Working Group Discussion One

Aerial Survey Working Group

Thirteen persons, under the chairmanship of Dr. Simon Stuart, spent most of the fourth and fifth meeting days deliberating in the aerial survey working group. It should be noted that the recommendations formulated during the discussions were 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 current aerial census techniques. Discuss the weaknesses and strengths of aerial census for estimating elephant numbers. Develop standard methodologies to enable comparisons between and within populations over time. Address the decline in data relevance/value through time (ageing). Suggest means to improve survey efficiency through the use of new technologies.

Focal Topics For Discussion:

* Review of all the current methods employed in aerial surveys. Discuss individual experiences with the strengths and weaknesses of aerial survey techniques.

* Cite the benefits and short falls of total counts and sample counts. The accuracy and precision of these two methods of data collection should be considered and the relevance of each method in different situations discussed.

* Categorise the quality of these data acquired from different surveys and sources for input to national, regional or continental databases.

* Clarify appropriate means of collecting these data to allow for proper statistical trend analysis.

* Find a working definition for the terms *"RANGE" and "DISTRIBUTION",* and discuss how the African Elephant Database can distinguish between these two terms when inputting data.

* Discuss the use of new technologies (ie. GPS/ GIS links) to enhance the efficiency, accuracy and precision of aerial surveys and produce realistic recommendations.

* Determine when estimates should be considered "outdated" and no longer of use as relevant, quotable data.

* Clarify how adequate sampling intensity is determined (the problem of precision vs. cost).

* 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?

Other topics that are considered relevant to the discussion.

Discussion Summary

The group reviewed current aerial survey methods, categorizing them as ***total and sample*** counts. Total counts can be classified further depending on their ***searching rates*** (high, medium or low), while sample counts divide into two: *block* and ***transect*** counts. The latter can also be classified according to their sampling intensity.

The group pointed out that the main advantage of an aerial survey is that large areas can be covered, permitting access to remote locations. However, limitations are brought about by variations in observer skill and experience, along with the obvious restrictions that thick vegetation imposes.

The group discussed in detail, with examples, the benefits and shortfalls of each of the two main methods (total and transect counts), and clarified the important distinction between *accuracy* (the closeness of the estimate to the number) and *precision* (the repeatability of the estimate).

It was agreed that while ***total*** counts can be precise, there is no way to assess their accuracy without independent information.

Sample ***transect*** counts, with repeated surveys, are potentially the most accurate method but are less precise (unless the sampling intensity is high). ***Block*** counts are less precise than transects because of the non-random distribution of animals, but they are at least as accurate, if not more, per unit effort as transects.

The determination of adequate sampling intensity for sample transect counts should relate to the precision required by the client to answer management questions. In relation to this, the group thought that the model developed by C. Craig in his plenary presentation could be adapted for use in different areas.

The group had important preliminary discussions on the categorization, by quality, of data for input into the African Elephant Database (AED). At present, all aerial survey data are included in category 1 for quality. Members felt that this category should be subdivided further as follows:

Total Counts

T1 = Searching rate <100 km ^{2} /hr

T2 = Searching rate 100-200 ^{2} /hr

T3 = Searching rate >200 km ^{2}/hr

In the absence of searching rate data, the results of total counts should be included in T3.

Sample Transect Counts

S1 = 95% confidence limits < $\pm$ *25%*

S2 = *95%* confidence limits $\pm$ 25 - $\pm$ *50%*

S3 = *95%* confidence limits > $\pm$ *50%*

In the absence of confidence limits, the results of sample transect counts should be included in 53.

Block Counts

B1 = 95% confidence limits < $\pm$ 25%

B2 = 95% confidence limits $\pm$ 25 - $\pm$ 50%

B3 = 95% confidence limits > $\pm$ 50%

In the absence of confidence limits, the results of block counts should be included in B3.

These suggested new categories must be reviewed more thoroughly for their ability to discriminate meaningfully between data of various quality and should, therefore, be considered preliminary recommendations.

On the subject of **statistical trend analysis of population data,** the group clarified that determination of trend depends on ***standard errors*** being recorded on population estimates. The ability to detect statistically significant trends depends on high precision of individual counts, or less precise but repeated counts over many years, as opposed to accuracy.

Carcass ratios are likely to be an important subjective indicator of trend when undertaking counts in areas unlikely to be censused again for many years. However, the use of this ratio needs to be assessed in different climatic situations. Although ***age structure*** can indicate population trend, this is difficult to assess from the air. However, it is a technique which deserves further consideration.

The group made precise definitions of ***elephant range*** as follows:

The African elephant range is the entire area in which the species occurs in the wild at any time. Vagrants should be excluded from the database, these being animals that are off course in areas where they are unlikely to recur.

The range is made up of the following four components:

Core range where elephants are present throughout the year.

Seasonal range where elephants are present seasonally.

Erratic range where elephants occur periodically, but not every year.

Situation unknown where elephants are known to occur, but there is insufficient information to state which of the three above categories applies.

The use of outdated data was also discussed, with the recommendation that for data believed to be extremely outdated, upper and lower population levels should be given. The upper level should be the same as the last reliable estimate. The lower level should assume a very rapid decline due to poaching. For countries without any previous data-based estimate, it is best not to give an estimate at all- until an estimate can be made.

The group agreed that the AED is of fundamental importance to the work of the AESG, its role being to maintain the continental overview of the status of the African elephant. It was accepted that the database should not try to operate at a scale to answer national management questions, or else it would become unmanageable. Certainly it can act as a useful starting point on which national databases can be built.

The group suggested **that training** in aerial survey techniques deserves high priority. Training needs were identified and countries with virtually no aerial survey capacity were listed. The group also discussed the potential use of several new technologies for improving aerial survey techniques. In its conclusions, the group recommended that the AESG should form a task force to look at aerial surveys and the AED with the objective of addressing both technical and management issues.

Photo by: Holly Dublin