Sussex Wildlife Trust

Wildlife Surveys and Monitoring

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Wildlife surveys and monitoring

This booklet outlines why we record wildlife and gives some examples of how to do it. It has been written as a guide with tips that you can dip in and out of, as you need. You will find lots of links to further information and resources to help you on your wildlife recording journey.

Why record wildlife?

There are many reasons to record wildlife, and it is an activity that anyone can be involved in.

- Increases our understanding of the natural world
- Helps to connect people with nature
- Allows us to answer questions about the state of the environment
- Enables us to understand the impact of management activities
- Can show us interactions between species and within communities
- Tracks changes over time
- Provides a conservation warning system
- Contributes to nature recovery
- Nourishes an enquiring mind

Survey data is crucial for making decisions that affect the natural world, from if and how we manage a site, to which species are prioritised for conservation, as well as trying to minimise impacts from land-use change such as new development.

These decisions should be based upon the most up to date information possible, and recording wildlife is at the heart of this.

Getting started in wildlife recording

Whatever you are interested in, from fungi to fish, seaweed to slugs, lichens to longhorn beetles, millipedes to mammals, and beeflies to birds, there's a National Recording Scheme for you! You can search through these at the Biological Records Centre or the National Biodiversity Network.

If you don't want to commit to regular recording that's ok too! Ad hoc records also make a valuable contribution to our understanding of the natural world.

For a bit of inspiration you can look for natural history collections at Natural History Near You or visit the Nature Recording Hub. There are lots of general wildlife groups on Facebook including NHM UK Biodiversity and British Ecologists, as well as groups linked to specific interests groups such as Conopids, Moth Trap Intruders UK and British Leafminers. And if you really can't choose, you might be interested in Pan-species Listing!

Help with identification

Learning takes time and practice, but don't let that hold you back. There are lots of tools to help you get started, as well as communities of Local Recording Groups that offer an opportunity to go out with, and learn from, other enthusiasts.

Photos can be a useful learning tool, although it's important to be aware that not all species can be identified by photos, and for some the photos will need to show specific features. It is worth taking photos from a couple of angles e.g. top and side, front and back, to ensure any identification features needed are visible. Including something in the photo that can provide a scale of the size can also be useful.

There are lots of great resources available to help with species identification, and FSC Biolinks has an ID Resource Finder to try and bring these all together.

Making a record

Wildlife records are snapshots of ephemeral events. They are also fundamental tools in nature conservation. At their core, they document the presence of something, in a specific place, at a specific time, noted by an observer.

What: The name of the species seen. Including a scientific name alongside any common name will avoid confusion. If it is something more unusual photos can help with identification and verification. To ensure data quality, it is important to record to the level that you can identify e.g. in some cases this may be genus or family, rather than species.

Where: The location, of your sighting as precisely as possible, using a grid reference and the name of a nearby settlement or feature. Ideally grid references will be at least six figures.

When: The date you made your observation, usually a specific day.

Who: The name of the observer. There may be others involved in helping to identify the species and their name can also be included as a determiner.

Information is power! You might want to add additional comments about your record, for example if you were doing a specific survey, the number of individuals recorded, the life stage (e.g. flowering, adult, gall), the sex, any behaviour observed, the habitat or microhabitat the species was found in, the time of day or the weather conditions. It is important to remain objective and record only what we see/hear: it is up to the user of the record to interpret what that data might mean for their purpose.

Finding a grid reference

You can calculate a grid reference from an Ordnance Survey map, and there are also a number of online tools to help you find one quickly, including Grab a Grid Reference and what3words.

Where does your data go?

Data is usually submitted to your Local Environment Record Centre, in Sussex this is Sussex Biodiversity Record Centre. If you are taking part in a national survey, you might want to check that the National Recording Scheme you are submitting data to exchanges data with your Local Environment Record Centre, to ensure the information reaches all of the places it will be useful.

Dealing with the regulars: Many species that are now of conservation concern, such as House Sparrows and Starlings, were once much more common, and it is important to record all species not just the rare ones. But how do you record common resident species? One approach is to record them once a year (or another time interval if more suitable), with a comment about their population size or abundance.

You may be asked for additional information to help verify your record, this is all part of ensuring that biodiversity data is as accurate as possible.

iRecord

A website for sharing wildlife observations, with records made available to National Recording Schemes and Local Environment Record Centres.

It is quick and easy to register, and provides a useful place for wildlife recorders to store their data. Records can be entered singly or as lists, and photographs (including of sonograms for species such as bats) can be uploaded to support verification.

An Activity can be set up for a particular site or area, this can be great for Local Groups, allowing the collation and analysis of members' data.

Data from iRecord is imported by Sussex Biodiversity Record Centre. If you are outside of Sussex, you might want to check with your Local Environment Record Centre.

iNaturalist

A website to get help with species identification, allowing you to upload photos and sound recordings, and search others' observations. A Project can be set up to display all the observations made within a set location or by a group.

Observations from iNaturalist will be imported into iRecord if an identification is reached.

Which to choose? If you are confident with your identification use iRecord, if you need a bit of help, try iNaturalist.

Wildlife surveys

Wildlife surveys are used to gather information about species and habitats, and enable you to move beyond anecdotal understanding. They can be as simple as a few notes about a site or involve systematic methods that are objective, repeatable and help you to gather all of the information you need.

Surveys are an important step in making informed decisions and enable the setting of clear objectives, allowing you to determine and prioritise management.

Choosing a survey method depends on many things, in particular the resources you have available, including time, equipment and enthusiasm! Other considerations include ethical factors such as animal welfare, health and safety, and access to sites. Some species are protected by law, and it is important to familiarise yourself with these. Their presence can restrict the methods you can use, or you could seek assistance from someone who has the necessary licence in place.

For surveys to be successful it is important to have some knowledge of the ecology of your target species, including behaviour and habitat niche, which can vary in different life stages.

For fungi, lichens and many groups of invertebrates, there will be some species that are identifiable in the field (or with the right photos) and others that require more detailed examination, so comprehensive surveys may require collaboration with specialists.

Getting lots of people involved with wildlife surveys may be one of the main aims for your group. The UK Centre for Ecology and Hydrology has lots of useful information to help you set up citizen science projects, and the National Bioblitz Network has all the resources and information you need to run a Bioblitz.

A Bioblitz or organised recording event can be an effective way to get more people engaged with your site, raise the profile of your activities, and generate species data. It gives interested amateurs the opportunity to work alongside more-experienced naturalists, and can give attendees

their first opportunity to be involved with wildlife recording, helping to develop skills and build a community of people that value the site.

Monitoring

The first set of surveys you undertake forms a baseline against which you can monitor going forwards. Future survey data can be compared to your baseline to show whether and how things are changing over time, and allow you to explore the reasons for this.

Monitoring helps us to understand the effect of management and whether it is having the desired impact, helping us keep track of progress against objectives such as habitat condition or populations of particular species.

Planning a monitoring programme

There are many factors that will impact a monitoring programme, including your intentions for the site, and the habitats and species present. Regular and targeted surveys require a commitment of resources, and it is important to be realistic about the amount of time, expertise, equipment and funding you have available.

The first step to ask yourself is what questions you are trying to answer. Being clear on this, will help you to design a suitable monitoring programme, and ensure you are carrying out the right kind of surveys, in the right way, to give you the information you need to answer these questions. Gathering a list of bird species at a site is different to working out their likely breeding status or estimating their populations, and tracking how these things are changing over time, and how this is impacted by current management.

Be realistic about the resources you have available, particularly time! It may be better to start small and build up, rather than overcommit and risk despondency if you don't manage to achieve all that you intended, as quickly as you hoped. Make sure you have the time to plan and carry out your surveys, as well as working out what your results mean, and sharing them with others. You can build on these foundations as you build skills, confidence and links.

When planning monitoring, consider how frequently each survey will ideally take place: some things will respond to management and change more quickly, others more slowly. The time you have available will also influence the methods you use e.g. a single visit with a rapid assessment, or several more detailed visits throughout the survey season.

Decide too whether you will undertake surveys yourself, or if you need some additional help or training. Don't be put off by current gaps in your knowledge, these are opportunities to develop partnerships and learn from others, and can be good ways to generate new ideas for a site.

You could contact a Local Recording Group to see if they are able to support you with your first surveys, to ensure you have everything in place that you will need going forwards with your monitoring. You may also find it useful to engage a professional ecologist, particularly for more specialist surveys. Ask around in your networks or consult professional bodies such as CIEEM to track down local contacts.

You can still carry out lots of useful groundwork, such as identifying parts of the site that appear to be particularly well-used by birds, butterflies or bats that could be the target of more-detailed survey work.

It is useful to give some thought to what you will do with the information you gather: how will you handle and store your data, how will you analyse and interpret it, how will you report it, and to who?

Spending time answering these questions can shape your monitoring programme, so it tells you what you need to know, but there are some other questions it is also worth considering: What decisions will your results guide? What does success look like? What changes are you prepared to make? How fixed are you to your beliefs? Are you prepared to be flexible? How reactive can you be? Are you prepared to be wrong? Are you willing to learn and embrace change?

Example: Monitoring the availability of deadwood. You might want to look at the quantity and size of deadwood of different kinds (e.g. fallen versus standing) or the rot features available (wet versus dry), this could be included as part of woodland condition surveys or veteran tree surveys. You might instead want to look at the functional role of the deadwood using surveys of species it is likely to support such as bats, breeding birds, fungi or saproxylic invertebrates.

Example: Monitoring a meadow. Where we are using management and/or introduction of plant species to increase the botanical diversity of a meadow, surveys of the plants are of course very useful. We could go down the route of using a habitat classification such as the National Vegetation Classification, or we could produce species lists with their relative abundance. We may just decide to focus on plant species that are indicators of good examples of the meadow habitat we are aiming for, and how their abundance is changing. It could be useful to measure factors such as availability of scrub and bare ground habitat, to get a greater idea of habitat condition, or perhaps you want to include monitoring of flower-visiting insects to identify if there are gaps in the seasonal availability of foraging resources.

Example: Monitoring a new pond or scrape: The progress of a new area of open water could be tracked by surveys of wetland plants and their abundance. You may also want to look at the types of aquatic insects that are colonising, or which dragonfly species are visiting, and whether they are breeding, as well as looking out for spawn during the spring, showing that amphibians have started to colonise.

Desk study

Desk studies can be easy to overlook but provide an excellent foundation to your knowledge about a site. They are an opportunity to delve into the information that is already held about your site and can point you in useful directions for further survey work and management.

Local Environment Record Centres can carry out searches of all the existing biodiversity data they hold for a site: it is often useful to include a buffer around your site e.g. 500m or 1km to understand the surrounding area.

Other useful sources of information include:

- Aerial photography and satellite imagery: useful for visualising the local landscape and how your site connects and interacts with it.
- Magic: provides information about designated sites, priority habitats, landscape and historic environment.
- National Biodiversity Network: holds and shares wildlife records.
- Soilscapes: lets you search for the soil profile of your area
- British Geological Survey lets you search data on geology and soil.
- National Library of Scotland: allows you to compare maps of different ages side by side to see how the landscape has changed.
- Parish Council: it is worth speaking to your Parish Council to see what advice and resources they may be able to help with.

Survey calendar

Ecology surveys are generally seasonal with optimal times to gather data depending on the survey.

Standard survey techniques

There is a wide range of survey techniques available in ecology, which can of course come with their own jargon

Transect: A fixed route for recording species along a line or within a corridor e.g. butterflies or bats, which may be divided into sub-sections using length or different habitat divisions.

Point count: Recording individuals seen and/or heard from a fixed point e.g. birds or dragonflies.

Targeted search: Often useful for rare species that occur at low abundance, or species that can be overlooked using methods such as transects due to their behaviour. These searches can be timed or combined with other methods.

Quadrat: A fixed recording area, often used for plants or slow-moving species such as molluscs in rockpools, usually with a measure of abundance for the species encountered.

Mark-recapture: Used to estimate a species' population size by marking captured individuals, and comparing this to the number of marked individuals later recaught.

Choosing a standard survey technique, which may also be part of a National Recording Scheme can help to smooth out some of the uncertainties in interpreting ad hoc records.

Sometimes a standardised method is not the right fit for your circumstances and you might want to tailor survey work to your needs. You will still be generating valuable data that you can compare against in the future.

Whether you are using established survey methods or something bespoke, it is important that the methods you have used are clearly documented in sufficient detail. This ensures that anyone using the data understands how they have been gathered, and that someone else would be able to accurately repeat the survey in the same way.

For repeat surveys, using the same method and survey effort will help ensure data are comparable. Think too about how you can standardise other conditions e.g. time of year and time of day, as well as weather and temperature, all of which can impact the activity of many species.

You may wish to stack methods e.g. monitoring the structure and condition of woody habitats alongside the bird activity in these areas. Whatever surveys you choose to do, ensure that you have detailed the methods including the survey route and any other important information.

Habitat surveys

Habitat can be defined in a number of ways, but here we are referring to a recognisable community of vegetation. There are many ways of classifying habitat, some of which can be detailed and complex, but detailed and complex is not essential, and broadscale habitat recording can be a useful place to start.

Aerial photography and satellite imagery can be useful to start identifying areas of similar looking habitats e.g. woodland, scrub, grassland and open water, which can then be ground-truthed.

Walking around the site allows you to add notes about features of interest such as boggy areas, ancient trees and patches with a higher abundance or richness of plant species. Adding in details about habitat mosaics (patchworks of different habitats close together) and habitat edges (boundaries between different habitats), microhabitats, habitat structure and functional features e.g. the availability of flowering resources or deadwood, can help you to understand what resources are available for groups such as invertebrates, and highlight where there might be opportunities to make enhancements.

There are several commonly used classifications for UK habitats:

Phase 1 habitat survey is a widely recognised habitat classification system. It requires information about the habitat structure, soil and some of the plant species present, in order to identify and map habitats correctly. Phase 1 classification is hierarchical, moving from broad habitats to specific habitats, with codes for each e.g. B grassland and marsh; B1 acid grassland; B1.1 unimproved acid grassland.

Phase 2 habitat survey maps stands of vegetation in greater detail using the National Vegetation Classification (NVC). These surveys are more involved, requiring the collection of extensive botanical data, and are best carried out by a more-experienced botanist. For some sites it can be useful to define NVC communities and monitor how these change over time as a way to understand the impact of management.

UKHab is a recently created habitat classification system, which is becoming widely adopted, particularly as it is the classification used for Biodiversity Net Gain. UKHab is hierarchical, with codes for habitats as well as secondary codes to add information about the habitat or factors such as land management.

Depending on the site, you may wish to explore other habitat survey methods including River Habitat Surveys, used to assess the physical structure of freshwater rivers and streams, the Great British Hedgerow Survey, to assess the condition of hedgerows or the Traditional Orchard Survey to monitor the condition of orchards.

Habitat condition

Moving beyond classifying a habitat, we can start to think about determining and monitoring its condition. But, how do we make judgements about habitat quality?

Condition assessments draw upon specific features of a habitat, which could include factors such as species richness, diversity in vegetation structure, presence of invasive species, damage, water quality, soil nutrients and connectivity within the landscape.

There are examples of condition monitoring such as Common Standards Monitoring, and you may find it useful to contact a professional ecologist or a conservation organisation for some help in setting up a condition monitoring method that works for your site.

Indicator species are often used in condition monitoring to tell us 'something' about the site where they are found. Some species have very specific requirements and can be indicators of a particular habitat e.g. chalk grassland or particular conditions e.g. nutrient enrichment.

Monitoring the presence and abundance of a selection of indicator plant species can underpin rapid habitat condition assessment, and may offer an opportunity for more people to be involved with survey work, as well as helping us to determine ongoing management at the site.
You can often find plants that are indicators of specific habitats within Local Wildlife Sites criteria for your area, as well as sources such as the Higher Level Stewardship: Farm Environment Plan Manual and Indicators of Ancient Woodland.

Fixed point photography or drone surveys can also be useful in monitoring habitat, as can comparing recent aerial photography and satellite imagery with older imagery.

Plants

Plant communities define habitat and its condition, so starting to recognise plants is a key part of habitat classification and monitoring.

Plants are often easiest to identify when they are flowering, so focusing your surveys during the spring and summer months can be most productive. As well as the features of the plant, such as leaf shape, flower colour, and shape and size, its flowering period and habitat are other useful factors to help in identification.

Woodland flowers generally come out earliest, with grassland and heathland flowers later, and survey visits can be targeted to peak flowering for the habitats you have, or you can carry out more than one survey visit during the season to record a greater number of species.

Plant surveys can comprise a list of species, which can be separated according to the habitat within which they were recorded. Adding a measure of abundance will allow you to make more meaningful comparisons in the future.

The DAFOR scale is the easiest assessment of abundance, but there are other options including percentage cover and the DOMIN scale.

Dominant (D): covers a large proportion of the area, many habitats will not have a dominant species.
Abundant (A): commonly encountered, you see lots most places you look.
Frequent (F): commonly encountered, you see some most places you look.
Occasional (O): found at relatively low frequency often in smaller populations.
Rare (R): only found once or as a small number of individuals.

Plant monitoring could include surveys of indicator species alongside annual counts of any rare or significant species present, e.g. the main foodplant of a rare bee or moth found at the site. There may also be Invasive Non-native Species present at your site and these should also be monitored, and ideally managed.

Useful resources include OPAL Tree Health Survey, National Plant Monitoring Scheme, the British Bryological Society and the Big Seaweed Search.

Amphibians and reptiles

There are only a small number of amphibian and reptile species in the UK, and you can quickly learn to identify them based on their appearance.

Both amphibians and reptiles can be elusive and surveys often need to be targeted to particular times of year, day and weather conditions.

Amphibians often congregate in breeding ponds during the spring months, and searching at night with a torch can be a good way to find them. There are other survey methods available including trapping and netting, but these need some experience. A licence is required if Great Crested Newts are likely to be present: you may wish to contact your local Amphibian and Reptile Group to see if they are able to support your survey work.

During daylight, you can assess ponds for their habitat suitability, and search for amphibians in the water and around the water's edge, as well as recording the presence and abundance of Common Frog and Common Toad spawn.

Reptiles often spend time basking to increase their body temperature, and searching sites that hold warmth such as banks, walls and log piles can be a good way to find them. Reptile surveys often mimic these natural basking sites using carefully-located artificial refugia such as metal sheets and bitumen felt. Remember to use precautions when checking refugia, if you are lucky enough to have Adders at your site.

The most productive times for reptile surveys vary with the time of year and weather, but generally, morning and late-afternoon/evening are good times to search. Reptiles can be easy to disturb, so remember to walk slowly with a light step; binoculars can also be helpful!

Useful resources include National Amphibian and Reptile Monitoring Programme, Surveying for Amphibians, Surveying for Reptiles, National Pond Survey and Pond habitat survey.

Birds

Birds are often conspicuous and are a popular group to record, offering scope for lots of different surveys. As with any group, time invested in getting to recognise families, will help greatly as you learn to identify birds. Colour, size, shape, behaviour and season are all useful pointers, and becoming familiar with songs and calls can also help. You can quickly familiarise yourself with the 'typical' birds of a habitat or site.

A bird survey can comprise a list of the species seen and/or heard, and this can be built upon with multiple visits to understand how and when different species are using the site.

If you have the skills within your group the Common Bird Census can be an enjoyable way to gather detailed data on breeding birds. It is important to think about winter visitors too, as well as those species that pass through during migration, and you may want to do targeted surveys at your site such as heronry monitoring or wetland species counts.

Useful resources include Big Garden Birdwatch and British Trust for Ornithology, which has information on a range of different surveys. There is also growing interest in using sound recording equipment to record migrating birds.

Fish

Although fish can be observed from the bankside, it is recommended that an expert be contacted for advice on undertaking a comprehensive fish survey.

Mammals

A lot of British mammals are distinctive, and you can quickly learn to identify them based on their appearance, with additional clues from their habitat and behaviour. For others, including some of the mice, voles and shrews, as well as bats, a closer look (or listen!) may be required. One thing many of them share is being elusive, and we often rely on signs such as footprints, feeding signs, dung or nests to establish their presence.

There are many techniques for surveying mammals, and some are more effective for particular species. A licence may be required if bats, Hazel Dormouse, Water Vole, Otter or Badger are likely to be present: this depends upon the survey technique you plan to use.

Direct counts: Can be useful for deer, timing and method need to be carefully planned as they are generally timid.

Nest searches: Harvest Mice and Hazel Dormice both weave characteristic nests. Harvest Mouse nest searches are best done during the autumn, and nest tube surveys (with a licence) can be undertaken for Hazel Dormice from spring until early-autumn.

Feeding remains: Several species leave distinctive feeding remains. Surveys include looking for nuts nibbled by Hazel Dormice, and piles of vegetation left by Water Voles and Field Voles.

Footprints: It is possible to find footprints in the field but your chances can be greatly increased by using a footprint tunnel. This technique can be particularly useful for Hazel Dormice and Hedgehogs.

Other signs: There are other ad hoc finds that can give you a good mammal record e.g. hair snagged in a fence, a Badger latrine, remains in an owl pellet or a molehill.

Live-trapping: Used to catch and hold small mammals without harm, live-trapping can allow you to gather data about the small mammal community and how it is distributed at your site. Animal welfare is the priority, and trapping surveys must be carefully planned, and undertaken by people with appropriate experience.

Passive surveys: Technology including thermal cameras, data loggers, camera traps and acoustic recorders can all help gather data about mammals using a site. Placement is important and you need to factor in the time needed to analyse your data. As with any method it is important to be aware of limitations e.g. population estimates can be more challenging, and the behaviour of some species make them less detectable.

AudioMoth is a low-cost acoustic logger, and programs such as Kaleidoscope and the BTO Acoustic Pipeline can help with the analysis of sound recordings from bats, small mammals and bush-crickets.

Bat detection: Bat detectors can be left out in the field or used for carrying out nocturnal transect surveys, roost counts and other bat surveys.

Useful resources include National Bat Monitoring Programme, National Water Vole Monitoring Programme, National Harvest Mouse Survey, Bedfordshire Bat Group: key to the echolocation calls of British bats, University of Bristol: the bats of Britain, Acoustic monitoring, guidance for using Hazel Dormouse footprint tunnels and Mostela cameratrap concept.

Invertebrates

There is still so much to learn about many of the species we share the countryside with, and this is particularly true of invertebrates, with many interesting behaviours and relationships to be discovered.

As with any group, learning more about invertebrates takes time and patience, some species can be more challenging to identify, and additional equipment may be needed. It is often worth starting with familiarising yourself with one group of invertebrates e.g. crickets and grasshoppers, hoverflies, bumblebees, butterflies and moths, ladybirds, longhorn beetles, shieldbugs, or damselflies and dragonflies.

Butterfly and moth recording is well-established in Britain, with lots of information to help with identification. Transect surveys are a useful way to monitor butterfly species and abundance: most butterflies are seasonal and weather dependent, so planning in a few visits throughout

the year will help to build up a species list for a site. Butterflies can also be searched for in different stages of their life e.g. looking for the eggs of Brown Hairstreak or Orange-tip, and the larvae of Brimstone or Small Tortoiseshell on their larval foodplants.
If you have access to a light trap, moth trapping can be a good way to monitor moth species at a site, and can open up a new nocturnal world!

Transects and point counts can help you keep track of dragonflies and damselflies, and netting larvae or searching for exuviae will help to reveal which species are breeding.

Freshwater invertebrates can be surveyed using kick sampling, with animals caught for identification before being released back to their capture location.

Flower-insect timed counts can be used as a way of monitoring the diversity and abundance of flower-visiting insects: with ten minute blocks spent watching flowering patches.

There are many other survey techniques for invertebrates including various traps, sweeping, sieving and beating, however it is recommended that you engage a professional entomologist if you want to know about the invertebrates at your site in depth.

Useful resources include National Moth Recording Scheme, UK Butterfly Monitoring Scheme, UK Ladybird Survey, Buglife, UK Glow-worm Survey, Big Wasp Survey, British Dragonfly Society, Beewalk, Earthworm Recorder's Handbook, Riverfly Monitoring Initiative, leaf-miner moths recording scheme and the Orthoptera recording scheme.

Fungi

There are fungi that identifiable in the field, however many more that require a closer look, and in some cases spore prints, treatment with chemicals or a microscope, to finalise their identification. It is recommended that an expert be contacted for advice on undertaking a comprehensive fungi survey.

Useful resources include the grassland waxcap identification support tool, British Mycological Society keys for macrofungi and the British Lichen Society.

Equipment

The equipment you need will depend to some extent on the survey you are undertaking, but some of the basics include:

- Notebook to record your data, or another means e.g. Dictaphone or tablet if preferred
- Clipboard, or better still a WeatherWriter (this is Britain after all!)
- Maps: this might include maps of the site, survey area/route, and an Ordnance Survey map, you may even want to carry a GPS
- Mobile phone for safety, also useful as a camera and you may have identification or recording apps you want to use in the field
- Binoculars and/or a hand lens are helpful for many surveys

There may be other things you want to take along including:

- Identification aids: these could be books or apps
- Camera: useful for identification, as well as cataloguing and showcasing your site. For some species, photographs can be used to identify individuals e.g. some reptiles.
- Survey-specific equipment such as nets, pots, trays, tape measures and torches.

Health and safety

Your planning should include outlining how you will ensure the safety of those carrying out survey work.

This includes making sure you have permission to access a site and the landowner (and anyone else involved in site management) knows when you are there. It is best to avoid lone working, especially around water, if you do have to work alone make sure someone knows where you are going and when.

In the field make sure you have suitable footwear and clothing, the correct protective equipment if needed, along with a first aid kit, water and snacks. Check the weather before you travel to the site, and if you encounter unexpected conditions e.g. water levels, livestock, changing weather, assess if it is safe to continue. Take extra care if you are carrying out surveys at night or in low light levels.

Additional specific risks with some ecological surveys include possible exposure to diseases from ticks e.g. Lyme disease, handling wild animals e.g. Weil's Disease, and Tetanus. You should familiarise yourself with the risks and how to mitigate them.

Biosecurity

As well as our own safety we should also make sure we are limiting any risks of spreading diseases amongst animals and plants, and invasive non-native species. Measures we can take include ensuring that equipment and footwear is cleaned and checked for fragments of plants or animals.

Data management

Systems such as iRecord can be a useful place to store data, and if you are carrying out analysis you may choose to use a program such as Excel.

Maps are used at all points of survey work right through from your desk study, recording in the field to presenting your results to others. They are a great way to contextualise data, and can help us to study patterns spatially and visually.

GIS (mapping) programs can allow us to combine different layers of information about a site e.g. habitat classification, species richness and management activities, which enables us to better understand a site, and what we want to do there.

- QGIS is a free digital mapping system that is supported by lots of online material to help you get set up.
- Land App offers a free simple mapping toolkit.
- MapMate is a software package to help you record, map and analyse your data.

Interpretation

There are lots of things that can help you to put your survey data in context:

- Habitats and Species of Principal Importance (Section 41 Habitats and Species) are considered priorities for biodiversity conservation, and may be referred to in relation to land-use planning, funding and land management.
- Conservation designations for species include those protected under various legislation, and these have been collated by JNCC in a searchable spreadsheet.
- Red lists assess the status of species with reference to factors including their population size, change in distribution. Red lists are available for many species groups including birds, mammals, plants and dragonflies.
- National lists such as the BSBI axiophytes list of 'worthy' plants.
- Local lists such as the Sussex Rare Plant Register and the Sussex Ornithological Society Sussex List.
- National and local distribution atlases are available for many species groups, some can be searched online e.g. the BSBI distribution maps, The Archive for Marine Species and Habitats Data and the Atlas of Sussex Shieldbugs, others are in print.

Identification and equipment

We are fortunate to have a wide range of identification and information resources in Britain, both online and in print.

There are some good general reference websites such as Naturespot, as well as those that deal with specific groups such as the British Arachnological Society, British Bugs, Plant Crib, and Steven Falk's insect collections on Flickr. The Royal Entomological Society has a list of publications some of which can be downloaded for free, and don't forget to check FSC Biolinks ID Resource Finder.

There are of course a number of natural history apps available too, including: Merlin, Seek, BirdTrack, PlantNet, What's Flying Tonight, Flora Incognita, INNS Mapper, SeaWatcher, CyberTracker and the delightful

iRecord Grasshoppers, which comes with a library of songs and calls. For apps that use artificial intelligence to identify images or sounds, remember they are not infallible and it is always worth checking in a book!

The Field Studies Council guides are a good starting point for cost-effective identification aids you can take in the field, and dedicated natural history websites such as NHBS stock a wide range of books and equipment. Other suppliers of ecology equipment include wildcare, Watkins & Doncaster and Anglian Lepidopterist Supplies.

Training courses and learning opportunities

There are a number of organisations offering training courses in ecology and conservation including the Species Recovery Trust and Field Studies Council. It is also worth looking at your local Wildlife Trust, as well as species interest groups such as BSBI, British Entomological and Natural History Society and the Bat Conservation Trust.

There are several YouTube channels where you can watch talks about ecology, identification and recording, including Buglife, Bumblebee Conservation Trust, Butterfly Conservation, Linnean Society, London Natural History Society, People's Trust for Endangered Species and The Tanyptera Project

For more information

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