

An introduction to Bird
Survey and
Census Techniques
Survey methods

**Species lists to
distribution studies**

Simple species lists

Advantages

- Species present
- Simple
- Locate threatened species
- No complicated analysis

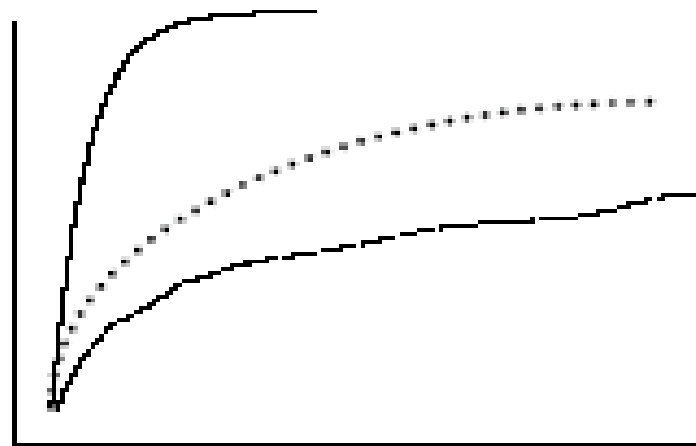
Disadvantages

- No account of effort
- Can't compare easily between surveys
- Can't compare easily between sites
- Does not assess abundance

Using species discovery curves

Species discovery curves

Total
species
recorded



Number of hours

- e.g. curves for three different habitats

Species discovery curves

Advantages

- Assess completeness of list
- Assess total number of species
- Compare richness of different sites

Disadvantages

- Requires careful analysis of data
- Does not assess abundance

Bird surveys – *advanced methods*

- Capture-recapture
- Catch per unit effort
- Radio tracking
- Play-back methods
- Distribution studies

Capture-mark-recapture

Advantages

- Temporary or permanent marks can be used
- Estimate population size
- Track changes in population size

Disadvantages

- Requires careful analysis
- Time consuming
- Requires specialised equipment and training
- Might influence bird behaviour?

Catch per unit effort

Advantages

- Standardised effort mist-netting
- Detects secretive understorey
- birds
- Index of relative abundance
- Track population size
- Rigorous

Disadvantages

- Requires careful analysis
- Very time consuming
- Requires specialised equipment and training

Radio tracking

Advantages

- Determine home ranges
- Determines time budgets
- Determines habitat selection at a fine scale

Disadvantages

- Requires careful analysis
- Time consuming
- Requires specialised equipment and training
- Might influence bird behaviour?

Play-back methods

Advantages

- Simple use of tape playback to detect birds
- Estimate population size
- Track changes in population size

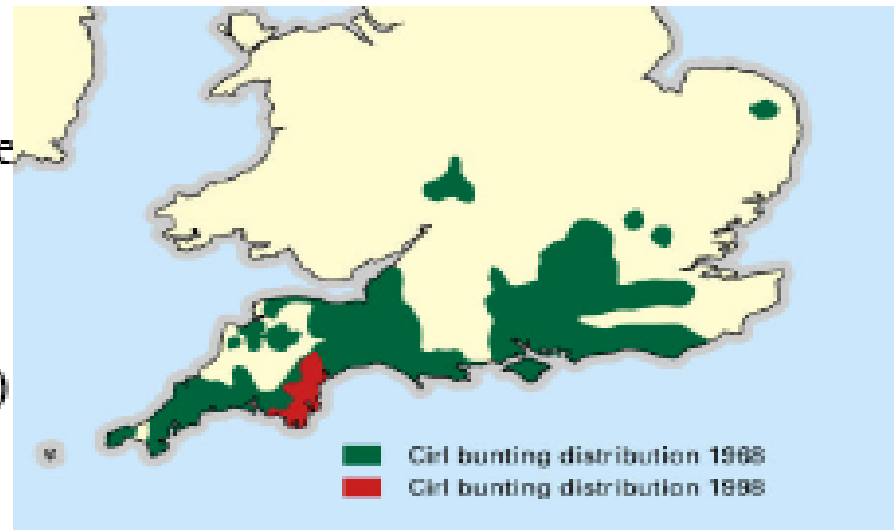
Disadvantages

- Requires careful design
- Time consuming
- Requires specialised equipment
- Might influence natural behaviour

Distribution Studies

Single-species studies

- Focus on a high priority species
- Use prior knowledge to define study area
- Rapidly assess species' range (and estimate population size)
- Repeat surveys to show distributional change through time



Habitat-scale studies

- Relate bird distribution to habitat distribution
- Can assess habitat preference and avoidance
- Can be used to assess and refine management practices
 - Understand relationships between birds and habitats
 - Predict distribution and numbers in un-surveyed areas
 - Predict possible consequences of future land use change

Line transects vs. Point counts

- Walk predefined route at a consistent speed
- Record all birds within a fixed **distance** on either side of the route
- Walk to predefined spots
- Allow time for birds to settle
- Record all birds around the spot for set **time** (2-20 minutes)

Points to consider for selecting and designing survey method

- Selection & location of routes
- Number of visits to each sample route
- Walking speed or length of time spent at each point
- Recording units for birds (age, sex, activity e.g. calling, feeding, flocking, roosting)
- Measuring distances – along route or determining the distance of birds from point
- Observer bias – measures to minimise bias

Background information needs for methods

- Detailed & clear instructions for the fieldworker
- Map of the area, with the boundaries outlined
- Identification information
- Clear & easily defined habitat codes
- Covering letter for landowners

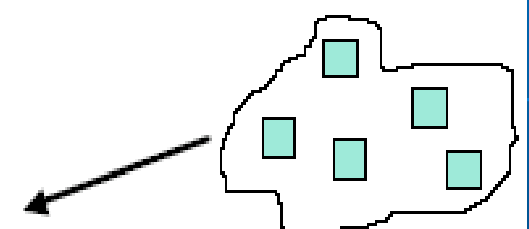
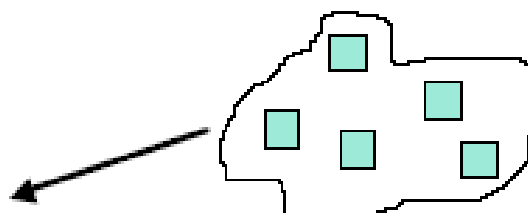
Site / Route selection

Line Transect

Point Count

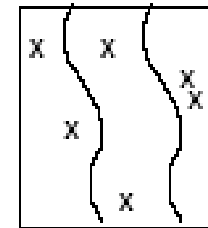
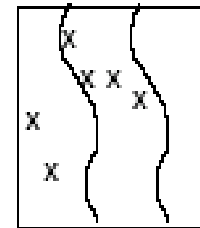
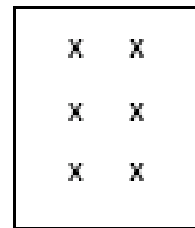
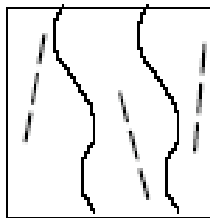
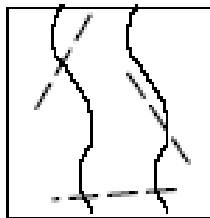
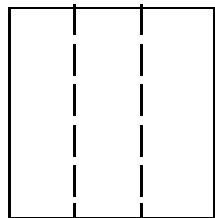
Selecting sites at random

Selecting sites at random



Selecting line transects:

Selecting points:



Systematic

Random

Random stratified

Systematic

Random

Random stratified

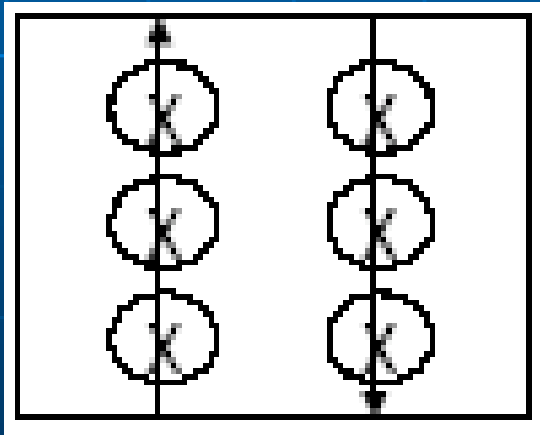
Habitat codes

- Use preset codes, so all fieldworkers are recording habitat in the same way. Codes can be included on datasheet to assist observers in the field
- Codes can be at different levels (“hierarchical”) – this gives the most information e.g. Habitat can be recorded:
 - where each bird is found
 - at regular points or along transect sections throughout the area
 - as a proportion of the whole area
- Codes are flexible: devise codes to answer your specific questions e.g. If we are interested in a farmland bird, increase number of farmland codes to increase level of detail and reduce the number of other habitat codes since we are less interested in them

Point counts vs Line transects

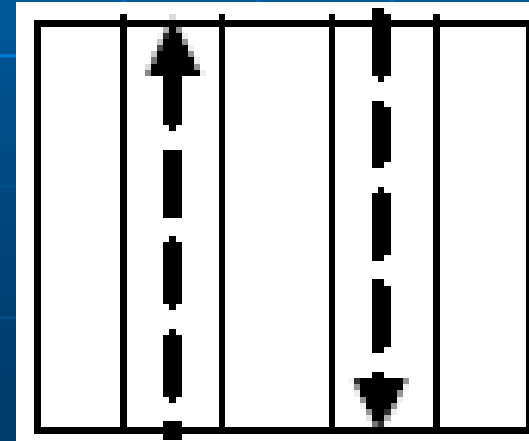
Strengths & weaknesses of point transects

- Time to spot and identify shy and cryptic birds
- Adaptable to species and habitats
- Double counting is a concern
- Time is 'lost' moving between points
- Good for habitat studies



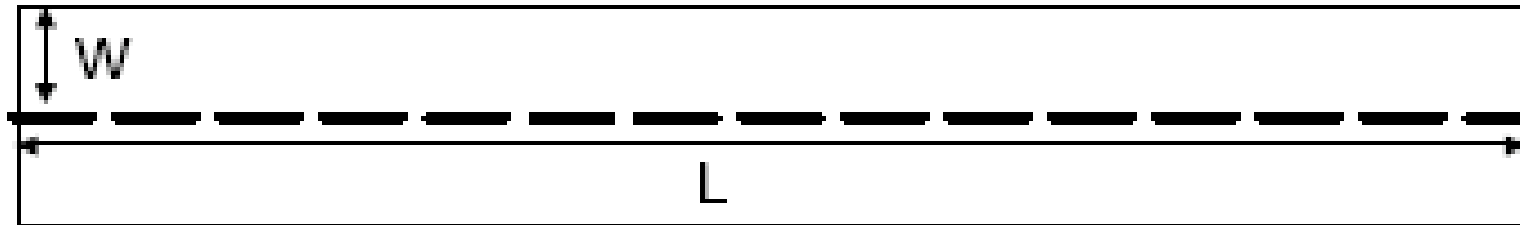
Strengths & weaknesses of line transects

- Cover ground quickly recording many birds
- Adaptable to species and habitats
- Double counting a minor problem
- Adequate for habitat studies



Data Analysis – bird density

Calculating densities- strip transects



N = number of birds seen

L = 1km

W = 100m

N = 100

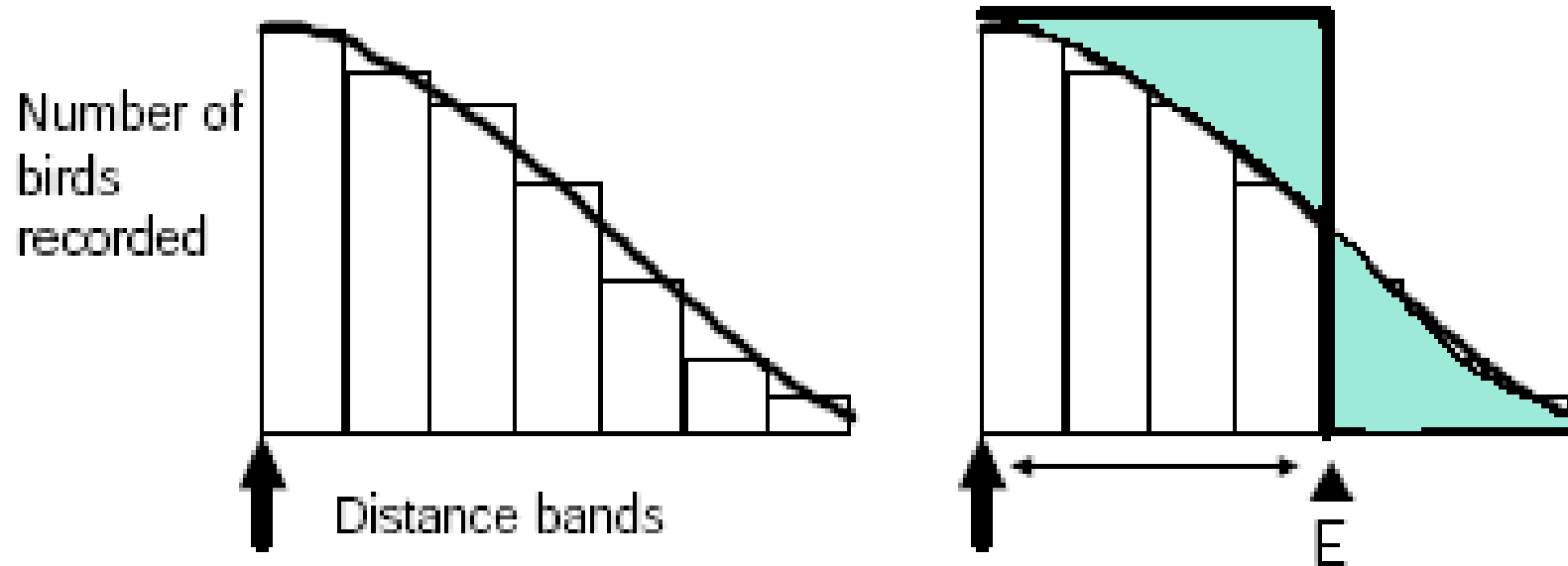
****** Density = N / 2 WL ******

500 bird per km² = 100 + 2*1*0.1

Distance Sampling

- All birds cannot be reliably detected over all distances - number of birds seen from a point must decline with distance....
- This decline in detection will be different for different species in different habitats
- Ideally, one would measure the distance to each individual sighting without error
- Often this is impractical so distance bands are used.

How distance bands work



Effective Strip Width = Distance at which as many birds are missed within it as are seen beyond it

$$****\text{Density} = N / 2 EL****$$

Benefits of Distance Sampling

- Efficient way to estimate bird density
- Provides a measure of bird 'detectability'
- Allows for differences in levels of 'conspicuousness' or 'detectability' between habitats
- Allows for the fact that some birds are more detectable over greater distance
- Allows for species to be more detectable in one habitat than another
- Allows for comparisons between species, and within species, across different habitats

Good density estimates require

- 60-80 bird records for line transects:
- 80-100 bird records for point transects

Assumptions of distance sampling methods

- Transects are placed in a manner that is representative of the habitat
- Birds on the line, or on the point, are always detected
- Distances are measured without error
- Birds do not move in response to the observer
 - There is no double counting of birds

Some sources of information

- Expedition Field Techniques Bird Surveys. 1998. Colin Bibby et al. Royal Geographic Society. London SW7 2AR
- A guide to the Birds of the West Indies. 1998. Herbert Raffaele et al. Princeton University Press. Princeton New Jersey.
- Bird trapping and Bird Banding. 1991. Hans Bub. Cornell University Press. Ithaca New York.
- Wildlife Management Techniques, 4th Edition. 1980. Sanford Schemnitz Editor. The Wildlife Society. Bethesda Maryland.