

SHORT COURSE at the Student Conference on Conservation Science

Centre for Research into Ecological and Environmental Modelling, University of St. Andrews

26 - 28 March 2012

An introduction to Distance software for analysing transect and point count data

The general objective of this 3 day workshop is to give interns a solid grounding in the basic methods for design and analysis of distance sampling surveys. Teaching will be a combination of lectures, computer sessions and discussion groups.

To gain maximum benefit from the workshop, interns should have some basic training, in statistical methods. Some experience of survey design would also be useful. Familiarity with the concepts of line or point transect sampling would be an advantage, although no prior knowledge of these topics is assumed. If you wish to be well-prepared, a useful primer to read before you come to the course would be *Introduction to Distance Sampling* by Stephen T. Buckland *et al.* (2001: Oxford University Press).

Much of the teaching will be through use of computers running the analysis software Distance.

Distance sampling

The term 'distance sampling' covers a range of methods for assessing wildlife abundance:

- line transect sampling, in which the distances sampled are distances of detected objects (usually animals) from the line along which the observer travels
- point transect sampling, in which the distances sampled are distances of detected objects (usually birds) from the point at which the observer stands
- cue counting, in which the distances sampled are distances from a moving observer to each detected cue given by the objects of interest (usually whales)

Workshop content

The workshop will concentrate primarily on line and point transect sampling. The concepts of distance sampling will be explained and the assumptions of the methods discussed. Although the basic theory will be covered, the focus of the workshop will be on practical application of the methods.

The workshop will start with an introduction to wildlife population assessment methods, and demonstration of how line and point transect methods are generalizations of sample count methods (strip counts and point counts respectively). The underlying theory and assumptions of both line and point transect sampling will be covered, and the relative merits of the two approaches in different circumstances discussed. Computer sessions will follow, to train interns in the use of Distance for straightforward data sets.

More complex issues will then be covered. Special methods are required when animals occur in groups or "clusters". For example, size bias can occur - that is large clusters have a higher probability of detection than small clusters, so that population size is overestimated. Methods for adjusting for this bias will be given. Another issue is stratification, which is used to improve the precision of estimates when animal abundance, detection probability or clustering varies over time or space. Good survey design is an essential ingredient of a successful survey so design issues and field methods will be covered in detail. Some specialized applications of distance sampling such as cue counting and indirect counts (e.g., dung or nests) will be mentioned.

Schedule

Monday 26 March

09:00 Workshop opens

Introduction: methods for estimating animal abundance; distance sampling; line transect sampling

Choosing a detection function

10:45 Coffee/tea

11:00 Analysis in Distance

More on line transect sampling

Computer session: line transect exercises

13:00 Lunch

14:00 Relative and absolute measures of fit

Assumptions of distance sampling

Overview of Distance

15:45 Coffee/tea

16:00 Computer session: line transect exercises

Demonstration of data import

18:00 Adjourn

Tuesday 27 March

09:00 Variance estimation

Computer session: variance estimation

10:45 Coffee/tea

11:00 Point transect sampling

Computer session: point transect exercises

13:00 Lunch

14:00 Survey design

Automated Survey Design

15:45 Coffee/tea

16:00 Computer session: automated survey design exercises

Computer exercises

18:00 Adjourn

Wednesday 28 March

09:00 Miscellaneous topics

Computer session: choice of miscellaneous exercises

10:45 Coffee/tea

11:00 Post stratification variance

Computer session: post stratification

12:45 Lunch

14:00 Field methods

15:45 Coffee/tea

16:00 Participants data; computer session

Description of reprints distributed to participants

18:00 Adjourn