the forms such as the "subjectivity" of some of the questions. Furthermore, there are spatial and temporally complex issues in the analysis of HEC, and it is a major concern that the draft HEC form could create an expectation among the range States that the form can be a 'tool' to analyse such issues. The monitoring and pin-pointing of conflict zones may assist range States but this should not detract on the need to keep MIKE focused. The LEM data collection is already overloaded, the introduction of a new and voluntary form could add burden and affect the MIKE data quality.

Furthermore, in the area of HEC, the IUCN AfESG Human Elephant Conflict Working Group (HECWG) has investigated this area in detail and developed 'tools' for the study and management of HEC, and assisting capacity training for enumerators of elephant damage.

Following its recommendation to drop the HEC form, the TAG agreed that MIKE should promote the AfESG HECWG protocol including the use of their form. The information collated under the protocol would not form part of the MIKE database for analysis.

It was agreed however that the Director should review the existing Carcass forms and see if some improvement was possible on that form regarding elephant mortality and HEC factors. [Action : Hunter, SSOs]

8. Any Other Business

8.1 Aerial Data Sheets

There was discussion on the format of aerial data sheets to be annexed to the Aerial Survey Standards. It was agreed that Dr Colin Craig would harmonise the columns in the aerial data sheets in line with the text of the Aerial Survey Standards to acheive consistency. The final data sheets should be sent to the MIKE CCU for upload to the MIKE website. [Action : Craig]

8.2 Convention of Migrating Species/AfESG

Dublin reported that an MoU with an action plan for a strategy in Central Africa has been signed between IUCN AfESG and the Central African range States. Under the MoU, both MIKE and ETIS form a central part of the action plan. The strategy for West Africa has been sent to the range States and would become de-facto to the MoU. The next course of action now is to secure 8 or 9 signatures in West Africa to the MoU which will then be submitted to ECOWAS. If adopted, the terms would be equivalent to the Yaoundé Declaration.

8.2 CoP report

A query was raised as to the draft ETIS and MIKE reports to the COP 12.

It was agreed that the outline of the methodology and scope of the draft reports to the COP be submitted at the next TAG meeting. [Action : Milliken, Hunter]

9. Next Meeting

The next meeting will be scheduled between June and July 2004 in Nairobi.

ABBREVIATIONS

CCU	Central Coordinating Unit
CoP	Conference of the Parties of CITES
EC	European Community
ETIS	Elephant Trade Information System
LEM	Law enforcement monitoring
MIST	Management Information System for Uganda Wildlife Authority
SSO(s)	Sub-regional Support Officer(s)
TAG	Technical Advisory Group

Action Plan
(on issues relating to TAG meeting, Namibia, 9 – 10 December 2003)

Action Points		Action By
2.0 Matters Arising		
2.1	Survey Effort & Power Prepare a draft statement clarifying the relationship of power, effort, covariates and time.	Hunter, Barnes, Burn, Sukumar, Craig
2.2	Measuring Information Network Effort Prepare a paper on the research on proxy measures for measurement of Information Network Effort.	Douglas Hamilton
3.0 Progress Report Africa & Asian Sub-regions/ MIKE CCU		
3.1	Digital mapping of MIKE sites Clarify sites boundaries for Chawore, Nyami Nyami, Cabora-Bassa and Kruger	SSOs Stander
3.2a	MIKE and ETIS Sub-TAG Clarify exact scope of the terms 'co-opted' and 'ex-officio' TAG members Circulate CVs of new TAG members.	Hunter Yeo
3.3	Early Warning Indicators from Carcass Data Initiate the Carcass Data Taskforce.	Hunter, Barnes, Dublin, Hart, Douglas Hamilton, Burnham and Burn
4.0 Data Analytical Strategy		
4.1	Formulate hypothesis implicit in draft analytical strategy. Finalise draft analytical strategy for circulation to TAG.	Burn, Hunter
4.2	Site level questions Reformulate table of Site level questions on site, national, regional and global levels. Feedback from National and Site Officers.	Hunter, SSOs
4.3	Measuring LEM Effort Initiate the Law Enforcement Taskforce	Hunter
4.4	Genstat 6.0/7 Feedback on inclusion of statistical extensions to Genstat 7, and linkages to program Distance, ArcGIS and ArcView 8 series.	Burn
5.0 Population Survey Approaches		
5.1d)	Retrospective Estimation of Dung Decay Rates Feedback to TAG whether logistic regression model would be precluded in habitats of seasonal variation.	Burn, Burnham, Sukumar
	Feedback to TAG on simplification of the calculation for dung decay rate.	Burn
	Facilitate and get the retrospective dung decay studies underway in ongoing Central African surveys.	Burnham, Burn, Hart, Blake, Hunter
5.1e)	Provide final output of dung count standards for TAG approval.	Dung Count Taskforce Venkataraman, Dublin, Barnes, Hedges, Tyson, Blake, Burnham, Burn, Eggert
5.2	Classification MIKE sites (Population/Area) in SEA Provide revised site matrix with column for source of	Hunter, SSO (SEA)

	population estimates	
6. New Technology		
6.1	CyberTracker Inter-meeting dialogue to evaluate CyberTracker.	Hunter, Tchamba, Luhunu, Beyers, Stander and Blanc
7. MIKE Forms		
	Review existing Carcass Forms for improvement of data on elephant mortality and HEC factors.	Hunter, SSOs
8. Any other business		
8.1	Aerial Data Sheets Provide MIKE CCU with final aerial data sheets for upload to website.	Craig
8.2	CoP Report Provide TAG with outline of the methodology and scope of draft reports to CoP.	Milliken, Hunter