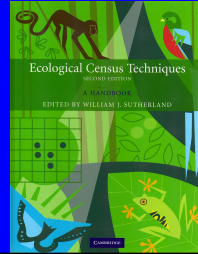
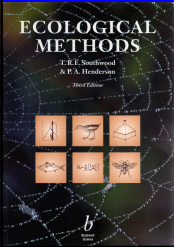


Counting: important points to remember

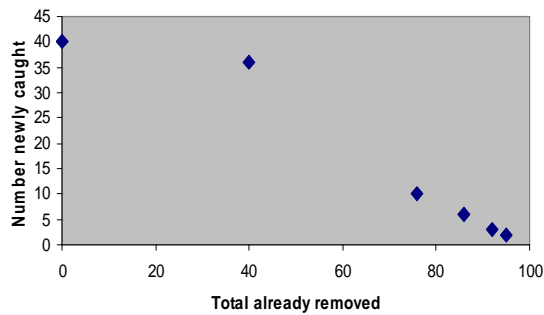
1. Know how your animal lives and behaves
2. Study the experience of other people
3. Check the effectiveness of your methods
4. Be critical of your results



The Removal Method

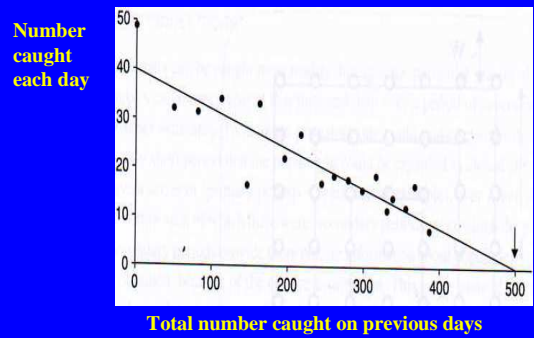
Day	Number in population (not known)	Caught and removed (known)	Total already removed (known)
1	100	40	0
2	60	36	40
3	24	10	76
4	14	6	86
5	8	3	92
6	5	2	95

Removal Method - Example



Removal method

Rattus rattus in houses in Sierra Leone over 18 days



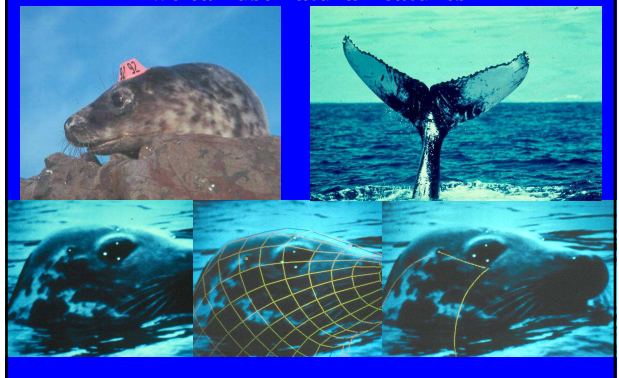
Goodness-of-Fit Tests

Observed data

Expected numbers, if assumptions were correct

Test fit of observed to expected -
for example by chi-square test

As well as marking animals,
we can use natural features



Mark and Recapture: two capture method

N = total number in population (not known)

n1 = number marked and released after first capture

Proportion now marked in population = $n1/N$

n2 = Number caught during second sampling occasion

m2 = Number of these carrying marks

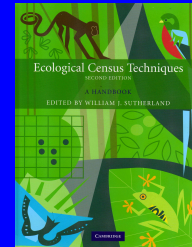
Estimated proportion of population marked = $m2/n2$

$$\frac{n1}{N} = \frac{m2}{n2}$$

$$N = \frac{(n1+1)(n2+1)}{(m2+1)} - 1$$

Important Message

Every population estimate made must also have either a standard error or confidence limits



Mark-Recapture Methods: General Assumptions

Population is closed

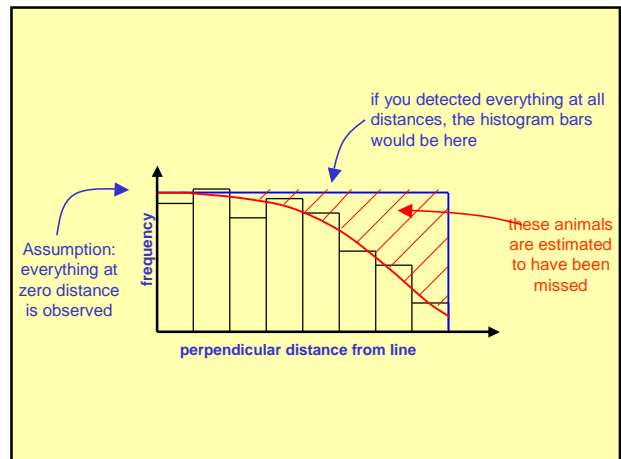
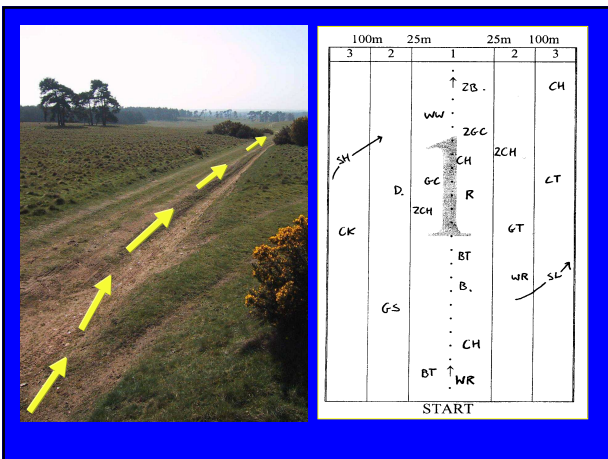
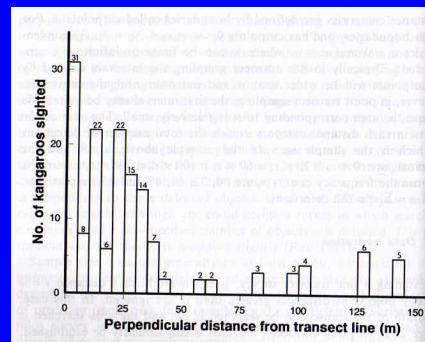
Animals do not differ in probability of being captured

Probability of capture is the same on all occasions

Probability of capture is not affected by being captured

Marks do not drop off

Line transect observations of Eastern Grey Kangaroos



<http://www.ruwpa.st-and.ac.uk/distance/>

Books

Software free to download

Courses

Assumptions of Distance Sampling

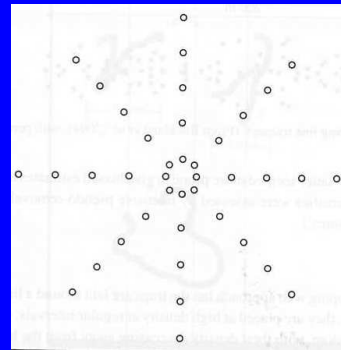
1. Measures of distance are accurate
2. Animals are randomly distributed
3. All animals on the line of travel are detected
4. Animals do not move (in response to observer) before being detected
5. Individuals do not differ in detectability (or in the "decline function")
6. The correct decline function is fitted

Marques et al. 2007.

Improving estimates of bird density using multiple-covariate distance sampling

The Auk 124 (4): 1229-1243

A Trapping Web



Buckland et al. 2006.

Point transect sampling using traps or lures.

Journal of Applied Ecology 43: 377-384.

Population estimation essentials

1. Know your animal
2. Study the experience of others
3. Check the effectiveness of your methods
4. Choose a method appropriate to:
the animal,
the habitat,
the resources available to you.
5. Remember the assumptions -
be critical of your results

Enjoy your work