Surveying Techniques

These are different techniques that can be used to draw conclusions about a particular area.

Quadrats

A quadrat is a method for sampling a population to draw an estimate about its size.

It is impractical to count all the organisms in a population because it would be too time consuming and some organisms may move or die during the time it takes to count the entire population.

A quadrat is usually a square made of wire. It may contain further wires to mark off smaller areas inside, such as 5 × 5 squares or 10 × 10 squares. The organisms underneath, usually plants, can be identified and counted. Quadrats may also be used for slow-moving animals, e.g. slugs and snails.

Example
The field you are surveying is 50 m2 in area.
There are eight daisies inside a 0.25 m2 quadrat.
The estimated population size of daisies in the field would be:
8 × (50 ÷ 0.25) = 8 × 200 = 1600 daisies

Advice for using a quadrat
Place it randomly so that a representative sample is taken.
For increased accuracy, measure a large square and use a random number generator to decide where to place the quadrat.
Repeat across the area under study to increase the validity and reproducibility of results.
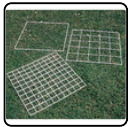
Transects

A transect is a line across a habitat or part of a habitat. It can be as simple as a string or rope placed in a line on the ground.

The number of organisms of each species along a transect can be observed and recorded at regular intervals.

Abundance of different species at Site A

Distance from Point x (metres)
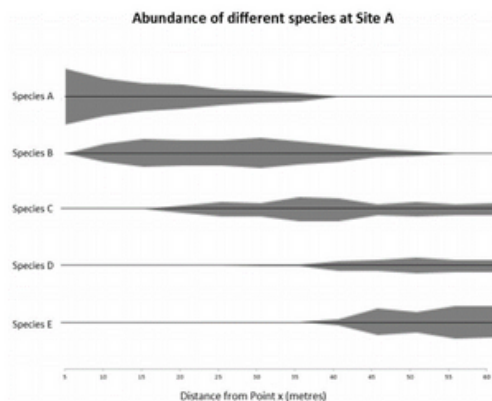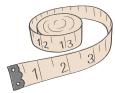
A kite diagram shows the number of animals (or percentage cover for plants) against distance along a transect.

The distribution of organisms in a habitat is affected by the presence of other living organisms - such as herbivores or carnivores - that might eat them. It is also affected by abiotic factors, such as availability of light or water.

A gradual change in the distribution of species across a habitat is called zonation. It can happen because of a gradual change in an abiotic factor.
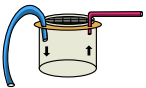
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Collecting Organisms

Organisms can be collected using a variety of methods. These methods include:
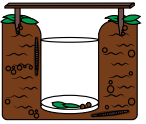
Sweep nets
Useful for collecting insects and other small animals from bushes, long grass and ponds.

Pooters
A pooter is a small jar used for collecting insects. It has two tubes - one goes into your mouth so you can apply suction, and the other goes over the insect so that is sucked into the jar. A fine mesh over the end of the first tube stops you swallowing the insect.

Pitfall Traps
A pitfall trap is often used to get a sample of small invertebrates living on the ground, such as beetles, spiders and slugs.

It consists of a container, such as a yoghurt carton, buried in the ground. The top of the container is level with the soil surface, and it is covered by a piece of wood with a slight gap to allow insects to climb in. It is important to check the trap regularly to avoid the animals escaping or being eaten before they are counted.

Capture re-mark

A way to estimate the population size of an animal species is using the capture-mark-recapture method:

1. animals are trapped, eg using pitfall traps
2. they are marked in a harmless way and then released
3. traps are used again a few days later
4. the numbers of marked and unmarked animals caught in the traps are recorded
5. the population size is estimated using the following equation

$N = (n_1 \times n_2) \div m_2$
Where:
   - N = population estimate
   - n_1 = number of marked individuals released
   - n_2 = number of individuals in the second sample (marked and unmarked)
   - m_2 = number of marked individuals in the second sample

Example
Ten animals were trapped, marked and released. Two days later, 20 animals were trapped. Five of these were found to be marked.
population size = $(10 \times 20) \div 5$
                =$200 \div 5$
                = 40

When using capture-mark-recapture data, you have to make assumptions including:
• there is no death, immigration or emigration
• the sampling methods used are identical
• the marking has not affected the survival rate of the animals