SURVEY GUIDE

Tips and hints on surveying

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HOW TO SURVEY:

Surveying can be a very useful and interesting activity to find out which species are living at or visiting a site. It can be very informal, just noting down species seen when visiting the site and building up a species list; or it can be more formal, for example designing a survey using techniques such as transects. These ideas will be explained more fully in this booklet.
It is important to remember, that however formal or informal your surveying is, for a record to be valid four key pieces of information must be recorded:

What: Identification of species
Where: Location, including a 6 figure grid reference if possible (See appendix 3)
When: Date of sighting, time of day can also be useful
Who: Name of the recorder and contact details.

Before doing any surveys it is useful to ask yourself the following questions which will help you decide what sort of information you need to collect and how detailed it should be:

Why do you want to survey?

What do you want to know, what is the purpose of the *survey*[1]?
Possible reasons for surveying are:

- To find out which species are present on your site.
- To get some idea of the distribution of species on your site and their *relative abundance*
- *Monitor* population changes; assess effectiveness of any site management.

What are you going to do with your results?

As well as identifying why you want to survey, it is also important to think about what you will do with all of the information before actually doing any field work. For example, if you just want to know what is present on your site, then you will not need large amounts of data about population levels, or whether they are breeding etc. By thinking about this first you can save yourself a lot of time, and ensure the data you collect is relevant.

What resources do you have?

Time, money, personnel, equipment etc. will all affect how detailed a survey you can do, but a pair of binoculars, camera, notepad and a pencil are a very good start for many surveys.

[1] All terms in italics appear in the glossary at the back of this booklet

Do you need any permits/licences?

Will you need access to other people's land? Do you need any licences, for example the trapping of some animals such as Great Crested Newts and shrews requires a licence. Make sure you have any necessary permits/licences before starting. For further information about licensing contact Natural England on 0845 601 4523, or go to their website: http://tinyurl.com/NElicence.

What are you surveying and when is the best time?

The best time of year to survey will vary depending on which species or *habitat* you are surveying. Generally however, the best time of year is spring/early summer (appendix 4 sets out the best time of year for surveying different species and habitats).

Which survey techniques are you going to use?

A basic guide to the different techniques required for different groups of species is explained in the next section. The answers to the above questions will affect which techniques you decide to use. For example, if you decide that building up a species list is all you want to do, then using casual observations and perhaps concentrating your efforts on the most likely habitats is the best way forward. However, if you decide that you want to plan a survey that can be repeated year after year, then this will involve a bit more planning. For more in depth detail on planning surveys, Sutherland's 'Ecological Census Techniques' book is highly recommended (see Appendix 1).

If you have answered all the above questions you are now ready to get out and get started!

Things to do before carrying out survey:

1. Print a map of the area you want to visit using Google Maps, or http://magic.defra.gov.uk/website/magic/, or draw a simple map of the area showing key features e.g. streams, woodland area, buildings. This will help focus the survey techniques needed and can also help pinpoint what actually needs to be surveyed. A map also forms an invaluable part of any future management plans (see example map, appendix 5).
2. Ensure you have got all the necessary equipment before starting any survey work, including a walking stick or throw-line if working near water and make someone aware of where you are going.
3. Draw up recording sheets, or ask CPERC for one. These can be very simple, as long as they include the four key pieces of information; what, where, when, and who.

SURVEYING SPECIFIC SPECIES GROUPS

Which technique?

Different *taxa* (groups of species) need different *survey* techniques. This next section will show a range of techniques, when is best to use them and how.

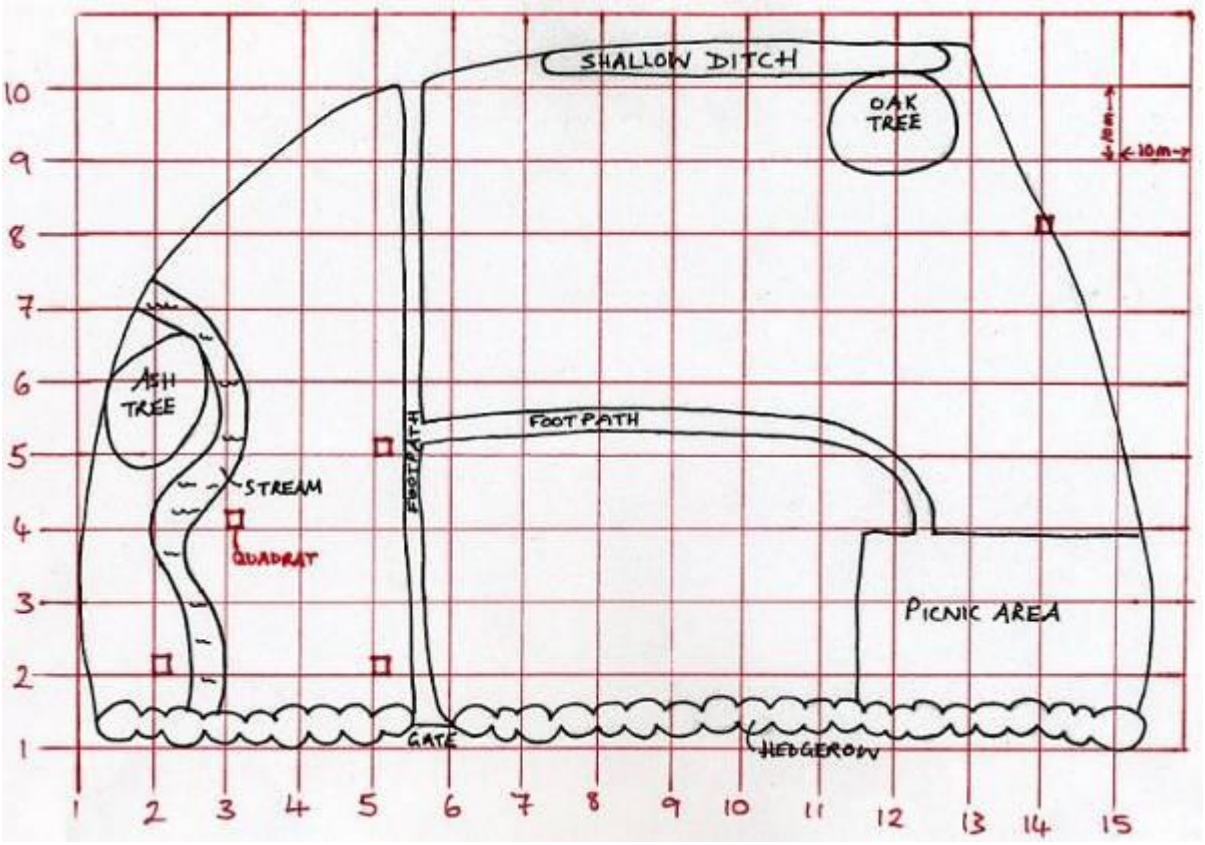
Plants

Flowering plants:

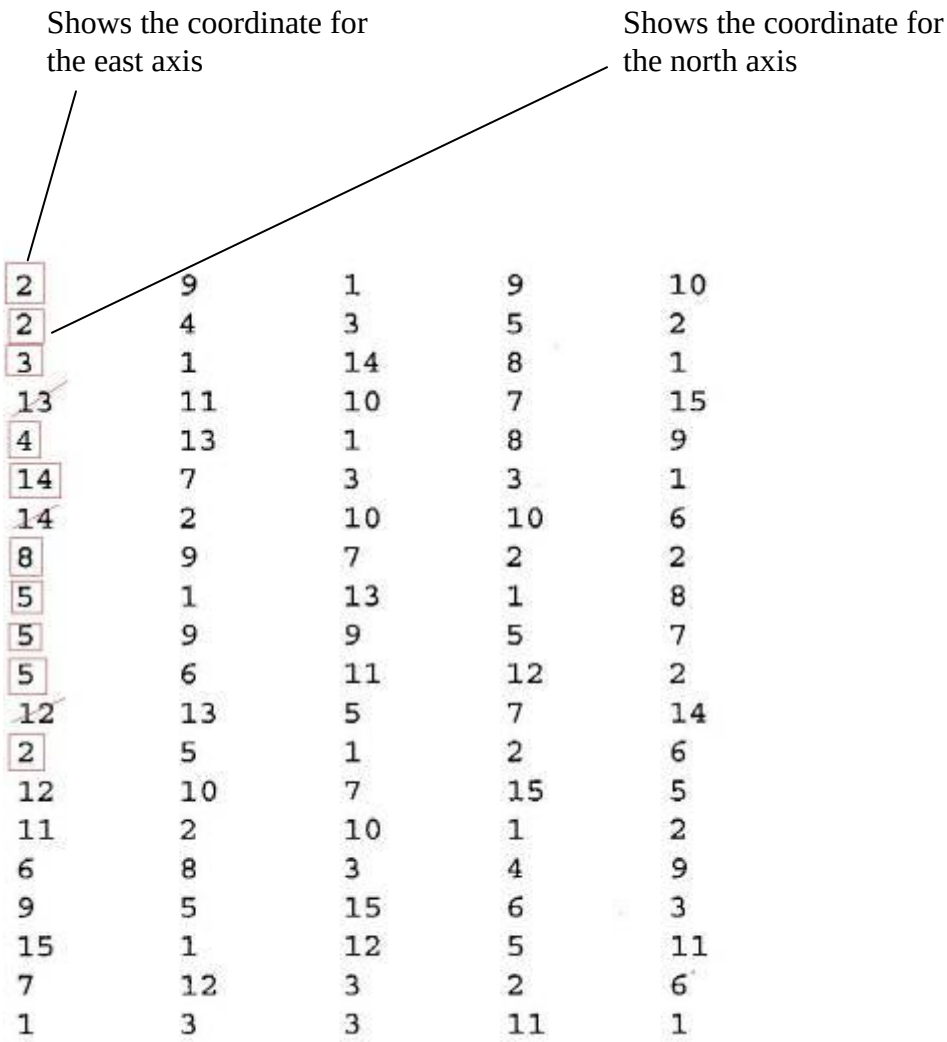
One of the most accepted techniques is to use *quadrats*, which are often frames of a square shape of either 0.5m x 0.5m or 1m x 1m. They are laid on the ground and then whatever is inside the quadrat is identified and recorded.

There are two main ways the quadrats can be placed: Random, or along a *Transect*

- Random: The whole site is divided into squares on a grid (two tape measures laid at right angles can be used in the field) and quadrat points are selected using a random number generator as the diagram below shows.



Randomly placed quadrats

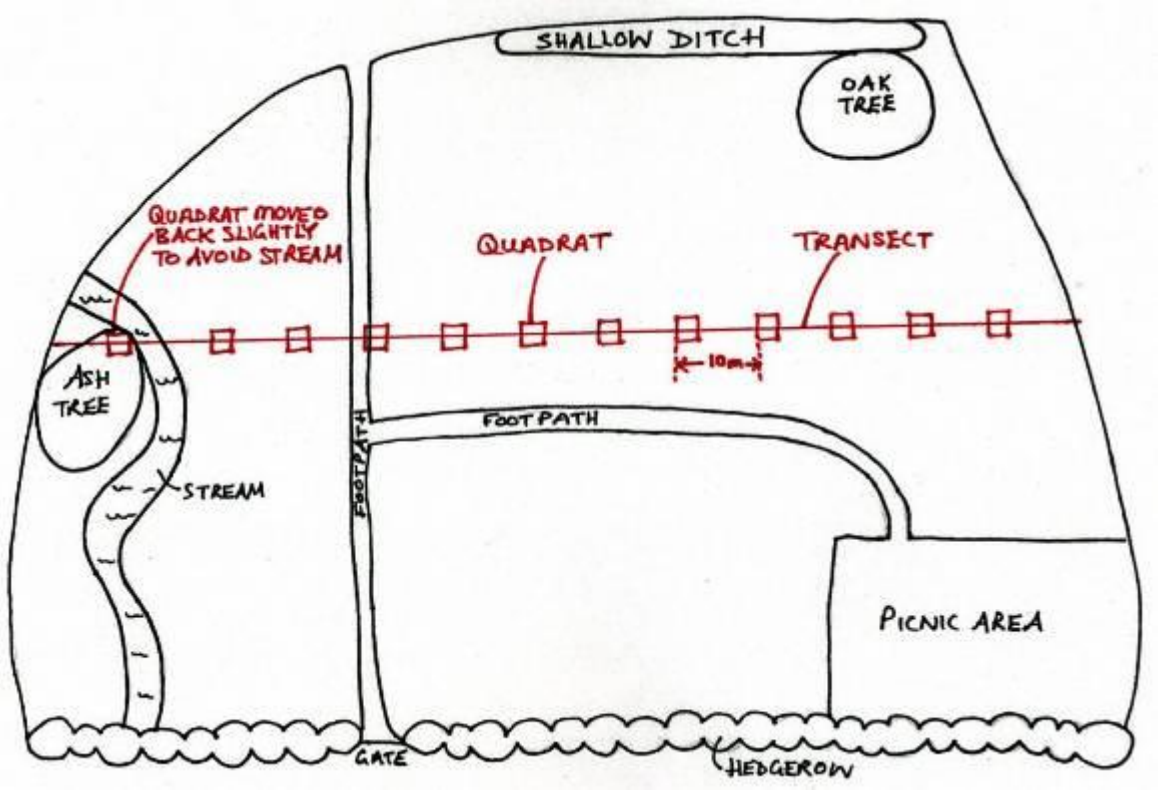


These random numbers were generated from the website: http://www.random.org/nform.html but you could equally read across a line of numbers from a phone directory.

Reading the numbers down the column (this is standard practice, but it is equally okay to read across the rows), take each new number as a coordinate (highlighted in this case by a red box). The numbers crossed out, were unable to be used because the north axis only goes up to 10.

Therefore, for the first quadrat you would walk 2m east and then 2m north and place your quadrat where those 2 points cross (shown as the bottom left hand corner of the grid square. The next square would be 3m east and 4m north again placing your quadrat in the same way as for the first square and so on for the next squares.

- Transect: An imaginary line is drawn across the site (a tape measure is useful for this) and the quadrat is placed at regular intervals along the line, as the below diagram illustrates.



Linear quadrats

When deciding what size of quadrat to use, the general rules are:

- *Species* rich *habitats* e.g. some grassland habitats, will need smaller quadrats 0.25m x 0.25m, but species poor habitats will need larger quadrats, perhaps even 2m x 2m or 4m x 4m.

This is all to do with ensuring the recording is as accurate as possible and also to make your life easier. If you have a large quadrat with lots of different species then each quadrat will take a very long time and you are likely to get confused as to what has been recorded. Conversely, too small quadrats and you will have to do many of them before recording most of the plant species present.

There are no hard and fast rules as to how many times to place a quadrat down. However, it is recommended to start off with 5 quadrat samples. If after 5 samples you are getting lots of different species in each quadrat which has not been recorded yet, then put a few more down. However, if you are getting very much the same in each quadrat, then the 5 samples will be fine.

For frequency of plants, there are two main ways this can be recorded:

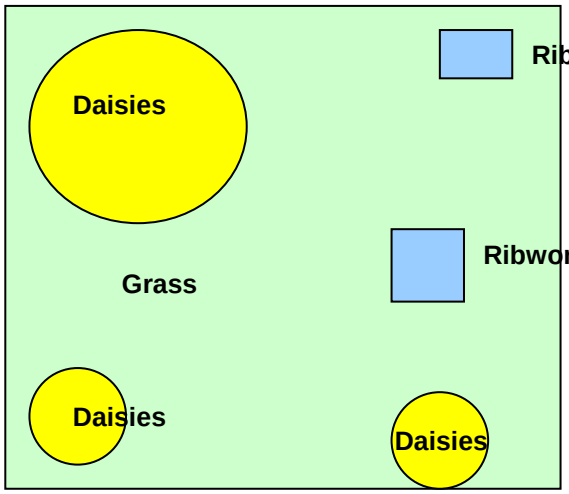
Percentage cover for each species in the quadrat, these can be divided into as many divisions as you like, a common breakdown is as follows:

- 0-25% cover
- 26-50%
- 51-75%
- 76-100%

Another common way is to use the DAFOR scale:

- Dominant
- Abundant
- Frequent
- Occasional
- Rare

A person assigns a letter according to what they believe is 'Dominant' etc. Having the same person assigning the category of DAFOR for each species will help reduce the subjectivity of this scale. Some books assign percentages to the DAFOR scale, such as Hill et al (2005), but this is not always the case.



Example of a simple quadrat

Using the example quadrat, the percentage cover would be as follows:

Ribwort plantain - 0-25%
Daisies – 26-50%
Grass – 51-75%

Using DAFOR:
Ribwort plantain – Occasional
Daisies – Abundant
Grass - Dominant

Trees

It is great to record any veteran trees. Natural England provides useful guidance on Veteran trees, http://tinyurl.com/NEtrees, highlighting the best way to determine if you have any on a site. However, even if you don't have any veteran trees, it's great to record all tree species for a site. Like flowering plants it is easiest to identify trees when they have flowers and/or fruits on the trees. The time this occurs will depend upon the tree species, but between May-July is a good time. Determining a tree's identity when it's not in leaf is harder, but this can also be done by using guides such as the AIDGAP guide to 'Identifying deciduous broad-leaved trees and shrubs in winter'. Nevertheless, attending a tree identification course is still often the best way.

Amphibians and Reptiles

Reptiles:

For reptiles, casual records are the best way unless you know of a resident population.

To increase your chances of finding any reptiles present:

- Put out refuges, for example corrugated iron sheets, or old squares of carpet. These are often be used by reptiles such as slow worms and snakes, as well as other animals such as toads and small mammals who use them as shelter. Reptiles will very often use them to warm up under early in the morning, or late in the evening. They should be placed in good sunny spots which are near to cover, at the base of hedgerows, or on grass banks often works well. Do be careful of putting refuges in areas which are heavily used by the public.

Grass snakes can often be found under refuges (photo by G. Van Ginkel).

- On warm spring days check open spaces for any basking adders or lizards. South facing slopes are particularly good for basking reptiles.

- If you hear rustles in vegetation, return 10 minutes later, very slowly and quietly, as it is likely to be a reptile moving away and they may have returned to bask in the same spot.

Amphibians

Counting adults at breeding sites can provide a good estimate of distribution and abundance.

The best way to *survey* is to use torch surveys. However, anybody wishing to do torch surveys must go with someone who has a Great Crested Newt licence, as it is illegal to disturb Great Crested Newts.

Casual observations can also provide valuable data and as part of their *habitat*, amphibians need:

- A breeding pond
- Damp sheltered areas near to a pond
- Connections across suitable terrestrial *habitat* to other breeding ponds.

Therefore, this sort of area would be a good place to start looking for amphibians.

The best months for surveying both reptiles and amphibians are April, May and September.

Mammals

Unless you have mammal trapping training and have a trapping licence for shrews, mammals can be quite tricky to *survey*, since many are nocturnal and can be difficult to find. One of the best ways is to look for signs that mammals are using the site, such as tracks, droppings, footprints, nests, and food remains, rather than look for the actual mammal.

Photo: Fox print.
They are very similar to dog prints, but the way to distinguish a dog print from a fox print is on a fox print a cross can be drawn through the print without touching any of the pads.

One mammal that is easy to survey is the Brown hare. It is of conservation concern and has had a *Biodiversity Action Plan* written for it. A standard technique for a more structured survey of hares is to use *transects*.
Select your area, (arable land is the best *habitat*, but make sure you have the permission of the landowner). Pick out an easily identifiable landmark on the other side and slowly walk towards it. Stop and pause for one minute every 100m looking out for any hares.
The minimum length of your transect should ideally be 1km.

Recording roadkill or other dead animals is a good way of noting presence.

<u>Bats</u>

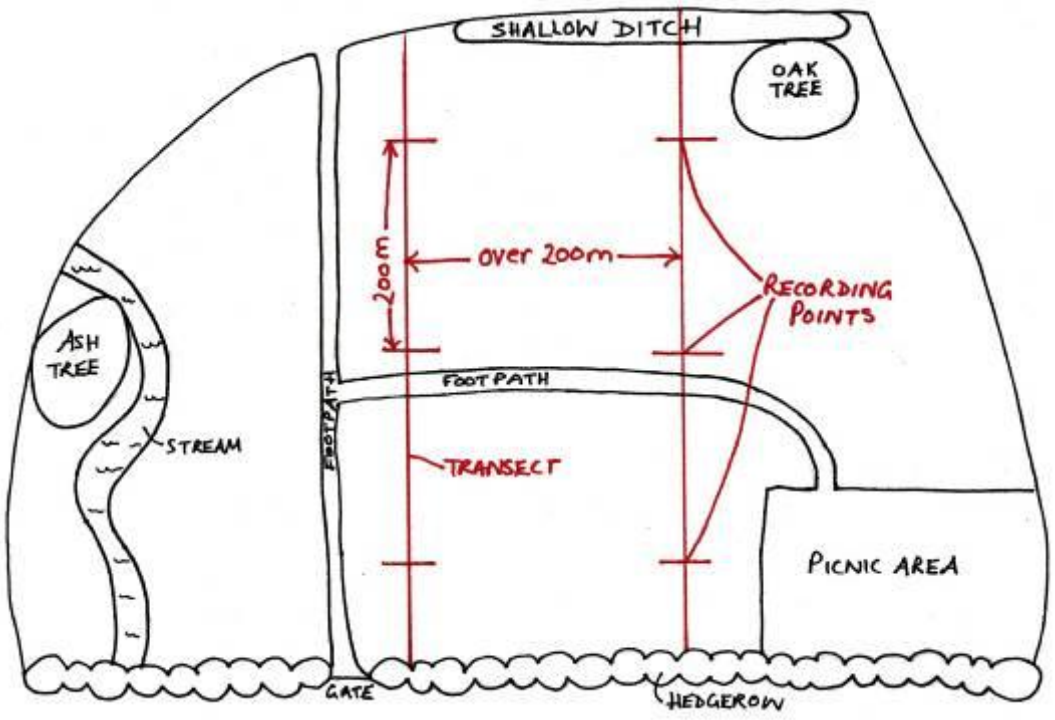
It is illegal to disturb British bats in any way.
Therefore, to do any bat *surveys* it is best to have a trained bat surveyor with a bat detector. However, casual observations by walking around areas at dusk are possible and would allow you to say whether bats are present or not. A trained surveyor could then help determine which species they are.

Birds

There are a wide variety of bird *surveys* that can be carried out at different times of the year, such as winter bird or breeding bird surveys. Surveys can also be carried out on specific *habitats* such as farmland or wetland. Please remember when surveying breeding birds it is very important to avoid disturbing or damaging the nest and surrounding area in any way.

Generally, if you are doing more than just casual observations, the technique for each type of survey will be the same i.e. *transects* (as the diagram below illustrates). Ideally each transect should be at least 1km long and then separated into 200m sections. Birds seen (or heard) are recorded in 200m sections. This is to try and prevent the same bird being recorded twice.

Breeding bird surveys are best done between April and June and where possible the transects should be walked before 9am, as this is when birds are at their most active. If you have room for more than one transect then they should be parallel and at least 200m apart. Although barriers often prevent them from being parallel, they should never be closer than 200m together.



Bird survey transects

Point counts are also a good survey method, particularly if you want a more structured survey but the area is not big enough to warrant a transect. Within your survey area, choose random points. (See pages 6-7 for more information about “choosing” the random points). At each point wait for 1 minute to allow the birds to settle and then record the birds seen or heard at each point for 5 minutes. Early morning is the best time for birds, around 7.00am.

Bird Song

Often a good way of identifying birds is through their sounds, particularly useful for passerine birds (song birds e.g. finches, tits, thrushes, sparrows, warblers etc.). Map your site and record on the map what you heard and where.

Bird sound CDs are available and there are also many training courses around to help with identifying bird song.

Butterflies and moths

Butterflies

The standard technique is to use *transects*. Transects should be at least 1km long and divided into sections. Counts should be made up to 2.5m either side of the line and 5m ahead of you. Preferably each section should vary in *habitat* type, management and length. Transects should be walked one day each week between April and September, between the hours of 11am and 3pm. Weather conditions are important for butterfly transects, warm summer days are best, as that is when they are at their most active. They should not be walked in windy conditions or when it is raining. Always record the start time and weather conditions.

Moths

The majority of moths are night-flying, therefore the best way to survey moths is by using light traps. Generally a moth expert is needed for moth surveys, especially to start with.

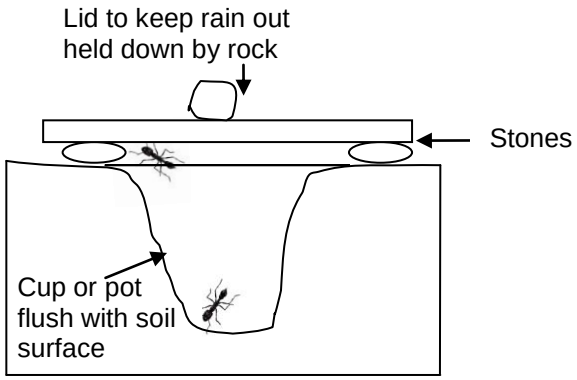
Other invertebrates

The two main techniques that can be employed are *Sweepnetting* or setting up *pitfall traps*

- *Sweepnetting* can either be carried out across the whole site for a set amount of time, or it can be carried out whilst walking along a *transect*. The best technique depends on site size; for larger, more varied sites, a transect is best.

Sweepnetting for insects

- *Pitfall traps* - set traps at equal distances along a transect e.g. for 100m transect, place one every 10 m.



Alternatively, if your site has different *habitats*, divide the site up and put a set number of traps in each block. Do not leave traps for more than 12 hours before checking and remember to re-fill the holes once you remove the cup.

HEALTH AND SAFETY NOTES

Please take the following into consideration before going out to the field and surveying.

- Wherever possible do not survey alone. If you have to, make sure somewhere knows where you are going and when you expect to be back.
- If you have one, always carry a mobile phone (and make sure it's switched on).
- Wear suitable clothing and footwear for the weather conditions.
- When surveying be aware of slippery or uneven surfaces and low braches or holes, a simple walking stick is a great help when surveying.
- To further reduce small chance of catching Weil's disease when working around water make sure you wash hands thoroughly before eating, drinking or smoking. If you do feel ill and experience flu-like symptoms a few days after, do consult a doctor and ask for an Elisa Blood test.
- Beware of Giant Hogweed; it can cause severe skin irritation.
- Particularly in very hot weather, make sure you carry plenty of water with you.

<u>Disclaimer</u>

Please note these are only guidelines, CPERC are not responsible for any accidents that occur.

APPENDICES

Appendix 1: Useful books

Title	Author(s)
Ecological Census Techniques – A Handbook	William J. Sutherland
Handbook of Biodiversity Methods: Survey, Evaluation and Monitoring	Hill, Fasham, Tucker, Shewry and Shaw.
The Wild Flowers of Britain and Ireland: The Complete Guide to the British and Irish Flora (A&C Black)	Blamey, Fitter, and Fitter
The Wild Flower Key (Revised Edition) - How to identify wild plants, trees and shrubs in Britain and Ireland (Warne)	Francis Rose
Colour Identification Guide to the Grasses, Sedges, Rushes and Ferns of the British Isles and North Western Europe (Viking)	Francis Rose
Grasses, Sedges, Rushes and Ferns of Britain and Northern Europe (Collins)	Fitter, Fitter and Farrer
Trees of Britain and Northern Europe (Collins)	Alan Mitchell
A guide to the identification of deciduous broad-leaved trees and shrubs in winter (FSC AIDGAP guide)	Andrew May and Jonathan Panter
Pocket guide to the Butterflies of Great Britain and Ireland (British Wildlife Publishing)	Richard Lewington
Field Guide to the Dragonflies and Damselflies of Great Britain and Ireland (British Wildlife Publishing)	Steve Brooks
Field Guide to the Moths of Great Britain and Ireland (British Wildlife Publishing)	Paul Waring and Martin Townsend
How to find and identify mammals (The Mammal Society)	Sargent, Morris and Troughton
Small Woodland Creatures (Oxford Press)	Olsen, Sunesen, and Pedersen
Small Freshwater creatures (Oxford Press)	Olsen, Sunesen, and Pedersen
Field Guide to the Insects of Britain and Northern Europe (Collins)	Michael Chinnery
Mushrooms and Other Fungi of Great Britain and Europe (Pan)	Phillips, Shearer, Reid and Rayner
Collins Field Guide. Birds of Britain and Europe (Collins)	Peterson, Mountfort and Hollom
Bird Songs and Calls of Britain and Northern Europe. (Collins) Includes 2 CDs	Geoff Sample

Other useful references:

FSC Fold-out Charts - www.field-studies-council.org
These are very useful colour pull-out charts covering a wide range of plants and animals.

AIDGAP keys – also available from the FSC. These identification keys are slightly more technical than the fold-out charts and go into more detail.

http://handbooks.btcv.org.uk: A set of useful practical conservation books, which includes titles on surveying.

FBA (Freshwater Biological Association) guides – www.fba.org.uk. These tend to be very specialised keys for freshwater invertebrates and fish.

Appendix 2: Glossary

Biodiversity Action Plan: Set up by the government in response to the 1992 Convention on Biodiversity, this describes the UK's biological resources as well as planning how to protect them. It is broken down into Species Action Plans, Habitat Action Plans and Local Biodiversity Action Plans, each with targeted actions.

Habitat: The area in which an organism or group of organisms lives, for example woodland.

Invasive species: A species which is not controlled by its natural competitors, either because it has been introduced to a new area where these competitors are absent or because its natural competitors have been wiped out.

Light trap: Used in moth surveys. The moths are attracted to the light, fly down the funnel and into a box from which they cannot escape. Egg boxes in the trapping box gives the moths somewhere to hide. The moths can be examined and sampled the next morning.

Monitoring: Sampling a group of organisms or a habitat on a regular or ongoing basis to assess changes and effect of management on the site.

Pitfall trap: A container such as a plastic cup is placed into the ground, so the top of the cup is flush with ground level, which insects then fall into and can be identified.

Point count: Identify a number of points within a site and at each point stand there and count whatever you are surveying for, for example birds. Then move onto the next point.

Quadrat: A square frame usually 1mx1m or 2mx2m, but can vary, and is used in vegetation sampling. It is laid on the ground and all the vegetation within its boundaries is surveyed.

Relative abundance: The proportion or percentage of organisms in a sample that are of a particular species.

Sweepnetting: Used in invertebrate surveys. A net is swept through the vegetation and then everything in the net can be identified.

Survey: Collecting data for a specific site or group of species etc., to find out what is present. A survey can also be used to collect information on population sizes.

Taxa: A group of species e.g. mammals, birds, plants etc.

Transect: A straight line through an area being surveyed.

Appendix 3: What are grid references and how do I write one?

A grid reference is a string of numbers that gives an exact location in the country and is invaluable when it comes to a record. The more numbers a grid reference has, the easier it is to locate a sign or sighting, for example a 6 figure grid reference will pinpoint a location to the nearest 100m; while an 8 figure grid reference will locate to the nearest 10m. Imagine if a friend gave you a grid reference to find that 'rare orchid', how you would want to as know as much detail as possible, it's the same for records centre.

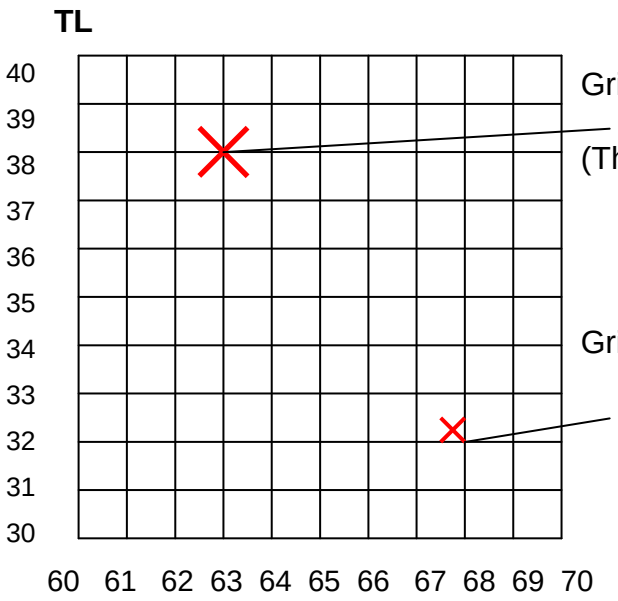
It is organised by the Ordnance Survey and works by dividing the map of Great Britain into 100km squares with each square identified by 2 letters e.g. TF. These squares are then further divided into 10km squares which are given 10 numbers in an easterly direction (left to right) and 10 numbers in a northerly direction (upwards). These are further subdivided into 1km squares and so on.

How do I give a grid reference?

"Grab a Grid Reference" is great for guiding you through obtaining a grid reference online. http://www.bnhs.co.uk/focuson/grabagridref/html/index.htm

Alternatively, if you are using an OS Map:

1. Write the two letters found on the map, identifying which 100km grid square the map is. (For the majority of Cambridgeshire and Peterborough this will be TL or TF).
2. Take the left edge of the kilometre square your record is in and read off the figures at the end of this line, (either at the top or bottom of the map). This is the Easting.
3. Take the bottom edge of the kilometre square and read the numbers on either the far right or left margin. This is the Northing.
4. Put the letters and the numbers together and this is your 4 figure grid reference (Point 1 on the diagram)
5. For a 6 figure grid reference, divide the kilometre squares into 10 and then estimate how many tenths the point is away from the kilometre square grid lines (Point 2)



Grid reference for point 1:
TL 6338
(This would be **630380** as a 6 figure reference)

Grid reference for point 2:
TL678322

A good way of remembering which order to write the numbers in, i.e. Eastings first then Northings is to remember the following: *Along the hallway and up the stairs*

For more information about grid references see:

www.ordnancesurvey.co.uk/oswebsite/gi/nationalgrid/nghelp1.html

Appendix 4: Best times for surveying and methods

Taxa	Optimum time of year	Methods
Amphibians and reptiles	April-May, September	Casual observations Torch searches
Flowering plants	May- July	Transects / quadrats
Trees	All year (but May-July for most flowers	Record each individual tree (depending on scale of site)
Bats	April-October	Casual observations or seek advice from a trained bat surveyor
Small mammals	Sept- Nov (Peak abundance)	Trapping
Other Mammals	All year (but March-April, October when vegetation is lower)	Casual observations, including tracks, feeding remains and scat (droppings).
Breeding birds	April- June	Transects Point counts
Winter birds	Nov - Mar	Transects Point counts
Butterflies	April- September	Transects
Moths	Summer	Light traps
Other invertebrates	Summer	Pitfall traps Sweepnets

Habitat	Optimum time of year	Methods
Rivers and ditches	Spring and late summer	Quadrats (vegetation) Kick sampling (invertebrates)
Hedgerows	May- Sept	Quadrats
Meadows	Once in spring and then again late summer. (Make sure it is done before any cutting!)	Quadrats (vegetation) Fauna (taxa dependant- see above)
Churchyards	Spring - summer	Quadrats (vegetation) Fauna (taxa dependant- see above)
Woodland	Spring	Quadrats (vegetation) Fauna (taxa dependant- see above)

Appendix 5: Example map