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Surveying wildlife in the Chilterns



A guide to site-based wildlife surveys in the Chilterns

By Martin C. Harvey, May 2014

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Chilterns Commons Project, supported by the National Lottery
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Surveying wildlife in the Chilterns

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Introduction

How important are the Chilterns for wildlife? Is wildlife thriving or declining in the area? Does habitat management on local sites improve conditions for wildlife?

It's impossible to answer these questions without gathering information about wildlife, and to do that wildlife surveys are required. But there are other reasons for doing wildlife surveys as well, not least that they can be very enjoyable activities! There is increasing evidence that being involved in outdoor activities such as wildlife surveys leads to better mental and physical health. And surveys can be an excellent way of getting people involved and enthused about their local environment, allowing them to discover the wildlife that depends on nature reserves, commons and other nearby sites.

So what is a survey? The term gets used rather broadly to encompass a range of activities. At its simplest a survey could just be some hand-written annotations on a map of your site, **based on one person's observations.** At the more complex end of things a team of people might carry out repeated surveys using specialist equipment, to a rigorously designed methodology that allows for statistical analysis to monitor changes in wildlife over time. And there are lots of survey activities that fall somewhere between these extremes.

In fact, one of the challenges when thinking about wildlife surveys is deciding what type of activity to get involved with. This decision may depend on a range of factors, not least the enthusiasms and interests of the people who will be carrying out the work! This guide will help you work out what survey approach is right for you, and provide pointers to the information and help that you might need to get successful results.

How to use this guide

This guide grew out of a series of workshops for volunteers within the Chilterns Commons Project. It focuses on surveying wildlife on particular sites, such as the Chiltern commons, rather than surveying across the wider landscape, but we hope that the ideas suggested here will be of use to anyone wanting to know how to get more involved in wildlife surveys.

The guide has been designed for reading online, and it includes links to websites that provide further resources and information, as well as links between various sections of the guide itself.

Glossary

- **Baseline survey:** Gathering the initial information about what is on your site; can refer to making the first set of wildlife records to start listing what lives on your site, and can also take in the collation of existing knowledge, e.g. from local environmental records centres, from publications, and from people who know the site.
- **Biodiversity Action Plan:** In recent years much conservation planning has been documented as "biodiversity action plans" (BAPs), listing priorities for conserving species and habitats and setting out targets for achieving this, both at national and local level. Biodiversity Action Plans have largely been superseded by recent changes to government policy, but the definitions of BAP priority habitats and species are still very useful guides (and have been carried over into the **NERC Act**, see below).
- **Indicator species:** species that are only found in certain places or under certain conditions, so that their presence tells you something about the site in which they occur. Some species are good indicators of particular habitats or land-use (e.g. "Ancient Woodland Indicator" plants), others are

indicators of environmental conditions (e.g. lichens can be used to assess aspects of air pollution). Indicators can be positive (they indicate desirable features) or negative (they indicate undesirable conditions; e.g. a strong growth of Stinging Nettles can be seen as a negative indicator, suggesting habitat disturbance and nutrient enrichment). See the [What does it all mean?](#) section.

- **Local Environmental Records Centre (LRC):** Each of the Chiltern counties has its own Local Environmental Records Centre. The LRCs work with wildlife recorders (both volunteer and professional) to collate data on species and habitats in their area, making it available for the local planning system and for others who need to use it. See the [Wildlife contacts appendix](#).
- **Monitoring:** Often used informally to mean any repeated survey that provides information on changes over time. A stricter definition links monitoring to a pre-defined set of objectives, where monitoring refers only to checking whether those objectives are being met. For example, you may wish to monitor whether the management of your site is meeting the objectives laid down in the site management plan.
- **NERC Act:** the [Natural Environment and Rural Communities Act 2006](#), containing legislation relating to wildlife, protected areas such as Sites of Special Scientific Interest, and rights of way etc. Includes lists of species and habitats of "Principal Importance": these have replaced Biodiversity Action Plan priority species and habitats, although they are largely the same lists.
- **Species and Habitats of Principal Importance:** these are considered priorities for national conservation planning, and are defined in Section 41 of the **NERC Act**. The lists are based on the **Priority habitats and species** originally defined as part of the **Biodiversity Action Plan** process. Other categories are also used to identify priorities, such as Red Data Book and Nationally Scarce species lists (see [What does it all mean?](#)).
- **Surveillance:** This term if not widely used for wildlife surveys, but strictly it refers to a series of surveys that are carried out over time to measure change. Surveillance measures change without necessarily having a pre-conceived idea of what the change should be, which distinguishes it from **Monitoring**, which measures change against a pre-defined target.
- **Survey:** Informally used to refer to any activity that gathers information about wildlife and habitats. More strictly it refers to activities that gather information on a one-off basis (such as **Baseline surveys**), rather than as a series of surveys over time (**Surveillance**) or a survey to see if objectives are being met (**Monitoring**). **It's useful to be aware of the differences between survey, surveillance and monitoring, but most of the time people use the word "survey" for all three!**

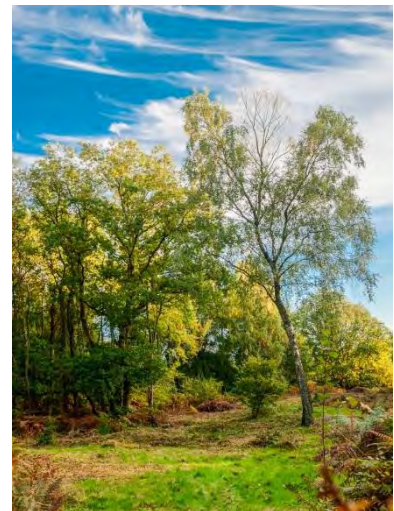
Planning wildlife surveys for your site

As we'll see in this guide, there are a wide range of survey activities that you could get involved with, but you're unlikely to be able to tackle all of them at once. How do you decide where to start, and what is most important? There are various ways of looking at this question, but your decision is likely to be influenced by a mix of:

- What your aims are
- Which habitats and species have been identified as priorities on your site
- What resources you have available (people, time, skills, money)
- What your volunteers enjoy doing!

What your aims are

When planning any survey project the most important thing to sort out is what your aims are. There are many reasons why you might wish to do a survey. For instance, suppose your site supports a population of a rare plant. A survey sounds like a good idea, but is your aim simply to map where the plant is currently growing, or to set up a monitoring system to see how the population changes over the years? Are you trying to link what happens to the plants with how the site is managed, in which case you'll need to be surveying something about the management as well as something about the plant? Or is your main purpose to engage with the local community, in which case a more public project such as an annual "wild flower watch" might be a



good way of drawing people in, even if it doesn't produce such accurate data on the rare species itself.

Any of these approaches could produce good results, but deciding which to devote your time to depends entirely on what you want to get out of it.

Which habitats and species are priorities

This question may be hard to answer if you haven't already done some surveys! But for most sites there is likely to be at least some existing knowledge that may enable you to pick likely priorities. If such information is lacking your first priority will be for some 'baseline surveys' (see [Glossary](#)) **to find out what you've got.**

The Chilterns Conservation Board has commissioned two studies that highlight priority species and habitats known from the Chiltern commons ([Miller et al. 2010](#), [Harvey and Hueber 2007](#)), and these can help on other sites as well. Appendix tables in the reports show which Chiltern commons have been identified as having nationally important habitats, and which have been given conservation designations. The studies demonstrate the commons' **importance for** species and habitats:

- Over two-thirds of the area of the commons within the AONB is designated for its wildlife interest, either locally, nationally or internationally
- Of the larger commons, just under 90% have documented biodiversity interest: designated sites, priority habitats and/or notable species

If there is already a management plan for your site then it will also contain information about biodiversity importance and any conservation designations. And your local environmental records centre (LRC, see [Glossary](#)) holds species and habitat data for the Chilterns, and will be able to let you know what has already been recorded for your site.

You may also be able to find out information from national databases, of which three are especially relevant:

- Species information on the [National Biodiversity Network Gateway](#)
- Habitats and site designations on [MAGIC](#)
- Soils and geology from the [British Geological Survey](#)

What resources you have available

Most wildlife surveys are done by volunteers, and the number and skills of the volunteers available for your site will to some extent determine what surveys you can tackle. Having said that, a good way of recruiting more volunteers is to let people know that there is an interesting project that they can be involved with, and sometimes the enthusiasm of one or two people can inspire a whole group of others to get involved as well. Training may be available as part of the survey project that you are joining in with, or you may find that a local expert is willing to share knowledge **with others and build up your team's skills that way.**

Although enjoyable to do, wildlife surveys do take time to carry out and document well. You need to be realistic about the amount of time that your volunteers have to **devote to a survey. It's best not to take on too many survey projects at once:** start with something that is achievable and will produce useful results in a reasonably short space of time. If that goes well you will be in a good position to expand to other areas in future.

Volunteer survey projects will produce lots of useful information, but it's also worth considering if there is a need to raise funds for professional surveys to be carried out. This might be because you wish to gather information on species groups for which no local knowledge is available, because you need to get data on protected species for which specialist training and licenses are required, or simply because you need to get a survey carried out quickly and exactly to your specifications. Funding for such projects may be available – contact the [Chilterns Conservation Board](#) for advice on funding opportunities.

What your volunteers enjoy doing

This goes without saying really, but a successful volunteer survey project needs to be enjoyable and rewarding for its participants. Sometimes the more rigorous survey methods can feel like hard work – they can also be very rewarding if the survey produces good results and you have people committed to carrying it out, but if your main aim is to get people outdoors, enthused about their local site and having a first go at wildlife surveys then a less demanding survey will be better, at least to start with.

An ideal approach?

The ideal sequence for carrying out surveys might look something like this:

1. Carry out baseline surveys to find out what is on the site
2. From the information gathered, define the priority habitats and species
3. Carry out surveillance surveys to see how things are changing
4. Define management objectives to conserve your priorities
5. Carry out monitoring to ensure that management is producing the desired results
6. **Continue further baseline surveys of species or habitats that haven't been** addressed before, and repeat the process

However, there are few if any sites where this ideal has been possible to achieve in full! The important thing is to do what you can, making sure that you always keep in **mind what your objectives are for the survey you're currently working on, and making** best use of your resources, and of the enthusiasms of the people involved.

Survey techniques and information for the main species groups

Recording wildlife

Any observation of any species of wildlife can form a valid biological record, as long as it is correctly identified and accurately recorded. As soon as you have seen your first species on your site you are in a position to add to the sum of knowledge about that species! And even a single one-off record may be important, especially for the less well-known groups of wildlife, where many species are under-recorded in many areas.

This general, '**ad hoc**' approach to wildlife recording is fun to take part in, provides essential data, and only requires that you keep notes of what you have seen, where and when. But it does have limitations. For example, a particular species may only have been recorded twice in one year, and 20 times in the next. But does that mean it has become more numerous, or were more people out looking for it, or did a change in the weather affect it? To untangle these questions, many recording schemes and centres run more structured survey projects alongside the gathering of ad hoc records.

Creating a wildlife record: the four Ws

At its most simple, a wildlife record needs these four essential elements.

What?

The name of the plant or animal that has been observed. An English name is fine for species groups with well-established English names (such as birds, butterflies, flowers), but for the less familiar groups (insects, fungi, mosses) **it's best to include a scientific name** to avoid any chance of confusion.

Where?

You probably know exactly where your site is and where you saw your latest species, but to make a record of that species you need to be able to communicate an accurate location to others. Whatever sort of recording you are going to be doing, you will need to include location information.

For some survey projects there may be an app available that allows you to use your phone to automatically calculate your location when you are out in the field, or alternatively go to a website and click on a map or aerial photo to show exactly where you saw the species in question. But if you are not **using these technologies then you'll need to record the name of your site** (and you may want to divide your site into compartments if it is large or contains several habitat areas) and ideally a grid reference.

Grid references can be calculated from an Ordnance Survey map (see here for instructions). How precise you need to be will vary depending on what you are trying to do: for example, birds are mobile species and many bird surveys only require a four-figure grid reference (e.g. "SP8504", which specifies a 1km square). For less mobile species, and to ensure that your record clearly indicates your site, you should aim to use a grid reference with at least six figures (100m square). To specify particular rare species or small habitat areas it will be better to use an eight-figure grid reference (10m square) if you can.

There are several websites that can help you find grid references:

- [Grab a Grid Reference](#)
- [UK Grid Reference Finder](#)
- [Where's the Path](#)

There are also a whole range of apps for mobile phones that will give you a grid reference based on the location of the phone (**search for 'grid reference' in your app store**), or you may have a [GPS unit](#).

It is very useful to prepare a map for your site showing compartments and habitats, and labelled with an agreed set of grid references for each compartment (see [Mapping habitats](#) below).

When?

You should record the date on which the plant or animal was observed. It is surprising how often people forget to do this, and with no date, the record has much less value. The exact date, written out in full (e.g. 1st June 2014), is best, but a date range (June–July 2014) or just a year may be more appropriate in some cases. Try not to use the short date format (e.g. 1/6/14) as some people put the month first rather than the day which can cause confusion. Some biological recorders put the month in Roman numerals to avoid this problem, e.g. 1st June 2014 is shown as 1.vi.2014.

Who?

The "recorder" is the name of the person who is making the record. This may seem an obvious thing, but it is amazing how many filing cabinets contain species lists that have become detached from their covering letter, or spreadsheets no longer attached to a covering email! Without knowing who did the recording valuable information is lost, the validity of the records becomes harder to judge, and some of the human interest is lost when looking at historical records.

The other name needed is the "determiner", which is the person who identified the species. Often this is the same person as the recorder, but in some cases a specimen or photo will have been identified for the recorder by someone else, and that person should be shown as the determiner.

The 'four Ws' form the essential bones of a record, but depending on what type of survey you are doing additional information may be useful (especially for rare or unusual species), such as:

- Abundance (how many, e.g. 3 badgers, five large clumps of frog spawn, 12 flowering spikes)
- What sex and/or stage e.g. adult, juvenile, female and young, larvae, saplings, mature trees
- Behaviour e.g. swimming downstream, nest-building, feeding
- Time of day and weather conditions where relevant
- Information about the habitat in which the species was found

Wildlife surveys and monitoring

No matter how good your baseline data is, as fast as you can compile it the species and habitats on your site will be changing! Continued recording of species over time (especially for the 'indicator' and 'priority' species, see [Glossary](#)) can provide valuable information on change, but to pick up changes more quickly and accurately some form of repeated, systematic survey is required (sometimes defined as surveillance, see [Glossary](#)).

For many groups, and especially for the more popular ones, there are structured survey and monitoring projects that you can get involved with, and these are highlighted in the species group sections below. Some surveys are well-established and have been collecting long-term monitoring data over many years, others are more project-specific and may focus on a particular topic for just one or a few years. Watch the websites of the main recording groups and keep in touch with your local records centre to find out what opportunities there are to get involved.

Structured survey and monitoring projects usually require you to record in more detail, and more regularly, than the general ad hoc recording described above. The most rigorous of the structured approaches can be quite hard work, with repeated observations made following a standardised methodology. But this approach can produce much more detailed results than ad hoc recording, allowing data to be analysed in greater depth and providing much more reliable information on any trends over time.

Sending in your records

Although you may start off making wildlife records simply for your own interest, or for a project on your particular site, the data that you gather can become even more useful if you share it with others – the sum of records from many people adds up to a much more comprehensive picture than any one person can achieve. Many different organisations are involved in collating and analysing wildlife records, and although this means that there is lots of interest in and information on wildlife in this country, it can also make it difficult to know where best to send your particular records.

If you are taking part in a structured survey project then the records will most likely be collated by the organisation running the project, and there should be a clear route for sending in your data. For the more general ad hoc recording it may be less clear. Most species groups have a national or local recording scheme that would be grateful for your records, and the local records centre for your county would also like to receive records for all species in their area. Sometimes there are good data exchange procedures set up so that you only need to send your records to either the national scheme or the local records centre, but in other cases you may find that the only way to be sure of your records reaching all the destinations is to send them to several places.

There are now some very good online wildlife recording systems that aim to ensure that records entered in one place are made available to all. The most well-established of these is [BirdTrack](#), for all bird records, and more recently [iRecord](#) has been set up to cover the whole range of species.

So it is difficult to give a simple answer to the question “where should I send my records?” The best solution is to contact those recording schemes and centres that are most relevant to you, and get their advice on the easiest way to provide the records to them. The most important thing is to ensure that your records do get sent to at

least one scheme or centre – your information is valuable and becomes much more so if it can be combined with other data to help monitor changes in our wildlife.

Another good reason for sending in records to a scheme or centre is that they will be **checked ('verified') by the people running the schemes**, to ensure that no errors have slipped through. This means that you may occasionally be contacted to ask if you can provide further information about any unusual records, such as particularly rare **species, or species seen outside their normal range or time of year. Please don't be** offended if this happens! The **scheme verifiers' job is to ensure that the data they** collate is of a high quality so that it can be used for research and within the local planning system, and it is important that they carry out checks. Everyone makes mistakes occasionally, even experts!, and having someone else check your records is **a good way of learning more. If you have found something unusual then it's good to** get as much supporting evidence as you can, e.g. a photo, specimen if appropriate, or second opinion from another experienced naturalist. And how do you know if you have found something unusual? See the section below on '[What does it all mean?](#)'

The National Biodiversity Network

The National Biodiversity Network (NBN) is a national charity that aims to bring together as many as possible of all the biological records that are available for the United Kingdom. It works with many partners, including the majority of recording schemes and records centres, to bring wildlife records together in one place, and **make the information available. You can't submit your records direct to NBN**, but if you send them to one of the recognised recording schemes or records centres the data should be made available to NBN in due course. Find out more about the NBN via:

- The [NBN website](#) (news about wildlife recording, discussion forums and resources)
- The [NBN Gateway](#) (distribution maps and other information for all species)

Getting help with identification

The best way to learn about wildlife identification is to spend time with someone who is good at it! Many wildlife experts can point to a particular person who inspired their interest and taught them how to get started. If you are lucky enough to have one or more knowledgeable naturalists nearby you may be able to call on their help, and it is good to take the opportunity to attend field meetings or other events if you can, to meet local experts and join with others who want to learn about wildlife.

Museums provide another source of expertise and information. There are nationally important collections of natural history within fairly easy reach of the Chilterns: the [Natural History Museum in London](#) and its [outpost in Tring](#), and the [Oxford University Museum of Natural History](#). There are good natural history collections at some of our local museums as well, including the [Buckinghamshire County Museum](#) and [Reading Museum](#) – for more details see "[Natural History Near You](#)", a project that is mapping museums with natural history collections.

If you don't have local expertise available, there are plenty of alternatives available online. The [iSpot website](#), from The Open University, is dedicated to helping people learn about wildlife identification across all species groups. On iSpot you can upload a photo or description of the species you have found and get advice from a friendly and knowledgeable community of naturalists. Local records centres and Wildlife Trusts may also provide a photo identification service, or run an email group that allows for discussion and photo sharing. And social media sites such as Facebook and Twitter have lots of active natural history groups and enthusiasts that may be able to offer help with photo identification.

It's worth remembering that not all species can be identified from photos however, and to fully identify some groups you may need to start thinking about keeping specimens and using microscopes. But usually there is plenty you can do to get started with learning identification before deciding whether you want to take things to that level.

Top tips for taking identification photos

- Identification photography is different from traditional wildlife or landscape photography: if your photo is beautifully composed and aesthetically pleasing that's a bonus, but for identification what's needed is to see the features that distinguish the species. It does help to have things in focus though!
- Take several photos, from different angles – you never know which one may contain the vital distinguishing feature. But try and include some that are from directly above, or exactly side-on, which will be easier to compare with images in books and keys.
- Try to include something in the photo that will give it a scale (e.g. a coin or ruler in the background), or alternatively make sure you record an accurate (i.e. measured) assessment of size at the time of taking the photo.
- You'll probably need photos that are as close as possible to the species in question, but try to take a few of the surrounding habitat as well.
- Different species groups may need different approaches. For example, when photographing fungi (which are notoriously hard to identify from photos) you should try to get photos from above and below the mushroom cap, as well as of the stem. For moths the best angle is usually from above, while for bees and flies you may need shots from several angles to see all the features needed. For snail shells you often need to see both sides of the shell. For plants you may need to see leaves from the base and from higher up the stem, along with flowers and sometimes fruits.
- Some species can only be identified from photos if the photo shows exactly the right characters: some species cannot be identified from photos at all. It's best to accept these limitations, and only identify things to genus or group if they can't safely be assigned to a species. You can then choose to concentrate only on those species that can be identified photographically, or you can proceed to collect specimens or other evidence in those cases where photos alone are not sufficient.

Plants

Whatever habitats you have on your site, you are likely to want to know about the plant species that they contain. Plant species lists can help define the habitats (see [Surveying habitats](#) below), and be used to monitor change. And of course your site may be home to rare species that will be of importance in their own right.



Identification

There are many good books, field guides, websites and apps that can help you identify the species you find, and you may be able to get help from local botanists or a county plant group if there is one for your county. Plant identification usually starts with shape and colour of the flowers and leaves. In some cases you have to look out for quite small details to distinguish between groups of similar species, and you'll need to get used to the different growth forms and flower types found in each plant family. The habitat, location and date of flowering can also be useful clues, and if there is a county flora for your area then that will have good information about which species to expect.

Many plants are reasonably easy to identify, at least when they are in flower, but like all species groups there are some more difficult species that need close observation to identify correctly. The trickiest species may require close examination of flowers, fruits and leaves under a hand lens. Some groups of plants are considered to be more difficult than others: grasses, sedges, rushes, ferns and mosses probably fall into this

category, and are likely to need more specialist attention. But anyone can become a specialist with time and experience!

It's always best to take the field guide to the plant rather than the other way round if you can, but for the trickier species you may need to collect specimens and seek advice from experts. If you need to keep a specimen try to find out which part/s of the plant are the critical ones for identification (e.g. flowers, leaves, fruits) and just cut the minimum amount of material that you need. If you are careful this will do no **harm to the plant's** survival, but note that some rare species are legally protected, and that it is illegal to actually dig up plants without the **land-owner's permission**. The Botanical Society of Britain and Ireland (BSBI) provides guidance on [collecting and preserving plant specimens](#).

Field work

The most basic survey of plants would be to start compiling a list of all the species known from your site, and initially this can be done simply by walking round and looking for as many different species as you can find. Take a good field guide with you and you should be able to identify a wide range of species simply by observing them in the field, and taking photos for further confirmation if required. A hand lens ($\times 10$ or $\times 20$ magnification) can be a useful addition for seeing the details of flowers and fruits etc.

Species lists can be made much more useful by keeping separate lists for each of the main habitats on your site – over time, such lists can indicate how the habitats might be changing. The next step would be to record an estimate of abundance for each **species, but this isn't always straightforward. Actually counting plants is not realistic** for the common species, and even for rarities it can be difficult – do you count flowers, or whole plants, or estimate how much of the ground is covered by their leaves? Which approach is needed will vary between species, so if you do decide to count a species then make sure your records state exactly what it is you have counted.

A compromise is to give an abundance category. The simplest way of doing this is to **use the 'DAFOR' scale** (see box below), which enables you to record the **relative abundance of plant species. The 'DOMIN' scale takes a similar approach, but is more** detailed and can allow for better analysis of change if recorded consistently. If you do use these scales, make sure you also record what area they apply to – if you say a **particular plant is "Frequent", do you mean across the whole** site, or in a particular habitat or compartment, or in a smaller sample area? Make sure you document the survey area that your scale applies to.

The DAFOR scale

D = Dominant: a plant that covers a very large proportion of the area being surveyed, at least 75% of the survey area.

A = Abundant: a plant that is very common across many parts of the survey area.

F = Frequent: a plant found in several places in the survey area, and usually with more than just a few individuals in each of these places. Alternatively, this category can be used for a plant that is very abundant in a limited part of the survey area.

O = Occasional: a plant that occurs in several places in the survey area, but whose populations are usually not very big.

R = Rare: a plant that occurs once or as a small number of individuals in the survey area. This small number of individuals may be located in one place, or scattered over several different locations within the survey area.

Sometimes the **scale is extended to use "Locally Frequent", "Locally Dominant" etc., but these** categories are hard to define consistently and are best avoided unless you really need them.

Surveying wildlife in the Chilterns

Most plants are easiest to identify when in flower, and most flowers are out in spring and summer, so if you make several recording visits from March to September you have a good chance of recording most of the flowering species. For woodland areas **it's worth getting started in early spring, as many plants of the ground layer flower early, before the trees come into leaf, so as to make the most of the available light.**

It's always possible to find a few flowers at any time of year, and you may be able to recognise some species when they are not in flower, so there is always an opportunity to record something (and if you get in to mosses you can be kept busy all winter!).

Records, surveys and monitoring

All plant records will be of interest to your county plant recorder and local records centre, whether they are ad hoc observations or complete species lists, so make sure you send them in. [County plant recorders](#) liaise with the BSBI to pass on records to the national database.

To go beyond record lists, survey and monitoring projects that you may wish to consider include:

- Once you have a species list, you may wish to analyse it further and pick out some **'indicator species' that will help monitor changes in your habitats** – see [What does it all mean?](#) and [Surveying habitats](#) below.
- If you have any particularly rare species on your site, think about how they can be counted to monitor the health of their population, and organise a regular survey to do that, every year or every few years.
- And going beyond your site, you may wish to join in with the [Wild Flowers Count](#) project, from Plantlife. This is a monitoring project to look at changes in the populations of plants across the country. Recording areas are allocated at random to ensure that the data is statistically robust, so if you join in you will get a **1km square to record near your home, but it won't necessarily include** your site.
- The Natural History Museum runs a national [Bluebell survey](#), looking at the distribution of native bluebells alongside other introduced bluebell species.
- If you have any ancient or veteran trees on your site, make sure the details are added to the [Ancient Tree Hunt](#) survey.

Birds

Birds are probably the most-watched group of wildlife, no doubt because they are easy to see virtually wherever you are, they are colourful and active, and you can observe their fascinating behaviour, all of which makes them very rewarding to record.

Most birds are very mobile species, and their populations can be spread over large areas, so the changes that you record may be more a result of wider environmental changes and not so directly linked to conditions on your site. But the habitats on your site will of course affect what species are likely to turn up and whether they will be able to breed.



Identification

Birds can usually be identified from a combination of their colour, shape, size, behaviour and song. Start off by spending some time watching the common birds in your area and getting familiar with them. They will act as a good comparison when

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looking at other species later on. Bird songs and calls are a fascinating subject in their own right, and can help provide clues to identification (in fact for some species the calls are the easiest way to identify them). There are lots of good field guides and apps etc. to help, plus active local groups in the Chiltern counties.

Field work

As usual, a simple list of the species present on the site is a good starting point, and all you need to do this are a note book and your eyes and ears, although binoculars will make things easier of course. You will soon want to add to the basic list by gathering evidence for which species are breeding or wintering on the site, and how well they are doing. Records of species that pass through or are seen from the site but **don't actually breed or overwinter can still be useful** for general bird recording purposes, but are less informative about the habitats on your site.

Birds can be recorded all year round, and of course there are seasonal variations with some species present all year, while others may only be in this country during winter or summer, and others pass through in spring or autumn.

Records, surveys and monitoring

All bird records will be of interest to your county bird group and local records centre, whether they are ad hoc observations or complete species lists. The [BirdTrack website](#) (and [app](#)), developed by the British Trust for Ornithology (BTO) and partners, is a very successful system for contributing bird records. Your sightings become immediately available to both the BTO and the county bird recorders, and the website provides lots of analysis options that let you see how your records compare to those from other recorders. To get directly in touch with your county bird group see [Wildlife contacts](#) below.

For monitoring the birds breeding on a particular site the best method to use is the Common Birds Census (CBC). This requires a reasonably good level of knowledge of birds and their songs, but once mastered can provide good data on how well your site is doing for birds. The CBC is no longer run as a national project, but it is still widely used for site monitoring, and information and instructions can be found on the [BTO website](#).

Individual bird nests can be monitored for the BTO [Nest Record Scheme](#), following their guidance to ensure that nests are not disturbed or damaged.

Although not designed for surveying wild habitats, if you have houses and gardens nearby you may be able to encourage local residents to take part in one of the garden bird surveys. The simplest of these is the annual [Big Garden Birdwatch](#), coordinated by the Royal Society for the Protection of Birds. This happens once a year in January, and asks participants to record all the species that visit their garden during a single one-hour period. The BTO runs a national [Garden BirdWatch](#) project that collects data throughout the year, and some local bird groups have similar schemes. These are all **good ways of getting local residents interested in the wildlife, even if the data doesn't** apply directly to your site.

For further bird surveys and how to take part in them see [BTO volunteer surveys](#) and [RPSB surveys](#).

Mammals

Apart from ourselves, our domestic pets and farm animals, there are about 60 species of wild terrestrial mammal in Britain. Some of these make themselves fairly obvious (e.g. squirrels or rabbits), others are much more elusive and are unlikely to be seen unless you specifically look for them.

Identification

Many mammals can be recognised on sight by their characteristic shape, colours and behaviour. However, for the more elusive groups (such as mice, shrews, or otters) you are more likely to see their signs than the creatures themselves. Many mammals can be recognised from their footprints, their droppings, or their feeding signs.

Bats pose another challenge by being active at night, and are often identified from their ultrasound calls, with the help of 'bat detector' equipment that allows the calls to be recorded and analysed.

Field work

Those species that are easily visible can be recorded as they are seen, although for common resident species such as rabbits and squirrels it is not worth trying to record every single time you see them – a record once a year with a comment about relative population size may be adequate, unless you need to monitor their numbers more accurately (e.g. if you were investigating the effects of rabbit grazing on a grassland).

Live-trapping methods (e.g. Longworth traps) are often used to record the smaller mammals such as mice, shrews and voles. This requires having access to the right equipment and training and licences are required, to ensure that no harm is done to the species you are observing.

As mentioned above, bats also require more specialised skills to carry out full surveys, and again this is best done by someone who has been trained and licensed to do so. **But it's worth spending some time at dusk watching out for bats in general, without attempting to identify them, to see if you can find particular areas on the site that seem to have good numbers.** You may then be able to get a local bat group to visit your site and investigate in more detail. Dusk and dawn visits may also allow you to observe badgers and deer more readily.

Other methods have been developed to record and monitor particular species, including the use of hair-tubes (sticky tubes that retain a sample of hairs from the **small mammals that pass through them**) and 'footprint tunnels' – for more information consult [The Mammal Society](#) or contact your local mammal group (see [Wildlife contacts](#) below).

Records, surveys and monitoring

Ad hoc records of mammals can be contributed to the Mammal Society's atlas project, via their [online recording form](#), or direct to your county mammal recorder. The Mammal Society runs a number of [survey projects](#), including a footprint tunnel survey (focusing on hedgehogs and other small mammals), a harvest mouse survey and an owl pellet survey (identifying mammals from the bones found in owl pellets).

The People's Trust for Endangered Species (PTES) coordinates a range of mammal surveys, including projects for Dormice, Otters and Hedgehogs. For details see the [PTES survey page](#).

Ad hoc records of bats can be added to the [Big Bat Map](#), from the Bat Conservation Trust, who also organise more detailed surveys for the [National Bat Monitoring Programme](#). Your local records centre or bat group will also collect records, and contact them if you are looking for training or advice from a licensed bat recorder.

Amphibians and reptiles

There are just 13 species of terrestrial amphibian and reptile native to Britain, and in the Chilterns you are unlikely to find more than four reptile and five amphibian species. But even so, actually seeing all these species is quite challenging, as they are elusive and require patience and planning to observe. The word "herptiles" is sometimes used to mean the combination of amphibians and reptiles together.

Identification

Identification is usually based on appearance, including colour, shape and size, and type of movement. The animals' habitat and behaviour can provide additional clues, and some amphibians produce characteristic sounds. The species in the Chilterns can all be identified by sight as long as you have a good view of them, but for newts it is much easier if you can check the underside markings as well.

Field work

Reptiles are cold-blooded and need to warm themselves up to become active, so one of the best ways of observing them is to look for their basking areas and watch them on cool mornings, late afternoons or days with partial cloud. You then stand a chance of seeing them while they are basking, and before they have warmed up enough to hide themselves away. Sightings are most easily made in spring (March–May) or autumn (September–October). Reptiles are easily disturbed so approach potential basking areas slowly and quietly, and observe them from a distance (binoculars can be useful).

Another technique used to record reptiles is to put down small sheets of corrugated iron or roofing felt to act as refuges, under which reptiles will often rest and warm up. The refuges can be gently turned over periodically to check what species are using them. Such refuges need to be used with care – if they are positioned in an easily accessible place they may be disturbed too often, or may even suffer from being walked on and crushed. Also, if you are lucky enough to have Adders on your site there is a risk that the surveyor or a member of the public could be bitten if they get too close.

Amphibians need to return to water to breed, so if your site has a pond that will provide a focus for watching them. Frogs and toads, and their eggs or spawn, are usually easy to see when they are present. Newts are more elusive, but can be searched for at night by shining a torch into the pond. There are also trapping methods available, but these require training and if Great Crested Newts are present in the area a licence is needed. Contact your local amphibian and reptile group for information, and to enquire about arranging a group visit to help you record.

Records, surveys and monitoring

Ad hoc records can be contributed to your local amphibian and reptile group, or via your local records centre, or entered online via the amphibian and reptile [Record Pool](#).

Methods for monitoring populations of amphibians and reptiles vary between the species. Frogs and toads can be counted at the pond during the mating season, and if

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your pond is safely accessible for torchlight surveys then an estimate of newt numbers can be recorded. As long as this is done in a standardised way (e.g. at a similar date and time, and for a similar length of time, over several visits and years) it will provide a good estimate of trends in these species in your pond, or to compare several ponds on a single site.

Similarly, the use of refuges can give an idea of population size, although this is less easy to interpret as the numbers seen will depend on a variety of factors and large numbers of refuges are needed for reliable estimates.

To join in with national monitoring projects see the [National Amphibian and Reptile Recording Scheme](#).

Butterflies and other invertebrates

The term “invertebrates” covers a very broad group, including insects, worms, molluscs, spiders and many others – also known as ‘bugs’ or ‘mini-beasts’. The vast majority of all animal species are invertebrates, and estimates of the number of species in the UK range up to 30,000 or more. There will be more species of invertebrate on your site than there are of plants, birds, mammals and herptiles combined!

Within this huge number of species there are animals that specialise in almost every conceivable habitat, and their life-cycles are correspondingly varied. Many are good indicators of habitat quality, but they can be challenging to identify correctly, and it can be difficult to estimate population sizes and trends.



Butterflies are the invertebrates that are most familiar, best-studied and easiest to monitor, but information on the other groups can be very useful as well, and there is plenty of scope for making new discoveries among the less well-studied groups. The rest of this section focuses on butterflies, but see also [Other invertebrate groups](#), below.

Butterfly identification

As for the other popular species groups, there are lots of good books, websites and apps to help you learn about butterfly identification, and Butterfly Conservation (BC) has active local groups who organise events and surveys throughout the Chilterns. The vast majority of British butterflies can be recognised on sight once you have learnt what features to look out for, and assuming that you can get a good view of them. Close-focusing binoculars can be very useful for this, and catching butterflies in a net for close examination before releasing them is also a very good way to learn, does no harm if done carefully, and contrary to what some people think is not illegal!

Butterfly field work

Butterflies are predominantly insects of grassland, heath, scrub and woodland, and most sites will support a range of species. A few butterflies (such as Peacocks and Brimstones) overwinter as adults and can be seen on mild days in winter, but the main butterfly season is from March to October, with different species appearing at different times through the year.

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Weather conditions have a big effect on how many butterflies you are likely to see, and warm, sunny days are usually best, although on the hottest days there may be a dip in activity during the middle part of the day. In cooler conditions many species will seek out sheltered, south-facing spots in which to bask and warm up.

Many adult butterflies visit flowers to feed on nectar, so flower-rich areas are always worth checking, but some of the woodland species spend more time up in the tree canopy and rarely visit flowers.

Butterfly records, surveys and monitoring

All ad hoc butterfly records will be welcomed by the [recorder for your local branch](#) of BC, and the new [iRecord Butterflies app](#) provides another effective route for sending in records. To build up a complete butterfly species list for your site is not too hard to do, but will require visits in good weather on several occasions during the spring and summer – once a month from April to August would provide good coverage.

For more systematic monitoring there are a number of methods available, the most well-known of which is to set up a butterfly transect. This involves establishing a route across your site and walking that same route once a week from April to September in suitable weather conditions, and counting each individual of each species that you see within 5 metres of the route. Full details of the method are available via the [UK Butterfly Monitoring Scheme](#) website. A regular transect provides very useful data to see how butterflies are faring on your site, compared to how well they are doing on other sites in the region. However, to do a full transect is quite a large commitment of time, and you will need to consider whether the effort is justified before making the decision to go ahead.

To monitor particular species it is sometimes possible to do a reduced transect for a shorter period, or used timed counts at the peak of the flight period, to track changes in the species of interest.

BC have recently established a [Wider Countryside Butterfly Survey](#), for which volunteers are assigned a randomly selected 1km square near their home. This survey will not help you monitor a particular site, but will contribute very useful data to help assess the state of butterflies across the UK.

And there are less rigorous surveys that anyone can join with, the annual [Big Butterfly Count](#) is an excellent way to involve new people in watching wildlife.

Other invertebrate groups

Among the enormous number of other invertebrate species there are plenty that are familiar and easy to observe, as well as some that present great challenges for identification. Most invertebrate groups contain a proportion of species that can be identified in the field, a proportion that can be identified if caught and observed closely, and a proportion that can only be identified if specimens are retained and examined under a microscope, or in some cases dissected. Information and advice may be available from your local records centre, and there are local groups for some invertebrate species.

The invertebrate groups that can realistically be recorded in the field or by close examination of live specimens include:

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- Ladybirds (c. 30 species) – [UK Ladybird Survey](#)
- Dragonflies and Damselflies (c. 40 species) – [British Dragonfly Society](#)
- Shieldbugs (c. 20 species) – [British Bugs](#)
- Grasshoppers and Crickets (c. 30 species) – [Orthoptera Recording Scheme](#)

Among the more species-rich groups that may be possible to tackle, especially if you have a local expert to help, are hoverflies (just under 300 species, see the [Hoverfly Recording Scheme](#)) and moths (about 2,500 species, or about 800 if you focus on the larger macro-moths – see [Moths Count](#)). Lots of people enjoy watching and recording **these species, but if you're starting from scratch** it will take time to build up your identification knowledge. In many cases clear photos can help get identifications confirmed (see [getting help with identification](#)), but be aware that not all insect species can be identified from photos.

The [Bugs Count survey](#), part of OPAL (see also [Other surveys](#) below), is an approachable survey project that is good for getting more people interested in insects and other bugs. Some sites in the Chilterns are important for their Glow-worm populations, and if you are lucky enough to have Glow-worms on your site it is good to provide information to the [UK Glow-worm Survey](#). Stag Beetles are uncommon in the Chilterns, but if you do find one you can report it to the [Great Stag Beetle Hunt](#). For other examples see the [Buglife survey page](#).

Fungi and lichens

Fungi used to be thought of as 'lower plants', but they are a unique grouping of their own, forming one of the major Kingdoms of life. We're surrounded by fungi: in the soil, playing a vital role in the decay process, helping plants find the nutrients they need, even attacking animals. The most obvious signs of fungi are the 'fruiting bodies' (including mushrooms and toadstools) that they produce to spread their spores, but this is usually a small part of their life-cycle, much of which is spent in the form of tiny filaments (hyphae) that grow through the soil and other substrates.

Fungi are an enormously diverse group, and in the British Isles something like 12,000 species are known. Not surprisingly, this means that identifying fungi can be a challenge, but among all these species are some striking and immediately recognisable ones, such as the Fly Agaric.

Lichens are a partnership (symbiosis) between a fungus and an alga, the two organisms combining to produce a new 'species' of lichen. Lichens typically grow slowly on substrates such as rocks, walls and wood (both living trees and dead wood).

Identification

The features used to identify fungi include size, texture (e.g. shiny, rough, slimy etc.), colour and shape; for mushroom-type fungi, it can be especially important to note down details of the shape of the cap and the stem, including how they join, and whether there are any rings or skirts on the stem.

The pores or gills on the underside of the cap can be important (to see these try using a small mirror, avoiding the need to pick too many specimens). Additional clues can be gained by noting what the fungus is growing in or on, e.g. is it on soil, in leaf-litter or on wood, what tree and other plant species are nearby, what type of soil? Is the fruiting body growing alone, or as part of a group?

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Not all species can be identified from their appearance alone, and to record the full range of fungi you will need to learn how to take spore prints, and will need access to a microscope.

Similarly, for lichens a combination of microscopic examination and the application of particular chemicals to test their reaction may be required for identification. There are some species that are readily recognisable in the field, but to go beyond those requires a more specialist approach.

Field work

Fungi are strongly associated with autumn for most people, and it is true that autumn is when the fruiting bodies are at their most numerous. But some fungi are long-lived and present all year round (e.g. bracket fungi), and there are species that appear at other times throughout the year.

Lichens are generally available to find throughout the year, by examining suitable substrates including tree-trunks, rocks, bare ground, and human-made structures such as fences and walls.

Records, surveys and monitoring

Ad hoc records of fungi will be welcomed by your local fungus group. Guidance on recording fungi (and lots of other information) is available from the [British Mycological Society](#), and see also the [Association of British Fungus Groups](#).

For lichens there is guidance on recording from the [British Lichen Society](#). See also the [OPAL Air Survey](#), which uses a selected range of lichen species to provide information on air quality, and is designed for anyone to take part in.

Other surveys

Structured surveillance

'Structured surveillance' methods are being developed to monitor change in habitats, by recording a mix of species and habitat information. Most of these are still in a testing stage at the moment, but one that is due to be implemented more widely is [PondNet](#), led by the Freshwater Habitats Trust.

Phenology

Phenology is the study of the seasonal timing of natural history events. To contribute to this, anyone can join in with the [Nature's Calendar](#) project, which records a mix of species (such as the first Swallow and first Orange-tip of spring) and events (such as the first Bluebell flowering and the first autumn leaf-fall).

'Wider public' and educational surveys

We've already mentioned some of these above, such as the Big Garden Birdwatch and the Big Butterfly Count, but some other surveys that are suitable for beginners, and fun for lots of people to take part in, include:

- [OPAL surveys](#) are designed with full supporting information to allow anyone to take part in surveys focusing on a range of environmental issues, including air quality (using lichens), water quality (using plants and animals in ponds) and soil quality (using earthworms).
- [WildSquare](#) from the RSPB is aimed at children and families, providing a variety of surveys to take part in throughout the year.

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- [Garden Bioblitz](#) is an annual national project to encourage people to find as many species as they can in their garden over one weekend.
- For more ideas see the [BBC wildlife survey page](#).

Guides for developing your own 'citizen science' surveys are available from the [Centre for Ecology and Hydrology](#). Information on running your own 'bioblitz' to get people involved in looking for species is available from [OPAL](#).

Invasive species

Of the many species that have been introduced to this country, a small proportion are regarded as invasive, and can cause significant problems if allowed to spread into wild habitats. Examples are Japanese Knotweed and Signal Crayfish. It is worth monitoring such species as "negative indicators" on your site (see [Indicators and attributes](#) below), and you can also report them via the [Recording Invasive Species Counts](#) project or by using the [PlantTracker](#) app.



What does it all mean? Interpreting species records

Once you have a species list what can you do with it? It is useful to know which species are considered to be conservation priorities. This may be formally indicated through national 'species status' lists (see box below).

Species status

A confusingly large range of terms and categories have accumulated to indicate the status of species, using different criteria and applying to different contexts. This is a brief summary of the main terms in use. Species that are Red Data Book or Nationally Scarce do not automatically receive any legal protection, although they may contribute to the assessment of a site's importance. Species and Habitats of Principal Importance do receive some recognition in legislative guidance and policy. Protected species have specific legislation associated with them.

The government's Joint Nature Conservation Committee (JNCC) provides a [spreadsheet of nationally designated species](#) that includes all the categories below.

Red Data Book (RDB) species: these are species that have been identified as being rare and/or declining and/or under threat of extinction. Older lists of RDB species tended to lump together rare, declining and threatened species, but more recently published RDB lists follow international criteria that focus on the declining and threatened categories.

Nationally Scarce species: this is a category based on distribution. In most cases a Nationally Scarce species is one that is found in 100 or fewer of the approximately 3,000 10km-squares that cover Britain. (The term "Notable species" was previously used for this category.) You may also encounter the term "Nationally Rare", sometimes used to indicate species found in 15 or fewer 10km-squares, and that would have previously have been considered Red Data Book species on the grounds of rarity, but which are not considered declining or threatened and do not meet the new criteria for Red Data Book status.

Protected species: these are species that have been given specific protection under UK and/or European legislation, including the Wildlife and Countryside Act. The exact details of which species are protected and which operations are regulated are complex, and the legislation takes into account both conservation and animal welfare. Details are available via the [Natural England](#) and [JNCC](#) websites; BBOWT provide good information on their [Planning pages](#), and a useful collection of links has been compiled by the [Shropshire Biodiversity Partnership](#); for more details consult your local environmental records centre or Wildlife Trust.

Species and Habitats of Principal Importance: these are [lists of habitats and species](#) considered priorities for national conservation planning, and defined in Section 41 of the Natural Environment and Rural Communities (NERC) Act. These are largely based on lists first defined in the UK Biodiversity Action Plan process, where they were known as **Priority Species and Habitats**.

For most of the species that have a national status you should be able to find information by searching for the species name online (you may find that you get better results by searching for the scientific name rather than the English name). For some species groups a [published review document](#) may also be available to give further information on the ecology of the rarer species and why they have been given a conservation status.

In addition, there may be local lists highlighting species important in your county – your local environmental records centre will be able to advise of these. These can all help you define what species and habitats should be monitored further, and which might be priorities for habitat management.

Indicators and attributes

“Indicator species” are species that are only found in certain places or under certain conditions, so that their presence tells you something about the site in which they occur. Some species are good indicators of particular habitats or land-use (e.g. **“Ancient Woodland Indicator” plants**), others are indicators of environmental conditions (e.g. lichens can be used to assess aspects of air pollution). Indicators can be positive (indicating desirable features, and thus the species that you hope to see doing well on your site) or negative (indicating undesirable conditions; e.g. a strong growth of Stinging Nettles can be seen as a negative indicator, suggesting habitat disturbance and nutrient enrichment).

The most well-known application of this concept is probably in the established list of **“Ancient Woodland Indicator”** (AWI) plants, but examples exist for other habitats and other species groups. The most comprehensive published list of AWI plants is given in an appendix table in *The Wild Flower Key* (Rose, updated by O’Reilly, 2006, Frederick Warne), and more background to the concept can be found in Francis Rose’s **“Indicators of ancient woodland”** article (1999), available to download from [British Wildlife Publishing](#).

Information on indicators for other habitats is unfortunately widely scattered, but your local records centre or Wildlife Trust may be able to help. For instance, there are descriptions of habitats and indicators in the Local Wildlife Sites Criteria [available from TVERC](#) (see page 19 onwards). There are also tables of indicator species for **grassland’s in Natural England’s Farm Environment Plan Manual** (see for instance the grassland section that starts on page 55), and a stand-alone document has also been produced for [assessing grasslands](#) (this contains flow-charts and lists of indicator species for deciding whether a grassland meets the criteria for Biodiversity Action Plan priority habitats).

In Hertfordshire, Trevor James (BSBI county plant recorder) has been working with the Hertfordshire Environmental Records Centre to produce a list of plant indicators for habitats in that county. These are likely to be applicable more widely across the Chilterns, and we are grateful to Trevor for allowing us to include this as [Appendix 2](#) of this guide.

BSBI have also **made good use of the ‘axiophyte’ concept**. Axiophytes are “worthy plants – the 40% or so of species that arouse interest and praise from botanists when they are seen. They are indicators of habitat that is considered important for conservation, such as ancient woodlands, clear water and species-rich meadows.” There is a fair degree of overlap between axiophytes and indicator species, but

axiophytes can be used to flag up areas of good habitat in general, whereas indicators are usually more specific to a particular habitat.

A spreadsheet of axiophyte species for a wide range of British counties is available to [download from the BSBI website](#), but as yet no lists have been compiled specifically for the Chiltern counties. Species in the spreadsheet can still be used in the Chiltern context though, with the lists for Berkshire and Hampshire providing the best starting point.

Another way of analysing plant data is to use lists of 'attributes' (sometimes called 'traits'). For most native plant species there are lists available that show various characteristics of the plant itself (such as whether it is annual or perennial, whether it is known to be declining etc.) and also how strongly it is associated with various environmental factors (such as amount of light, amount of moisture, soil type, salt tolerance, nitrogen sensitivity). These attributes can be [downloaded in a spreadsheet](#) from the Biological Records Centre (**scroll down to find the "PLANTATT" download**), and much of the information can be seen for any given species via the [online botanical atlas](#), from BSBI and BRC (search for the species you are interested in and then look for the Habitats link).

If you have naturalists visiting your site and providing you with species records they may be able to let you know straight away which ones are of greatest interest, but otherwise it can take a considerable amount of effort to collate all the information that there is on conservation priorities and indicator species. However, knowing which of these are present on your site is very useful, and will help set priorities for which species and habitats should be the target of conservation management and further monitoring to see whether management is producing the desired results.

Surveying habitats

The term 'habitat' has been used to mean many different things, but usually refers to an area of land that has a recognisable and consistent set of environmental conditions (such as soil type, altitude, temperate range), and supports a recognisable suite (or 'assemblage') of species, most often based on plants but in principle applicable to other species groups as well. We are all familiar with broad habitat terms such as 'woodland' and 'grassland', but defining exactly what type of woodland or grassland you are looking at is harder, and defining the boundaries of a particular habitat can be tricky as well, as one habitat will often grade gradually into another.

The precise definitions of habitats depend very much on which classification you are using – habitats are more complex and less consistently defined than species. (For examples of habitat classifications see the [NBN Habitats Dictionary](#).) This can all make habitat surveying seem rather daunting, but anyone can make a broad habitat map, and then further refinements can be added over time.

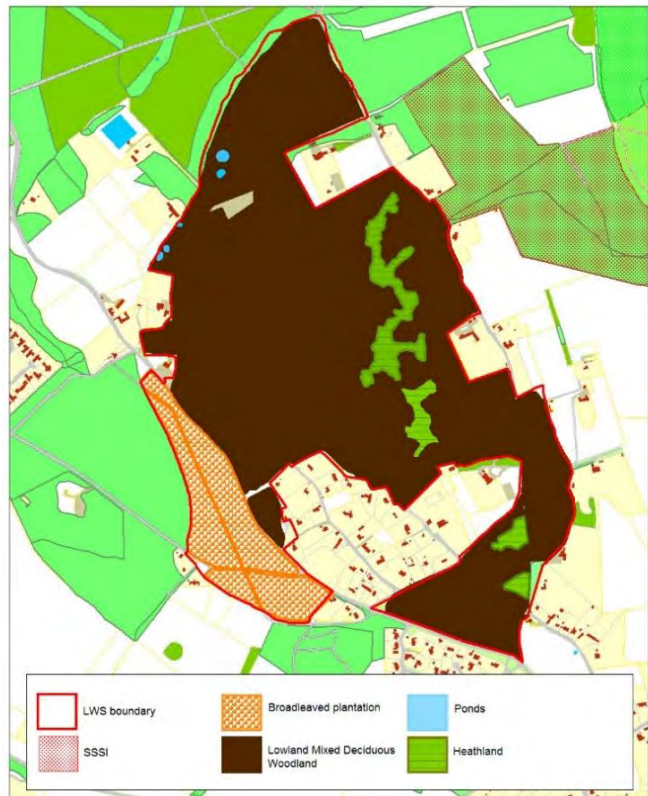
Mapping habitats

Habitat mapping can be done to different levels of precision. A good first step is to use an aerial photo to outline the major areas of woodland and grassland etc. These can **be refined by adding 'target notes', which are labelled on the map and annotated with information about particular features of importance: ponds, ancient trees, individuals of especially rare plants etc.**

You may decide that you want a series of maps to show habitats, and locations of rare or indicator species, alongside archaeological features, management plans, site access and infrastructure (e.g. gates, fences) etc. But if you can start off from an agreed base map, showing broad habitat compartments and a central grid reference for each compartment, you will be in a much better position to link all the data you may collect in future.

To add more detail to your habitat map you will need to decide on which habitat classification to use. The most accessible option is to use the [Phase 1 habitat classification](#). This has ten broad habitat categories (“woodland and scrub”, “grassland and marsh” etc.), each of which is subdivided into a series of more precise definitions for particular habitats within the broad category. Full instructions are [available to download](#), and it is possible to choose one broad habitat category at a time and focus on that, rather than having to do everything in one go. To identify Phase 1 habitat types you will need a mixture of information on the habitat structure (e.g. the mix of trees, scrub, and herbaceous plants), the soils and some knowledge of the plant species present in the habitat. Phase 1 has been used by the local records centres who may be able to advise further, and may also be keen to work with you to add detail to their own habitat mapping systems.

68W01 Kingwood Common



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Broad habitat categories such as “woodland” and “grassland” can be recognised and mapped using an existing background or aerial photo. Map © [TVERC](#).

Phase 2 mapping involves looking at plant communities in more detail, and categorising them according to the [National Vegetation Classification](#) (NVC). The methods are well-defined, but require a rigorous approach to sampling vegetation, usually using quadrats, along with the ability to identify the full range of species including grasses and sometimes mosses and lichens as well. Knowing what NVC communities you have on your site is very helpful, as there is a lot of information available on how the community links to other communities, and how the community may change over time depending on management practices. However, it needs an experienced botanist to make the most of it.

Habitat mapping tends to rely heavily on the vegetation that forms the most obvious element of the habitat, and also puts the focus on blocks of homogeneous vegetation, **but it's worth remembering** that other perspectives on habitat are also important. For example, when assessing habitats for insects the structure of the vegetation may be at least as important as the actual plant species that are in the community. Structural features such as the amount of dead wood in a woodland, or the height of the

vegetation in a grassland, will determine what species of insect can survive in the habitat. Often the edges between habitat blocks are important for insects. These features can usefully be added as target notes to your main habitat map.

Some of the best wildlife sites are a **'mosaic' of different habitats in close proximity**. Mosaics can be difficult to map if your focus is on blocks of habitat types, but they **shouldn't be overlooked! A recent project** from Natural England provides some good [resources on mosaic habitats](#).

Monitoring habitat change

Once you have a management plan that defines your aims for managing the site, you should ideally have monitoring projects in place to assess whether your management is achieving its intended objectives. Some of the approaches listed in the species group sections, above, may be appropriate for monitoring, but the essential difference for management plan monitoring is that you should have a pre-defined objective, the success of which can be judged from your monitoring.

For instance, suppose that your baseline surveys have found a colony of the rare Adonis Blue butterfly, and subsequent surveillance surveys have shown that on a butterfly transect at least 50 adult butterflies are counted in summer in most years. Since this species is a conservation priority, your management plan may contain an objective **to "Maintain favourable conditions for the Adonis Blue, such that at least 50 summer-brood adults are recorded on the transect every year"**. If your transect counts show that this figure is not being attained, that would focus attention on habitat management to improve conditions for the butterfly.

To monitor whole habitats the 'condition assessment' approach has been developed. This usually involves visiting each of the main habitat areas on your site and recording a range of features, such as the structural features mentioned in the previous section, **and recording the presence or absence of certain indicator species** (see "[What does it all mean?](#)"). **Guidance on carrying out condition assessment is rather scattered, but a web search for "site habitat condition assessment"** (e.g. within [Natural England publications](#)) will give you a way in, and you may be able to get additional help from your local Wildlife Trust.

As part of recording and monitoring your habitats it is well worth considering using photographs, ideally a set of photographs taken from the same points at regularly repeated intervals (fixed-point photography). To set this up properly you will need to document the locations from which the photos are taken, and ensure that each repeat set of photos shows the same areas.

How often you need to repeat the photos will depend on how fast your habitat is changing and what your objectives are. Grasslands and heathlands can change quickly and ideally need to be photographed at least once each year, while woodlands usually change more slowly and a photograph once every 5 years or at even longer intervals may be sufficient. However, **don't underestimate the amount of time it takes to organise a fixed-point photo system, take the photos, store them securely and ensure they are clearly labelled, and then interpret what they are showing! It's better to do just a few photo points and ensure they are done well, rather than being too ambitious and then being unable to keep the repeats going.**

[This link](#) provides a good example of documenting a fixed-point photo project, carried out by Sussex Wildlife Trust for the Knepp Estate. See also [Bedscape](#), the photo

archive project from the Bedfordshire and Luton Biodiversity Recording and Monitoring Centre.

Habitat survey projects

There are fewer survey projects aimed at habitats than there are for species, but some examples are:

- [Box woodland project, Chilterns Conservation Board](#)
- [PondNet](#)
- [PTES Traditional Orchard Survey](#)
- [Hedgerow survey information from Hedgelink](#)

Further reading

Harvey, M.C., and Hueber, N. 2007. [***An audit of biodiversity data for the Chiltern Commons***](#). Report to Chilterns Conservation Board.

Hill, D., Fasham, M., Tucker, G., Shewry, M., and Shaw, P. 2005. ***Handbook of biodiversity methods: survey, evaluation and monitoring***. Cambridge University Press. [Good and very comprehensive textbook on survey methods for all species groups, rather expensive to buy.]

Miller, B., Fennell, L., and Ratto, F. 2010. [***Chiltern Commons Project habitat audit***](#). Report to Chilterns Conservation Board.

National Biodiversity Network. 2009. [***The Darwin guide to recording wildlife***](#). [Excellent overview of wildlife recording in the UK.]

North, C., Greaves, H., and Whatmore, R. Undated. [***Recording wildlife in Merseyside***](#). [Although written for an area very different to the Chilterns, this document includes lots of useful information about carrying out wildlife surveys.]

Acknowledgments

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We are most grateful to Trevor James and Ian Carle for allowing us to reproduce the list of plant habitat indicators that appears in Appendix 2. Thanks also to Thames Valley Environmental Records Centre for permission to use the habitat map image on page 23.

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Appendix 1: Wildlife recording contacts in the Chilterns

Species group	National	Bedfordshire	Buckinghamshire	Hertfordshire	Oxfordshire
All	iRecord (online recording)	Bedfordshire and Luton Biodiversity Recording and Monitoring Centre	Buckinghamshire and Milton Keynes Environmental Records Centre	Hertfordshire Environmental Records Centre	Thames Valley Environmental Records Centre
	iSpot (online identification)	Bedfordshire Natural History Society		Hertfordshire Natural History Society	
	National recording schemes	Wildlife Trust for Bedfordshire, Cambridgeshire and Northamptonshire	Berks, Bucks and Oxon Wildlife Trust	Herts and Middlesex Wildlife Trust	Berks, Bucks and Oxon Wildlife Trust
Plants	Botanical Society of Britain and Ireland	Bedfordshire Orchid Group	Buckinghamshire Rare Plant Recording Group	Herts Flora Group	Oxfordshire Rare Plants Group
	British Bryological Society				
	Ancient Tree Hunt				
Birds	British Trust for Ornithology	Bedfordshire Bird Club	Bucks Bird Club	Herts Bird Club	Oxfordshire Ornithological Society
Mammals	The Mammal Society	Bedfordshire Badger Network	Bucks Badger Group	Herts and Middlesex Badger Group	Oxfordshire Badger Group
	Bat Conservation Trust	Bedfordshire Bat Group	Berks and South Bucks Bat Group North Bucks Bat Group	Herts and Middlesex Bat Group	Oxfordshire Bat Group Oxfordshire Mammal Group
Amphibians and Reptiles	National Amphibian and Reptile Recording Scheme	Bedfordshire Reptile and Amphibian Group	Buckinghamshire Amphibian and Reptile Group	HNHS amphibians and reptiles	Oxfordshire Reptile and Amphibian Group
	Amphibian and Reptile Groups of the UK			Hertfordshire Reptile and Amphibian Group	
Butterflies	Butterfly Conservation	BC, Bedfordshire and Northamptonshire Branch	BC, Upper Thames Branch	BC, Herts and Middlesex Branch	BC, Upper Thames Branch
Other invertebrates	British Dragonfly Society	Beds Moth Group	Bucks Invertebrate Group	Herts Moth Group	Moths of Oxfordshire Recording Scheme
	UK Ladybird Survey				
	Orthoptera Recording Scheme				
Fungi	British Mycological Society		Buckinghamshire Fungus Group		Fungus Survey of Oxfordshire
	Association of British Fungus Groups				
Lichens	British Lichen Society				

Appendix 2: Localised semi-natural habitat indicator plants for Hertfordshire



This list of indicator plants was compiled in January 2013 by Trevor J. James for [Hertfordshire Environmental Records Centre](#), but will be applicable elsewhere in the Chilterns, and we are grateful to Trevor James and Ian Carle for making it available. For further information contact the [Hertfordshire Flora Group](#).

The selection of the following plant species has been based on these criteria:

- All or the great majority of records since 1987 are recorded to 6-figures on the O.S. grid (*i.e.* they are uncommon enough or have ‘conservation’ value warranting detailed records being compiled for the *Flora of Herts.*). Grid references are usually for the precise (to 100 metres) locality of the plant, but are occasionally for ‘site-centroids’ where the precise locality was not identified by the recorder.
- The species are considered, generally, to have a great enough affinity with a coarse habitat type that enables them to ‘indicate’ either its current existence at that location, or that it was formerly a feature of the local environment. (A few records in the Hertfordshire flora database may refer to introductions, sometimes to the ‘wrong’ habitat, but for these species these are an extreme minority). Species that have affinity with more than one broad habitat type are excluded, as are species that may only indicate other associations (*e.g.* host association).
- Species selected are mostly those that occur in three or more localities in the county (unless their occurrence is a strong indicator of a ‘lost’ habitat for the area in which they were recorded).

The resulting lists include both county rare species, as well as numbers of ‘uncommon’ species (mostly occurring in 50 or fewer tetrads in the county, with some exceptions). They also include both species strictly limited to specific ancient habitat types, as well as species that are capable of persisting when a habitat type is otherwise degraded (therefore possibly being valuable ‘indicators’ of habitat restoration potential).

1. Ancient semi-natural woodland

In order to clarify the nature of the woodlands ‘indicated’ by the occurrence of the species, this ‘habitat’ has been subdivided into four main categories: acidic (heathy) woodlands; calcareous woodlands – both chalk and calcareous clay; woodlands on broadly neutral soils – mostly clay loams; and wet woodlands – where waterlogged conditions are locally frequent. In practice, any one woodland may have more than one of these characteristics.

1.1. *Acidic (heathy) woodland species (some of which indicate greater or lesser levels of ‘acidity’ of soils)*

<i>Athyrium filix-femina</i>	Lady-fern
<i>Polystichum setiferum</i>	Soft Shield-fern
<i>Dryopteris carthusiana</i>	Narrow Buckler-Fern
<i>Blechnum spicant</i>	Hard-fern
<i>Hypericum pulchrum</i>	Slender St John's-wort
<i>Sedum telephium</i>	Orpine
<i>Sorbus torminalis</i>	Wild Service-tree
<i>Scutellaria minor</i>	Lesser Skullcap
<i>Veronica officinalis</i>	Heath Speedwell

<i>Melampyrum pratense</i>	Common Cow-wheat
<i>Senecio sylvaticus</i>	Heath Groundsel
<i>Luzula sylvatica</i>	Great Wood-rush
<i>Scirpus sylvaticus</i>	Wood Club-rush
<i>Isolepis setacea</i>	Bristle Club-rush
<i>Carex pallescens</i>	Pale Sedge
<i>Carex pilulifera</i>	Pill Sedge
<i>Juncus bulbosus</i>	Bulbous Rush

1.2. *Calcareous woodland species (of variable soil or soil-moisture characteristics)*

<i>Polystichum aculeatum</i>	Hard Shield-fern
<i>Cardamine bulbifera</i>	Coralroot
<i>Monotropa hypopitys</i>	Yellow Bird's-nest
<i>Primula elatior</i>	Oxlip
<i>Sorbus aria</i>	Common Whitebeam
<i>Galium odoratum</i>	Woodruff
<i>Adoxa moschatellina</i>	Moschatel
<i>Luzula forsteri</i>	Southern Wood-rush
<i>Bromopsis benekenii</i>	Lesser Hairy-brome

<i>Hordelymus europaeus</i>	Wood Barley
<i>Polygonatum multiflorum</i> (s. str.)	Solomon's-seal
<i>Paris quadrifolia</i>	Herb-paris
<i>Neottia nidus-avis</i>	Bird's-nest Orchid
<i>Platanthera chlorantha</i>	Greater Butterfly-orchid
<i>Ophrys insectifera</i>	Fly Orchid

1.3. Neutral woodland species (usually clay loam woodlands)

<i>Rosa stylosa</i>	Short-styled Field-rose
<i>Veronica montana</i>	Wood Speedwell

<i>Epipactis purpurata</i>	Violet Helleborine
<i>Orchis mascula</i>	Early-purple Orchid

1.4. Wet woodland species (indicating more or less permanently waterlogged ground in a semi-natural woodland environment)

<i>Chrysosplenium oppositifolium</i>	Opposite-leaved Golden-saxifrage
<i>Lythrum portula</i>	Water-purslane

<i>Carex vesicaria</i>	Bladder-sedge
<i>Carex strigosa</i>	Thin-spiked Wood-sedge

2. Calcareous (clay/gravel) grasslands

These are essentially grasslands (and associated scrub) developed on superficial deposits, not over Chalk itself, although the two overlap in some characteristics (and species). Clay grasslands tend to be damp, whilst grasslands on calcareous gravels etc. are often dry, similar to but not the same as chalk grassland itself. The two types are separated:

2.1. Damp calcareous grasslands (e.g. on Boulder Clay, sometimes alluvial etc.)

<i>Ophioglossum vulgatum</i>	Adder's-tongue
<i>Alchemilla filicaulis</i>	Hairy Lady's-mantle
<i>Rosa micrantha</i>	Small-flowered Sweet-briar
<i>Astragalus glycyphyllos</i>	Wild Liquorice
<i>Trifolium fragiferum</i>	Strawberry Clover
<i>Trifolium ochroleucon</i>	Sulphur Clover

<i>Geranium pratense</i>	Meadow Crane's-bill
<i>Silaum silaus</i>	Pepper-saxifrage
<i>Briza media</i>	Quaking-grass
<i>Avenula [=Helictotrichon] pubescens</i>	Downy Oat-grass
<i>Anacamptis [= Orchis] morio</i>	Green-winged Orchid

2.2. Dry calcareous grasslands (e.g. on alluvial gravels, superficial drift deposits over Chalk)

<i>Cerastium arvense</i>	Field Mouse-ear
<i>Saxifraga granulata</i>	Meadow Saxifrage
<i>Lathyrus nissolia</i>	Grass Vetchling
<i>Trifolium striatum</i>	Knotted Clover
<i>Salvia verbenaca</i>	Wild Clary

<i>Euphrasia nemorosa</i>	Common Eyebright
<i>Campanula rotundifolia</i>	Harebell
<i>Carduus nutans</i>	Musk Thistle
<i>Cirsium eriophorum</i>	Woolly Thistle
<i>Aira caryophyllea</i>	Silver Hair-grass

3. Chalk grassland

This is defined as grassland/associated scrub developed directly on Chalk, on either rendzina or coombe soils. It is the characteristic grassland of 'downland'.

<i>Thalictrum minus</i>	Lesser Meadow-rue
<i>Helianthemum nummularium</i>	Common Rock-rose
<i>Iberis amara</i>	Wild Candytuft
<i>Filipendula vulgaris</i>	Dropwort
<i>Rosa rubiginosa</i>	Sweet-briar
<i>Astragalus danicus</i>	Purple Milk-vetch
<i>Anthyllis vulneraria ssp. vulneraria</i>	Kidney Vetch
<i>Hippocrepis comosa</i>	Horseshoe Vetch
<i>Polygala vulgaris</i>	Common Milkwort
<i>Bunium bulbocastanum</i>	Great Pignut
<i>Gentianella germanica</i>	Chiltern Gentian
<i>Gentianella amarella</i>	Autumn Gentian
<i>Clinopodium acinos</i>	Basil Thyme

<i>Thymus pulegioides</i>	Large Thyme
<i>Thymus polytrichus</i>	Wild Thyme
<i>Euphrasia pseudokerneri</i>	Chalk Eyebright
<i>Orobanche elatior</i>	Knapweed Broomrape
<i>Campanula glomerata</i>	Clustered Bellflower
<i>Asperula cynanchica</i>	Squinancywort
<i>Scabiosa columbaria</i>	Small Scabious
<i>Tephrosia integrifolia</i>	Field Fleawort
<i>Avenula [= Helictotrichon] pratensis</i>	Meadow Oat-grass
<i>Koeleria macrantha</i>	Crested Hair-grass
<i>Bromopsis erecta</i>	Upright Brome
<i>Gymnadenia conopsea</i>	Fragrant Orchid

4. Acidic grassland/heath

The following species occur in a range of acidic grassland/heath types, damp or dry, or in other habitats derived from acidic grasslands or heath (e.g. secondary woodlands).

<i>Montia fontana</i>	Blinks
<i>Spergularia rubra</i>	Sand Spurrey
<i>Hypericum maculatum ssp. obtusiusculum</i>	Imperforate St John's-wort
<i>Viola canina</i>	Heath Dog-violet
<i>Calluna vulgaris</i>	Heather
<i>Potentilla argentea</i>	Hoary Cinquefoil
<i>Potentilla anglica</i>	Trailing Tormentil
<i>Potentilla x mixta</i>	P. anglica x reptans
<i>Ornithopus perpusillus</i>	Bird's-foot
<i>Trifolium micranthum</i>	Slender Trefoil
<i>Genista tinctoria</i>	Dyer's Greenweed
<i>Genista anglica</i>	Petty whin
<i>Ulex minor</i>	Dwarf Gorse
<i>Polygala serpyllifolia</i>	Heath Milkwort
<i>Pedicularis sylvatica</i>	Lousewort
<i>Galium saxatile</i>	Heath Bedstraw

<i>Juncus squarrosus</i>	Heath Rush
<i>Luzula multiflora</i>	Heath Wood-rush
<i>Carex muricata</i>	Prickly Sedge
<i>Carex leporina [= ovalis]</i>	Oval Sedge
<i>Carex echinata</i>	Star Sedge
<i>Carex binervis</i>	Green-ribbed Sedge
<i>Carex viridula ssp. oedocarpa [= C. demissa]</i>	Common Yellow-sedge
<i>Nardus stricta</i>	Mat-grass
<i>Deschampsia flexuosa</i>	Wavy Hair-grass
<i>Aira praecox</i>	Early Hair-grass
<i>Agrostis canina</i>	Velvet Bent
<i>Agrostis vinealis</i>	Brown Bent
<i>Danthonia decumbens</i>	Heath-grass
<i>Dactylorhiza maculata</i>	Heath Spotted-orchid

5. Marshy grasslands/swamp

The 'habitat' here is broadly defined as any herbaceous vegetation which is more or less permanently semi-inundated, but excludes open water. It also specifically excludes specialised wetlands such as fen mire, spring seepages etc., as their 're-creation' is either almost impossible or at least a very long-term prospect. The list includes both highly localised species associated with ancient habitat, as well as species capable of colonising 'new' habitat. It also includes species of somewhat acidic as well as more calcareous water characteristics.

<i>Equisetum fluviatile</i>	Water Horsetail
<i>Equisetum palustre</i>	Marsh Horsetail
<i>Ranunculus flammula</i>	Lesser Spearwort
<i>Ranunculus hederaceus</i>	Ivy-leaved Crowfoot
<i>Thalictrum flavum</i>	Common Meadow-rue
<i>Stellaria neglecta</i>	Greater Chickweed
<i>Silene [= Lychnis] flos-cuculi</i>	Ragged-Robin
<i>Rumex hydrolapathum</i>	Water Dock
<i>Rumex palustris</i>	Marsh Dock
<i>Epilobium palustre</i>	Marsh Willowherb
<i>Oenanthe fistulosa</i>	Tubular Water-dropwort

<i>Myosotis laxa</i>	Tufted Forget-me-not
<i>Veronica scutellata</i>	Marsh Speedwell
<i>Galium uliginosum</i>	Fen Bedstraw
<i>Valeriana dioica</i>	Marsh Valerian
<i>Senecio aquaticus</i>	Marsh Ragwort
<i>Bidens cernua</i>	Nodding Bur-marigold
<i>Triglochin palustre</i>	Marsh Arrowgrass
<i>Juncus subnodulosus</i>	Blunt-flowered Rush
<i>Juncus acutiflorus</i>	Sharp-flowered Rush
<i>Carex disticha</i>	Brown Sedge
<i>Carex acuta</i>	Slender Tufted-sedge
<i>Dactylorhiza praetermissa</i>	Southern Marsh-orchid