Working Group Discussion Two
Ground Survey Working Group

Dr. Raman Sukumar, from the Asian Elephant Specialist Group, chaired the ground survey working group of about 10 persons through nearly two days of discussions. It should be noted that the recommendations formulated during the discussions are preliminary. They are currently undergoing careful review by the data review taskforce which was appointed by Dr. Holly Dublin at the close of the AESG meeting.

Terms of reference

Goals:

To critically assess the methods of ground census and indirect techniques for estimating elephant numbers and densities. Determine the strengths and weaknesses of the methodologies currently employed. Develop methods for more precise population estimates to allow better comparisons between and within populations over time.

Focal Topics for Discussion:

* Assess the differences between the studies undertaken in central African forests and east African montane/coastal forests. Compare these with lessons learned from Asian elephant research.

* Identify the limitations of using dung counts as a means to estimate numbers/densities of forest elephants.

* Critique the common assumptions regarding the following:

    i) Defaecation rates: the differences between seasonal forest foraging and year-round forest use;

    ii) Effect of seasonal movement of elephants in to and out of forests on dung density estimates;

    iii) Differential decay rates along precipitation, slope, temperature and altitude gradients;

    iv) Effects of decomposers, such as dung beetles, on decomposition rates;

    v) Validity of using distance from roads and rivers to set densities and thereby, estimate population size.

* Assess data quality and categorising of data for input to national, regional or continental databases.

* Identify the best means to analyse these data.

* Define how data decreases in value with time since last census (ageing). Should old (guess) estimates be discarded or revised?

* Using revised census methods, is there an acceptable way to review and revise previous estimates to allow for valid trend analyses.

* Define the best means to provide data to the African Elephant Database:

    i) How different quality data should be managed?

    ii) The frequency of updating numbers;

    iii) The shedding of data which does not meet the present scientific standards;

    iv) Revising the historical numbers to include updated estimates produced by employing new techniques.

    v) Re-introduction of revised data into the database?

* Discuss the role of the African Elephant Database: What can range states or individuals provide towards this facility, and what can they expect in return from this tool?

Others topics that are considered relevant to the discussion.

Discussion Summary

This group began their deliberations by summa rizing the differences between East, Central & West African ground surveys. Basically, surveys in Central Africa have been conducted in vast areas of contiguous lowland forest, whereas in East Africa, there is a wide variety of forest types in small isolated areas from which elephants can move in and out. West Africa tends to be more like East Africa.

It was pointed out that human populations in Central African forests are sparse and are distrib uted along roads and therefore elephant densities increase with distance from roads. In contrast, human activities in West and East African forests are ubiquitous and there is probably no gradient of human pressures which relates to elephant density.

The group listed a number of important decision making steps which are useful to take before embarking on ground surveys. These steps relate specifically to information needs (i.e. what are the management authorities, donors and techni cal experts aiming to produce information on?); survey design (i.e. what is the method under consideration designed to produce?); resources (i.e. what funds, time and skills are needed?); and the level of accuracy and precision required (i.e. what sort of results are expected from the survey and what are the limitations of the survey?). It was stressed that both donors and managers must be clear about their objectives when planning research on forest elephants.

In a critique of the current survey methods used (which were aptly reviewed in the plenary pre sentation by R. Barnes) the group noted the conclusions made by Jachmann (1991) from his comparative survey of four methods of estimat ing elephant density: that the dung seen on a transect is an accumulated index of elephant abundance over the previous month or two. Di rect counts of elephants (aerial and ground), which record instantaneous distribution, might not give as accurate estimates as dung transect counts.

It was agreed that in order to account for elephant movements, *either* (i) the whole range must be sampled if the survey is conducted in only one season *or* (ii) a survey must be conducted in both seasons. When planning a time frame for a survey, it should also be borne in mind that it takes about 2 months for the system to reach a new steady state after transition from one season to another.

The steady state assumption is central to ground survey theory and practice. Inaccurate estimates will result when the steady state assumption is violated. However, when the transects cover a large area and span a long time period, deviations from the steady state are probably evened out.

The group emphasised the urgent need for more data on the relationship between dung decay and rainfall and the possible relationship between defaecation rates and rainfall, before any effects of violations of the steady state assumption can be simulated.

The members of the working group agreed that much work remains to be done on the factors influencing dung-decay rates. They proposed that a wide-scale study of dung-decay rates was required and suggested 15 sites in India, Kenya, Congo, CAR, Malawi, Ghana, Cameroon, Congo and Gabon, where such studies could be con ducted. It was decided that a proposal for these studies should be drawn up.

Various factors which could be studied within such a proposal were discussed. The point was made that either one conducts an ecosystem study including *all* factors that might influence dung decay, or one keeps the study as simple and as practical as possible. For example, rainfall influ ences decay rates directly and also indirectly through determining dung-beetle activity. Thus the simplest procedure might be to relate rainfall to dung-beetles.

The group made substantial suggestions for rede fining *data quality* of ground surveys for input ting into the AED. It was strongly felt that there should be two scales, one for aerial and one for ground surveys. The new data quality categories for ground surveys were proposed as follows, subject to further discussion:

High: *Confidence Limits (CLS) for mean elephant density less than 30% and *one* of the following:

(a)   Decay rate measured on site for *>50* dung-piles
(b)   Defaecation rate measured on site
(c)   CLS for dung density estimate <20%
(d)   Sampling is done for both wet and dry seasons *OR* Any 3 of the above 4 conditions (a) -(d)

Medium CLS for elephant density < 50 *OR* Any two out of the three following conditions:

(a)   Decay rate measures on site for > 30 dung piles
(b)   Defaecation rate measured for target population
(c)   CLS for dung density <30%

Low   When the conditions for HIGH and MEDIUM are not fulfilled.

* In this discussion CLS are 95% confidence limits expressed as a percentage of the mean. The group specified that data would be assumed to be valid for the date of the survey, and dung counts made in the past would be updated as new data on defaecation and decay rates become available. For trend analysis not less than 5 consecutive estimates over time are required. A significance level of 90% would be acceptable.

In general, the group felt that the AED is a valuable tool for stratification and for planning ground surveys. It was pointed out that the value of the database is likely to grow as more data for the forested regions are collected. Updating estimates once every 3 years was felt to be adequate.

Reference

Jachmann, H. Evaluation of four survey methods for estimating elephant densities. *African Journal of Ecology* 1991. 29:188-195.