

Monument Monitoring

LEVEL 2



Level 2 is about exploring the issues and opportunities that follow on from Level 1 in more detail.

Introduction

At this level you can identify the key stages in a monument's history, understand the processes that affect it and appreciate the practical decisions that land managers have to make. It can also be the starting point for projects that study and record monuments by theme or which develop a better understanding of a particular place in England's heritage. Though our significant heritage is protected

through scheduling it doesn't mean we know everything about it. As technologies improve and new research comes to light your monitoring and deeper engagement with a monument could help not only enhance our knowledge of it, but build local community understanding and interest; all helping ensure its long term protection.

This Level 2 toolkit contains information on:

1. **Research**
2. **Photographs and plans**
3. **Vegetation: trees and shrubs**
4. **Vegetation: grassland**
5. **Cultivation and erosion**
6. **Burrowing animals**
7. **Learning and developing projects**

This level covers the seven most frequently encountered topics. Databases, accessible information, land management practices and the issues posed by them change frequently, so we have placed the particular emphasis on staying in touch with good practice.



Historic England

SOUTH DOWNS
NATIONAL PARK

This project was managed by the National Trust, the South Downs National Park Authority and Historic England. It was funded by Historic England and the South Downs National Park Authority and supported by archaeological societies and individual volunteers. We are very grateful for their help.

Images have been provided by the National Trust, Historic England or the South Downs National Park Authority except where stated otherwise.

1. Research

This section is a guide to help you:

- Understand more about a Scheduled Monument, particularly when there is limited information given on the NHLE entry;
- Develop a more complete picture of a complex site like a hill fort, abandoned settlement, or a group of monuments in their landscape and historical context;
- Communicate the importance of a monument to other people within local communities.

For instance, examples of research that has shed light on monuments on the South Downs include:

- Some prehistoric barrows have their present shape as a result of nineteenth-century excavations and past cultivation that can be traced on aerial photographs.
- The form and condition of Devil's Dyke Iron Age hillfort near Brighton is strongly influenced by its use in wartime training and as a popular visitor attraction.

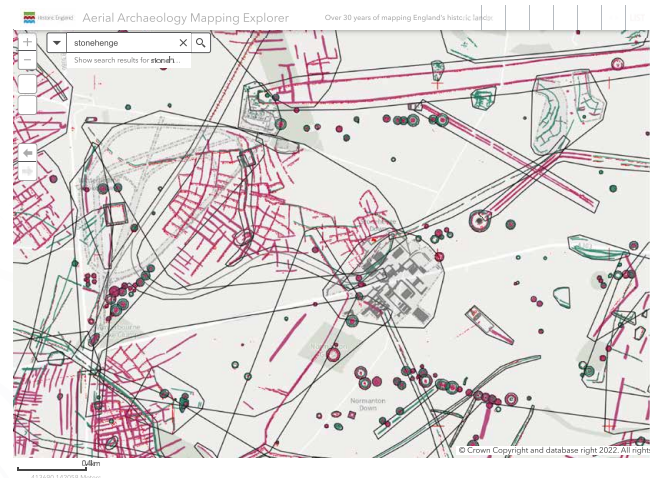
- Groups of barrows on heathland commons include scheduled and unscheduled ones. A systematic review of all features in such a barrow cemetery will give the best picture of the history and significance of the site as a whole and the importance of the scheduled earthworks.

In such studies it is important to separate survival from condition. Monuments can have many significant surviving features but they may be overgrown and inaccessible. They can also be in good condition but uninformative.

Most of the research information that you will need can be accessed free of charge online or at local authority record offices, although charges can apply for providing scans of original documents and taking photographs. Historic England's training webinar [Online resources for archaeological and local history research 2 \(adobeconnect.com\)](#) is a good introduction.

Historic England has seven easily accessible public resources:

1. [The online National Heritage List for England \(NHLE\)](#) gives the monument description and number, a National Grid reference and map as well as access to photos and comments uploaded by other users. Some older descriptions are very brief. But there are photos and comments uploaded by other users up-to-date generic descriptions of classes of monument in the more recent entries which are well worth looking at.
2. Pre 1940 aerial photographs can be accessed online at [britainfromabove.org.uk](#).
3. [Aerial Photography Explorer \(APEX\)](#) has many aerial images, which have been previously digitised.
4. The Historic England Archive holds comprehensive historical aerial photographs for the whole country from the early 1940s onwards. The archive will carry out a free search and provide photocopies and scans at a reasonable cost.
5. [Aerial Archaeology Mapping Explorer \(AAME\)](#) displays archaeology that has been identified, mapped and recorded using aerial photographs, lidar and other aerial sources, it also gives access to reports. It is constantly being updated.
6. There are sometimes archive files on individual monuments. They may contain ground-level photographs, plans and information about past condition. The reports of the Royal Commission on Historical Monuments for England (RCHME), which became part of English Heritage/Historic England in 1999, are often particularly valuable. Some archived files may have restricted access because they contain confidential landowner information. There are also documents at The National Archives deposited by Historic England and its predecessor organisations for topics like applications for Scheduled Monument Consent. These can be searched for on [the Discovery catalogue](#).
7. [A Heritage At Risk Register](#) is published annually for each Historic England region. Registers cover listed buildings and registered parks and gardens in addition to Scheduled Monuments. As well as a statement of condition each entry identifies the principal vulnerability and the trend. It gives a contact Historic England case officer. Monuments with underground features and earthworks are identified as Archaeology at risk. Those scheduled monuments that have masonry and other standing fabric are listed as Buildings and Structures at risk.



▲ Extract from Aerial Archaeology Mapping Explorer centred on Stonehenge

Historic Environment Records (HERs)

HERs contain details of archaeological sites within a local authority area. Contact details can be found on [Heritage Gateway](#) but please note that this website is currently being restructured. If you are researching a site in any depth, you should request a full HER search. This will be up-to-date and identify all known surveys, excavations and reports. A charge is normally made, but if you explain your project to the local authority team and the intention to submit your results to the HER this may be waived. The database normally consists of individual items which may or may not take account of previous entries or give a record of condition. You may therefore need to study the HER to form your own overview.

The National Trust Historic Buildings and Sites and Monuments Record

(HBSMR hbsmr@nationaltrust.org.uk) follows the same principles as the local authority HERs. In some cases, the Trust only owns part of a site. It also has [Heritage Records Online](#). This is the public-facing version of the HBSMR database. It has maps, details and photographs. It also provides a platform for the Heritage Archaeology Ranger Team (HART) programme, where volunteers are helping to assess the thousands of sites looked after by the Trust.

County and local archaeology societies

These have local knowledge and often maintain their own archives and libraries. A Google search can show you which societies are active in your area or the area of the monument. It may be worth contacting a society for support or to find out what current projects they have and how you can help.

Make sure that you have the right referencing

Information submitted to, and obtained from, HERs and the HBSMR needs to use the right referencing. For example, where a group of barrows has been scheduled as one monument it is logical to have an individual survey for each one. They all sit within one NHLE reference number but may have individual HER records and reference numbers. Cissbury Ring in West Sussex illustrates this point well. It is scheduled as one monument, but contains Neolithic flint mines, an Iron Age hill fort, Second World War foxholes, Roman field systems and many other distinct features. The National Trust has created 201 individual records for the site on the HBSMR, which allows detailed monitoring.

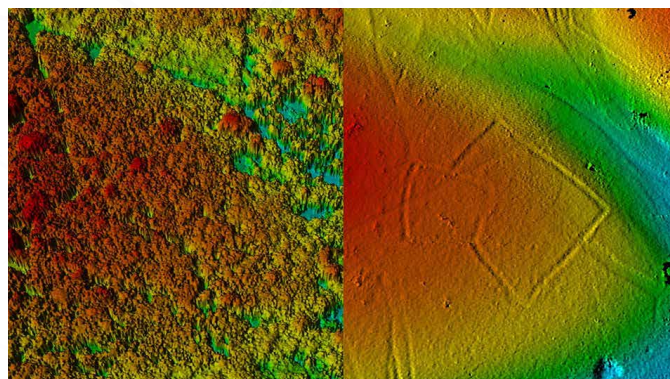
The essential point is always to be clear about the exact area that you are surveying.

Lidar

Lidar is invaluable in showing the extent of earthworks, interpreting areas of damage, tracing the spread of scrub and other features. It is particularly valuable in showing ground-level features beneath woodland and other tall vegetation, although evergreen plants can make it ineffective. [Historic England's Using Airborne Lidar in Archaeological Surveys](#) is a good introduction to its use, as is the [National Library of Scotland's 'using lidar'](#) pages which keeps an updated list of sources. In addition, Historic England is constantly updating Aerial Archaeology Mapping Explorer (AAME) as a free-to-access online resource.

You can access lidar coverage throughout the UK by using the [Exploring Georeferenced Maps page on the National Library of Scotland website](#) and following the on-screen instructions. DSM

shows vegetation and DTM shows landform. Switching between the two can give a useful picture of problems like scrub invasion before you visit a site. Environment Agency open access lidar data covers the whole of England and can be downloaded from www.data.gov.uk. This can be visualised using ArcGIS or the free QGIS.



▲ Lidar imagery demonstrating canopy penetration in open woodland in Saverlake Forest. The left-hand image shows the first return of the lidar pulse that effectively shows the tops of the trees similar to a traditional aerial photograph; the right-hand image shows the filtered data processed to remove the vegetation, which reveals the presence of an Iron Age enclosure.

In addition, there are [county and regional portals such as that for Hampshire](#).

AAME has high-resolution lidar data from projects like the [South Downs National Park Authority's Secrets of the High Woods](#).

Such projects are usually supported by extensive interpretation and analysis and are well worth studying to improve your interpretation of lidar for your site.

Aerial Photographs

The sources of information and advice on getting the best out of aerial photographs include the following two Historic England webinars:

[Introduction to Using Aerial Sources for Heritage](#)

and

[Webinar on Standards for Use of Aerial Sources for Heritage](#)

Ordnance Survey maps

Current Ordnance Survey MasterMap may show sufficient detail of a monument or its surroundings to form the basis of a site plan. The cost for such small areas will be about £10-20. But in many cases, there will be very limited information.

Historical Ordnance Survey maps at 1:10,560 and 1:10,000 can help in researching the broader aspects of a monument's history. But only the 1:2500 maps (25 inches to the mile) are a practical help with understanding past condition. [The British Library guide to OS maps](#) is very helpful.

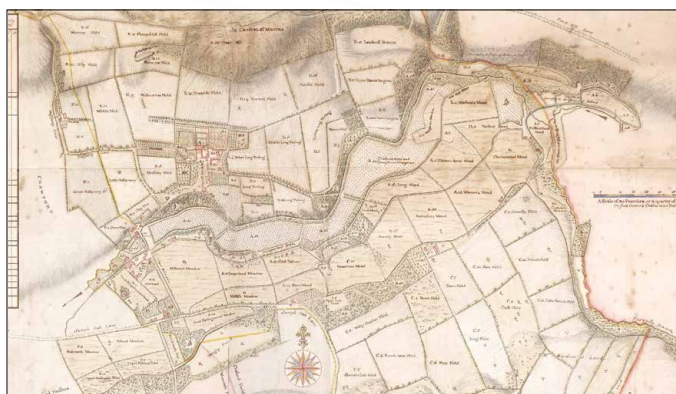
Most of the second and third editions of the late nineteenth and early twentieth century maps are available online at the [National Library of Scotland](#) and [British History Online](#) websites.

The fourth inter-war edition can be consulted at the British Library. Some sheets are available at county record offices. However, the information on this edition is often sparse. From the early 1940s onwards, aerial photographs are generally more helpful than Ordnance Survey maps.

By far the most useful historical Ordnance Survey map is the 25-inch first edition. A few sheets are accessible online at [British History Online](#) and the [National Library of Scotland](#). The local authority record offices hold some others. [The British Library](#) has complete coverage of original maps. One A4 extract can be printed from each sheet from a microfiche version.

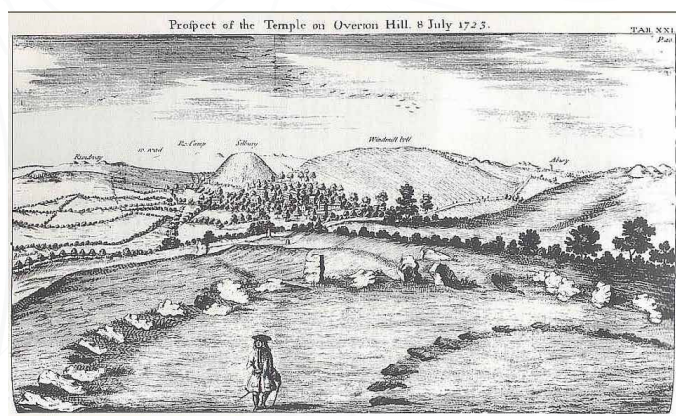
Historic maps and images

Because high-quality digital mapping is now freely available it is easy to assume that historic maps were accurate and show exactly what was there. This is rarely the case. Maps need to be treated with great caution. For example, the tithe maps prepared in the 1830s and 1840s were drawn to show land ownership and parcel boundaries. They were often reworked from earlier maps, and non-essential information appears in an arbitrary and inconsistent way. The Ordnance Survey Notebook Drawings of a generation earlier are generally accurate but at too small a scale to be helpful. On the other hand, some early estate maps like those prepared by Ralph Agas (1540-1621) are remarkably accurate.



▲ Extract from an estate map of Chilworth, 1728 This beautifully-drawn map at the British Library shows a mixture of what was there, what was intended, and what was intended but never built. It needs careful interpretation.

Local authority archivists will generally be able to advise on the accuracy and purpose of historic maps, either directly or in catalogue entries. Two useful rules of thumb are to look for supporting documentary evidence of the same date and to compare measurements of features that appear on both the present-day and historic maps. This can be done either by scaling off or overlaying and adjusting the historic map using Photoshop.



▲ Stukeley's drawing of Avebury, 1724

Monuments have been the subjects of drawings, engravings and paintings since the seventeenth century. They have also been a favourite photographic subject since Victorian times. [The Historic England Archive photograph collection](#), the [Society of Antiquaries Library and Archive](#) the [British Library Archives and Manuscripts Catalogue](#), the [Bodleian Library](#) and local authority record offices are good places to begin. County historical record societies have generally published at least one volume of historical images in the county. A Google search is often as good a start as any.

Archaeology Data Services and grey literature reports

Grey literature is the term for unpublished reports. They include investigations linked to development control in planning, such as an excavation undertaken in advance of a housing development. They can also include Desk Based Assessments, which are research reports produced to help better understand the archaeology and history of a site or place in advance of making planning decisions. [The Archaeology Data Service](#) is the main repository for UK digital archaeological information including grey literature and published studies, many of which can be downloaded free of charge. There are three catalogues: ARCHSEARCH contains all data relating to monuments and events records; ARCHIVES is a guide to all reports submitted to the service; and LIBRARY is a guide to books, journals and published reports.

Heritage Gateway

[Heritage Gateway](#) is managed by Historic England in partnership with local authority archaeologists. It is complementary to the Archaeology Data Service. In its original version, it provides access to: the National Heritage List for England; Historic England Research Records; the National Trust HBSMR; The Excavation Index; Designation Decision Records; summary Historic Environment Records. A two-year programme of enhancement will not be completed until summer 2023 and access to some sources is restricted until then.

Biological and biodiversity records

The nature conservation interest of a monument may be an opportunity for management that benefits both heritage and wildlife, or a constraint in limiting actions because rare and protected species are present. A surprising number of Scheduled Monuments lie within Sites of Special Scientific Interest (SSSIs) and County Wildlife Sites. You can check the status of your site on the [Department of Food and Rural Affairs](#) (Defra)'s magic website. In addition, many undesignated sites have nature conservation interest because of the soil conditions and microclimates that they provide. County biological and biodiversity records centres are run by wildlife trusts and will hold relevant biological records. They do not necessarily cover the same geographical areas as HERs. Remember to make your enquiry very precise, since record centres usually deal with broad area searches.

2. Photographs and site plans

Realising the potential of photographs

Photographs can be better than text in recording the key features of a site. They can also be the basis for long-term monitoring that moves beyond Level 1. When reporting on a site you should be clear about what the issues are and take photographs and write captions that illustrate these points. It is sometimes best to do this first and build your description of condition around these points. Photographs of monuments in good condition can be just as valuable as those showing problems, because they are a baseline for monitoring change.

Fixed point photography

This takes the principle a step further by committing to repeating photographs from the same point over several years. You need to record what you have done fully because someone else may take the later photographs:

- Take photographs of vulnerable areas of the monument, making a record of the settings used, orientation and weather conditions;
- Record each location with what3words or a National Grid reference;
- Take new photographs from exactly the same location and orientation on each subsequent visit, preferably at the same time of year, so that change can clearly be seen and measured.

Don't be too creative

The photographs required for monitoring need to show the state of the monument clearly with minimal areas in shadow. The aim is not for atmospheric or inspirational images, but a clear and accurate record of the site. But do take photos to inspire yourself.

Mobile phone or digital SLR?

The cameras on the mobile phones produced in the last few years can do almost everything that a digital SLR can. You need to spend a little time exploring the full range of functions to be found on PRO or ADVANCED, but there are plenty of online manufacturers' tutorial videos. The exception is probably taking photos in poor light, but the objective of showing what is there adequately can usually be achieved. Most phones enable you to edit the photographs before leaving the site.



^ This example at Chilworth in Surrey shows the erosion on the outer curve of the canal and the potential damage from a collapsing tree



^ Only a winter photograph can show the extent of erosion of this common boundary bank and the lesser damage to the higher level path



^ This photograph of a Second World War dome trainer shows the low-level post-war doors. The adjacent willow scrub is at the point of screening it completely from its original open setting

Principles of taking photographs:

Don't just point and shoot - Have a clear subject. For example, if a monument is becoming overgrown with scrub, photograph the 'front' of the advancing scrub and take a second photograph to show the effects of mature scrub.

Compose the photograph for a purpose - Mobile phone cameras have wide-angle lenses equivalent to a SLR lens of 22-30mm (what you see with the naked eye is equivalent to a 50mm lens). These emphasise the foreground, particularly when you have framed the photo with something there to make an interesting composition. In most cases you will want to show the middle ground most clearly. Using the gridline setting on the phone to ensure maximum coverage may help.

Scale - Always have a scale. It does not have to be a ranging rod. Anything that enables viewers to understand the size of what they are looking at will do.

Hold the camera level and steady - Minimise camera shake by using the volume button to take photographs, or set the camera to voice-activated.

Position of the sun - Always try to take photographs with the sun behind you. This may affect the time of day that you choose to visit a monument. When photographing into the sun is unavoidable, follow the suggestions below.

Weather conditions - In bright sunlight important features of a monument may be cast into deep shadow, so choose a day with suitable weather.

Ensure the maximum depth of field - This can be particularly important as a baseline record, showing features which only become of concern in subsequent visits. On SLRs this is normally done by keeping the aperture as small as possible. Many mobiles have the aperture set at f1.5 but some of the newer phone cameras allow the aperture to be adjusted.

People - Make sure that there are no people in the photograph, or that they are facing away from the camera, or are at a distance at which they cannot be identified. Even if you have their permission, once a photograph is posted on National Heritage List for England (NHLE) you have lost control of it.

Poor light and facing the sun - The touch screen function can lighten shaded areas to some extent. If this is ineffective, focus on the shaded areas and decrease the shutter speed via the PRO/ADVANCED function, bearing in mind that this will reduce the depth of field. Features in shade can be photographed with flash, although this reduces the depth of field dramatically.

Overgrown sites - Ground-level photographs of scrub and woodland on monuments are often pointless. It is better to capture an extract from a current aerial photograph. If you use the timeline function on Google Earth Pro, you can trace the spread of trees and scrub, in some cases back to the 1940s.

Check your photos before you leave site.

Site maps:

Drawing maps on a mobile phone or tablet

There are numerous free and low-cost apps such Sketchbook and Adobe Fresco for mobiles and Infinite Painter and Simple Draw Pro for tablets, although even with a good stylus it is often difficult to get an adequate sketch in the field.



^ This sketch plan by Debois Landscape Survey Group of the site of Ampthill Castle in Bedfordshire, set within a Capability Brown landscape, uses a simple but effective way of showing earthworks

GIS

ArcGIS and the free QGIS are the most commonly used GIS platforms for this type of survey. GIS is essential in mapping locations with large numbers of inter-related features like military sites. It can be used for individual monuments, but a sketch plan drawn on site can be more useful and quicker.

Sketch plans

A freehand drawing with orientation (use the compass in your mobile phone), an indication of scale and key dimensions – paced-out or measured – may be all that is needed. Gradients can be shown by simple hachuring. You can use a lidar, aerial photograph or Ordnance Survey extract as a base and print this onto squared paper to get relative distances roughly correct.

Vegetation mapping

This should be a plain record of what can be seen, keeping this separate from speculating about causes and management options. For example, a barrow or hill fort bank may have variable vegetation from closely rabbit-grazed to tall tussock grasses. This poses interesting management problems. But the key step is mapping what's there accurately and identifying any erosion on the thin turf.

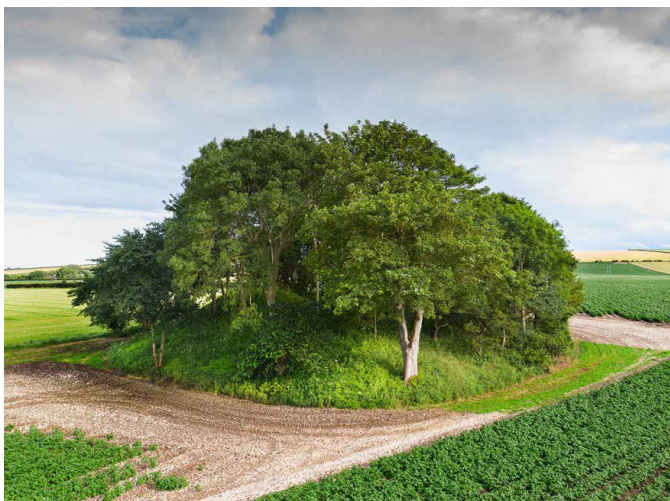
3. Vegetation: Trees and shrubs

Identifying threats

Tree and shrub roots can damage monuments by direct disturbance, from collapsed trees that rip up roots (windblow), by depositing complex chemicals (exudates) and related effects. Scrub and woodland provide cover for burrowing animals, mask a monument's form and landscape significance and can shade-out ground vegetation, resulting in erosion. Describing dense growth of hawthorn, blackthorn and other scrub species is straightforward. But if you can identify threats at an early stage so that there can be a management change before vegetation gets out of control, this is particularly helpful and valuable.

Designed landscapes

Monuments have been incorporated in designed landscapes, as at the Anglo-Saxon burial mound within the gardens of Taplow Court in Buckinghamshire. They have also attracted planting which is itself of historical significance, notably the trees planted on barrows on the Wiltshire downs to create dramatic skylines, and the tree rings planted on Sussex hill forts. The important thing in all cases is to observe any damaging effect carefully and to research the history and significance of the planting.



▲ The barrow at Willie Howe is one of Yorkshire's notable prehistoric land marks. Its mature trees are part of its landscape significance. Removal of the scrub layer allows the barrow to be clearly seen.

Nature conservation

Woody vegetation on monuments can have significant wildlife value, often because the monuments offer different soil conditions to those of the surrounding land. You don't need to be a botanist to spot that this is the case and a potential issue for site managers. Early succession scrub with scattered shrubs and rough grassland is often favoured by conservationists but it can easily get out of hand and it needs careful recording and monitoring.

Individual trees and tree roots

Eighty to ninety percent of the roots of trees and shrubs are in the top 600mm of soil. However, roots follow the path of least resistance and find their way into areas that have a looser structure than the surrounding soil, such as archaeological deposits.

Small buried objects can be displaced by roots, others can be affected by their exudates. Larger remains such as buried masonry may be held in place or loosened by roots. You cannot tell anything about these processes from the above ground tree. The essential point is that a mature, balanced tree may have done most or all of the damage that it is likely to do to a site and there may be disturbance as the roots of felled trees decay.

The main issue with mature trees is the risk of damage from windblow. This may be worsening with the increasing frequency of storms. If a mature tree is uprooted, physical damage to a monument can be substantial. A typical uprooted root plate would be at least 4m diameter and 600mm deep. If a tree appears to be unstable, is poorly balanced or is tall with a narrow crown this should be noted. Trees that have recently been exposed by the clearance of adjacent vegetation can be particularly vulnerable but those that have developed in exposed locations are generally windfirm.

Monuments in coniferous woodland

Here, there is often little or no ground vegetation. If the trees are removed on freely-draining sites, bracken often invades. The monument is less visible than it was before, and perhaps damaged by the underground stems of bracken. Recording the exact locations of trees and noting the vegetation of adjacent areas can inform management planning.

Monuments in deciduous woodland

Monuments can be safeguarded within deciduous woodland by making them the centres of clearings, maintaining shallow-rooted coppice over them and a variety of other measures. You can help guide this process by mapping the relationship between the form of the monument and its vegetation. A regular coppicing cycle by hand may be one of the best ways of minimising root disturbance and making the monument visible.

Scrub

Scrub can cause root damage in the same way as trees. If left unchecked it can shade-out the ground vegetation giving rise to erosion, particularly if attempts are made to clear it without a management plan in place. Ignorance of the characteristics of individual species and the way scrub spreads can lead to

costly mistakes. For example, cutting down blackthorn without treating the stumps with herbicide not only allows them to regrow but stimulates bushier growth, so that an impenetrable thicket is formed.

Some scrub communities such as those containing juniper are of high nature conservation significance. At other locations, high value is maintained by active management, often in intricate mosaics with species-rich grassland. Some locations on monuments such as the warm south-facing slopes of a hill fort rampart are also prime sites.

The essential things to note in surveying scrub are height, extent and density, particularly where it is actively spreading and can be suppressed. Being able to identify the species is also helpful for management planning. There are only about twelve common scrub species in England and plenty of identification apps for them such as Flowerchecker.

Bracken

Bracken can damage and displace archaeological features. The dense growth of fronds 2m or higher can completely enclose monuments and make them unrecognisable. The plant's underground stems generally lie in the top 450mm of the ground, but they can penetrate to at least 1.4m. Very crudely, the highest concentration of bracken fronds indicates the area of greatest disturbance. Drawing a simple map, you need to identify the patterns of growth and the variation in densities on the monument and hand over the management to experts.

Trials of the effects of mechanical crushing and cutting, grazing/trampling and herbicide treatment have shown that all are effective in reducing the vigour and extent of bracken. But they need to be kept-up indefinitely and some have the potential to damage shallow archaeological deposits. You may be able to offer hands-on help with bracken management, so check with Historic England and the landowner.



^ Unmanaged chalk downland is attractive but can quickly turn to scrub. If grazing is removed on the hillside beyond, the hawthorn will also spread rapidly



^ Once bracken gets a hold it is difficult to control. Repeated cutting and crushing maybe necessary, as on this barrow in the New Forest National Park

Surveying and recording tips:

Anticipate problems - If changes can be anticipated there may be time to alter the management regime to prevent them. This may be as simple as recording that there are no livestock in a field, or that there are patches of tussock grassland and a scattering of dog rose and bramble. At this point a single annual cut or flailing will prevent the development of scrub. This often occurs when earthworks survive as islands of pasture in a mainly arable holding. It can also be the case where the monument is less easily grazed than the main part of a field.

Describe exactly what is there - Use heights and extents on a sketch map. Don't assume impacts without evidence. A sketch plan or current aerial photograph of the extent of scrub will be important in deciding priorities.

Use common sense - For example, chalk downland scrub of wildlife value is easily recognised by its diversity of species. Its value is further enhanced if it grades into grassland dominated by broadleaved plants and needle-leaved grasses. Such areas can be highlighted as potential management issues.

Separate legibility from direct damage - For instance, a light covering of well-spaced young woodland without understorey may not be causing significant direct damage. Indeed, fragile woodland archaeological features like charcoal platforms often survive. But the woodland can affect understanding of the extent and purpose of the monument.

Identify problems but leave the solutions to land managers

- It may seem a simple matter to remove an area of scrub, put up a fence or extend an area of grazing. But these actions are often tied into the way that a landholding operates such as grazing and crop rotations, the seasonal availability of livestock and routes around the farm.

Identify acceptable condition - If there are stable patches of unmanaged vegetation, make this clear and leave well alone.

4. Vegetation: grassland

What to expect

In many ways the ideal cover for an earthwork monument is a dense, short grass. At places such as Stonehenge, which are visitor attractions, management can follow professional turf culture principles. But for the great majority of monuments there are neither the resources nor control over the land for this. If there is grassland of a sort which appears to be in stable management, that is an acceptable baseline standard.



^ Sheep grazing at Old Winchester Hill, Hampshire maintains a robust surface to the hill fort

Countryside Stewardship

Countryside Stewardship is a Defra scheme for the conservation management of rural landscapes. You can check whether a holding is in the scheme on the [MAGIC website](#). There are options for the individual management of monuments and it may be that work to the monument that you are visiting is in hand or planned. You can ask the landowner, or Natural England (enquiries@naturalengland.org.uk) what the position is.

Nature conservation

Monuments often have thinner soils than the surrounding area and are more likely to support grassland of nature conservation interest. This is more vulnerable to erosion. For instance, an earthwork may be overgrazed because it is a lookout point for livestock and rabbits. The classic case is the short species-rich turf of the South and North Downs. Don't regard such issues as a wildlife vs heritage conflict. There is usually a management

solution which gives the best of both worlds. Report exactly what you see, and if the monument is on a nature reserve discuss problems with the reserve manager.

Insufficient grazing

This will result in tussock grassland and perhaps scrub invasion, so it needs to be reported accurately. It can be a particular problem where earthworks survive as islands of pasture in a mainly arable holding. It can also occur where an earthwork is less easily accessible than the main part of a field.

Type of livestock and timing

Always note the type of livestock and the intensity of grazing, particularly where grazing is being used to bring a site back into good order. Problems such as localised erosion, poaching (surface compaction of bare soil) and patchy and selective grazing may arise from the type of livestock present and when they are put on the land. For instance, cattle are good for grazing down scrub and rough grassland but need to be followed by sheep if a good short turf is needed for conservation of the monument.

Do your research

For example, grassland that has never been cultivated is more likely to have significant archaeological deposits at shallower depths than grassland that has been ploughed and reseeded.

Fencing

It is natural to suggest fencing where a Scheduled Monument is being disturbed, but this is not helpful. You should describe the state of the monument, identify the causes of damage, if you can, and leave the actions to land managers. There may be alternatives, such as a change in the way that the grazing is rotated on a holding, or an alteration to stocking rates at key times. Fencing can have a significant impact. It will require Scheduled Monument Consent. Electric fencing and virtual fencing can be better options than traditional stock fencing, but may not be practical.

Potential problems to note on established grassland:

Sheltered areas such as those in the lee of a barrow covered with trees will attract livestock, particularly in wet weather, causing poaching on or close to the monument. Nearby buildings, walls, ditches and slopes can also be shelters. You should identify these so that they can be monitored or the sheltering effect reduced.

Livestock feeding stations are usually sited on drier areas such as upstanding earthworks. Stock will congregate in advance of feeding, and there can be significant poaching and erosion. In addition, the routes to a feeding station can also become disturbed. Make a note of feeding stations that affect monuments because it is sometimes possible to re-site them or to rotate the location.

Pinch points such as gateways or gaps between bands of scrub lead to a concentration of moving stock and subsequent poaching and erosion.

Rubbing posts can be low tree branches, trunks and fence posts. Livestock often create poached and eroded ground around them. If rubbing posts can be removed without harming the monument, this is usually the best option.

Water sources Poaching and erosion can rapidly occur around water sources. Make a note of troughs that are causing problems, because it may be possible to get them relocated. Ponds and other standing waterbodies are a different matter. Where stock have access to the water, the edge can soon become a muddy mess. On the other hand, features like moated sites are quite frequently fenced-off and become a tangle of scrub.

Bare soil patches can form a congregation point for livestock, which will lick bare areas for minerals, dust their bodies, and scrape them with their hooves. The patches may become a focus for erosion and so should be recorded on surveys.

5. Cultivation and erosion

Scheduled Monuments and the law

Scheduled Monument Consent from the Secretary of State is required for any activities that physically affect a monument above or below ground. The full legal position is set out by [Historic England here](#). Disturbance without consent is a criminal offence. You can help by clearly recording any such disturbance in your report. This will help Historic England to pursue the matter. If you think that a heritage crime ([as defined here](#)) has been committed, report it to the police on 101 and to Historic England.

The impacts of cultivation

The great majority of landowners and land managers understand and respect England's heritage. Many participate in agri-environmental schemes such as Countryside Stewardship and the issues discussed here usually have practical solutions. Some Scheduled Monuments are in cultivated ground, either as patches of grassland within arable fields or directly within the area of cultivation. In addition, monuments in some locations are at risk from conversion of grassland to arable cropping or a change in practice from methods like direct drilling to deeper cultivation. The risk of damage to a monument from such a change is self-evident, although this has to be set against the increased reversion of marginal arable land to pasture since the mid-2000s.

A large number of monuments have probably been lost to ploughing over time, particular during periods of intensive agricultural change. For example, post-Second World War intensification of farming accelerated the pace of loss dramatically. Although there have been well-publicised cases of Scheduled Monuments being ploughed, most instances of harm are caused by gradual degradation, so frequent visits to record the following can be particularly useful.

- Conversion of grassland to arable or a change of cropping
- The gradual encroachment of arable onto the monument and the erosion of any buffer area that has been agreed with the landowner
- The gradual flattening of the upstanding earthworks by cultivation over the top of them
- Disturbance caused by subsoiling, mole ploughing and other work to improve drainage
- The deepening of cultivation caused by erosion and compaction while ploughing to a constant depth
- Damage from ancillary works such as farm tracks
- Changes in the type and depth of cultivation may bring archaeological deposits to the surface. Cultivation may encroach on the monument or a buffer zone and be visible as a colour change immediately after ploughing
- Compaction caused by the use of heavy machinery under unsuitable conditions evident as poor crop growth; the presence of grass species like creeping bent and standing water after heavy rain.

In addition, where monuments are left as grassland within arable fields, they can become overgrown with scrub, or become homes for rabbits and badgers, or sites for tipping waste.

Historic England guidelines for monitoring the impact of cultivation are given in its [Conservation of Scheduled Monuments in Cultivation \(COSMIC\) protocol](#). The Rural Payments Agency uses a database to approve payments linked to land use. It uses Scheduled Monument and HER data as part of this to specify restrictions on the crops used, their rooting depths etc. Farmers within the Rural Payments Scheme are thus given limits within which to work.

Acting promptly to deal with erosion

Erosion can be a major problem on Scheduled Monuments, often as a result of the way that they were constructed and have survived. For instance, some earthworks were made by throwing-up soil from adjacent land so that they are topped by subsoil rather than topsoil: a wear-tolerant surface layer of vegetation is not formed. More recent changes, such as the scouring effects of intensive periods of rain, are also a factor.

Eroded areas on monuments managed by conservation organisations can be allowed to recover by diverting routes or temporary closure of public access. But in most cases an eroded area has to remain in continuous use and requires robust repairs. A very wide range of solutions to erosion has been tested. There are many geotextiles and reinforcement products on the market, as well as the practical experience of countryside managers. Repairs will require Scheduled Monument Consent and Historic England can provide specialist advice on the specification.

The purpose of this section is to enable problems to be spotted early, and to understand the principles of what can be done.

Identifying and recording erosion

The need for accurate recording is self-evident. Locations can be identified on a sketch map backed by GPS spot references. The best method of recording is photographs, ensuring that there are horizontal and vertical scales in place. It is equally important to anticipate problems by identifying where the turf cover is wearing thin or has been disturbed. Visiting the site at different times of year will give a picture of seasonal uses and the effects of weather conditions.

Causes of erosion

In some cases, cause and solution may be straightforward. For example, an adjacent public right of way may be impassable and users take a higher and drier route across the monument. This may be obvious, but should be fully recorded.

Erosion by vehicles may arise from unauthorised private vehicles, but damage is often part of everyday access in rural areas. It is usually worst when the soils are wet or waterlogged. Vehicles may not cause damage all the year round and their use is often acceptable in drier periods.

Other causes include cyclists, horse riders, unstable areas caused by burrowing and sheer weight of visitor numbers.

Erosion on newly-cleared ground exposed by scrub clearance or other vegetation management is another issue and anticipating this problem in your surveys can be a great help.



◀ Improvements to the main paths are often the best way of combating erosion elsewhere



◀ Erosion can quickly get out of hand and require major work

Principles of repair

Where ground has been damaged by heavy use and trampling, but topsoil remains in place, it may be possible to prevent erosion by returfing and overlaying a geotextile.

Where erosion has already begun it may be necessary to build-up levels with the parent material such as chalk or sandstone and to reintroduce a soil layer of the same type and depth as that which has been lost. This may require revetment. A variety of re-turfing and geotextiles applications then need to be considered. The risk of compromising the integrity of the monument by introducing materials from outside the site are self-evident, but it is often possible to use clean parent rock not contaminated by organic matter.

The use of an inert or biodegradable sacrificial layer of surfacing such as woodchip or gravel is also possible.

6. Burrowing animals

Effects:

Burrowing by badgers and rabbits can cause significant damage to monuments. The impact of moles is less severe, shallower and more localised. Freely draining archaeological earthworks provide particularly attractive locations for these animals.

In the medieval and early modern periods, the earthworks of some hill forts and barrows became part of managed rabbit breeding areas or warrens, such as Sharpenhoe Clappers in Bedfordshire. These were distinct from warrens in the modern sense of a colony of wild rabbits. The archaeological harm caused by rabbit burrows is countered by rabbit grazing to maintain short turf which is often of high nature conservation value as at Ampthill Castle, also in Bedfordshire.

Animals can disfigure the surviving structure and profile of a monument through collapsed tunnels and the spread of excavated material. Tunnels can destabilise the earthwork. The exposure of bare surfaces through collapse of tunnels can leave the monument prone to further degradation such as erosion and there can be a general loss of archaeological information.



^ The surface of the monument on the open hilltop site at Ampthill Castle is largely maintained by rabbit grazing



^ The rabbit burrows are on a more sheltered sloping site away from the monument

Behaviour:

Rabbits form dense colonies of up to 30 individuals. A typical colony has short surrounding grass with a secure nearby refuge of scrub, bracken, hedgerows or woodland. One of the key actions in removing rabbits from a monument is to get rid of this cover. The entrances to burrows are commonly between 80mm and 200mm wide and a warren may have 5-250m of tunnel, reaching 0.75-4.5m below the ground surface.

Badgers live in social groups (clans) of 2-23 in elaborate tunnel systems known as setts. The main sett stays in use indefinitely, but others can have shorter or seasonal uses. Tunnels can extend up to 100m but are typically 10-20m long and generally no more than 2m deep. Badgers are protected under the Protection of Badgers Act 1992. Actions affecting them may require a Defra licence and specialist advice should always be sought.

Moles are present in most habitats where the soil is sufficiently deep to allow tunnel construction. These vary in depth from just below the surface to well over 1m down. Affected areas are characterised by the molehills created from the spoil of excavating the tunnel system.



^ Active badger setts are easily recognised by disturbed soil at the entrances

Site assessment and monitoring:

This is easiest in late winter or early spring when animals are becoming active and vegetation is at its lowest, making observation of burrow holes easier. Badger surveys require specialist training and a practical knowledge of the legislation, but anyone with a bit of common sense can make basic observations.

Evidence includes droppings, badger latrines, scrapes, and tracks. There are several popular guides to these. The Mammal Society's Mammal Mapper app is particularly useful.

Level of activity can be estimated from counting holes or identifying individual burrow systems. An estimate of whether the burrow systems are active or inactive can be made, enabling an assessment of the potential impact on the monument. You should also record the amount of disfigurement and evidence of significant loss in burrow spoil.

7. Learning and developing projects

Knowing where to start

There are many easily accessible sources of information, training and guidance that you can use to start a project based on Scheduled Monuments at any level and in any depth. It may be as straightforward as asking a few questions. For example, the medieval chapel at Chilgrove north of Chichester survives just as a hollow. What community did it serve? Why did it pass out of use? How did it relate to the parish church at West Dean? Are there similar abandoned chapels in the area? Were materials from the building re-used locally? If so, where are they? Or you can join a like-minded group. For instance, the organisation [Subterranea Britannica](#) started with a few people taking an interest in Cold War bunkers. It is now the first port of call for professional and amateur archaeologists alike.

Projects could include the following:

Providing a fuller picture - Some of the older monuments have limited information in the NHLE entry. At sites like deserted settlements and monastic ruins the boundary may have been cast wide as a precaution because there were not the resources to carry out a detailed survey. Lidar, aerial photograph interpretation, analytical survey and perhaps archival research may show that the significant part of the site is smaller or larger than the scheduled area. They will also show the monuments' context and setting in relation to routes,



^ At Marwell park in Hampshire there are five separate scheduled sections of deer park boundary. Historians have been able to link them up in order to understand the extent and history of the park.

watercourses, fields and boundaries. In the case of boundary features like park pales, individual scheduled sections make more sense if the line of the entire boundary can be reconstructed.

Reconstructing landscapes - Scheduled Monuments are the best examples of their type. But in many cases, understanding comes from looking beyond individual monuments to the wider landscape. Bronze Age round barrows are an obvious example. The best examples may have been scheduled within a complex dispersed barrow cemetery, but it is only by looking at all the barrows, including the damaged ones and bumps that may not be barrows at all, that a full picture can be formed.

A sense of place - Prominent multi-period monuments are a natural focus for in-depth research. Harting Beacon on the South Downs in West Sussex, for instance, is a Late Bronze Age hilltop enclosure with associated outworks and approach road, an Anglo-Saxon burial mound, and a Naval Telegraph Station. Each of these can be the topic for a new project expanding research to include other features of the same period and function along the downs. There is also the opportunity to look at the role the beacon has played in the surrounding landscape that it dominates, such as the villages and hamlets at the scarp foot, routes up the scarp and earthworks along the ridge to the east and west.

Formal training and education

University continuing education departments offer a wider range of online courses. The Oxford University Department of Continuing Education has a particularly wide range and depth.

The Council for British Archaeology (CBA) runs training courses direct and has a very useful web page [Archaeology Elsewhere](#), which lists approved courses, talks and other events. It also sponsors young archaeologist clubs.

The Chartered Institute for Archaeologists (CIfA) caters mainly for professionals but many of its training courses and approved third party courses, such as those run by commercial archaeology companies, are open to non-members.

Archaeological societies

Many counties such as Surrey and Sussex have long-established societies which provide training and lecture programmes and act as umbrella organisations for volunteer projects. There are also local societies, often affiliated to the CBA and archaeology

groups within amenity societies. The CBA also has its own regional societies who run their own programmes of events and activities. Local authority library services are often the best way of finding out about the societies. You can also check Google for groups local to you.

Key learning requirements

While Scheduled Monument monitoring is easily accessible without the need for further training or specialist skills, there are three topics where training can be particularly helpful.

Knowing the basics of **vegetation identification and management** can make condition reports more precise and practical. There are several ways of identifying individual plants which may characterise a monument. These include sending a photograph to the [Botanical Society of the British Isles \(BSBI\)](#) on Twitter, Instagram or Facebook. iSpot is another option. The BSBI also has online keys and a YouTube channel for the more difficult groups, such as grasses. The standard references for the type of

management required are Natural England's [Lowland Grassland Management Handbook](#) and [Scrub Management Handbook](#), although both are now rather dated.

By far the best approach is to attend vegetation survey courses run by the [wildlife trusts](#) and the [Chartered Institute of Ecology and Environmental Management](#), making your particular interest known to the course organisers.

Topographical survey - For most monument condition surveys a sketch plan with key dimensions is sufficient. For one-off surveys of complex or ill-defined monuments, it is more cost-effective to commission a company specialising in archaeological surveys than to purchase or hire equipment. It is only when a sustained programme of surveying a large number of monuments or a large area that training and acquiring equipment should be considered. Standards and conventions for surveys are set out in Historic England's [Understanding the Archaeology of Landscapes](#). A minimum standard for a detailed survey would be Level 2: accurate cartographic location and extent of the monument(s) at scales of 1:10,000 and 1:2,500; site plan at a scale of up to 1:2,500.

Interpretation of aerial photographs and lidar -

Interpretation of major earthworks and the location and extent of the main types of vegetation is usually straightforward. Historic Environment Scotland's [National Collection of Aerial Photography](#) has a very good general introduction to a more informed approach. There are a number of published guides to the interpretation of aerial photographs and there is [Historic England's Using Airborne Lidar in Archaeological Surveys](#). Historic England is constantly updating the information from aerial surveys and new projects that could be models for yours.

Setting up a new project

The principles of setting up any new volunteer project are broadly the same and are covered by [The Conservation Volunteers](#) and the Council for British Archaeology general advice on insurance, health and safety, data protection and wellbeing as well as its [Local Heritage Engagement Network](#).

The principles are as follows:-

Identify the team This may range from a group of like-minded villagers to a young archaeologists club. Projects always need to be socially inclusive and to comply with the Equalities Act. Review your activities, how you share information about what you are doing and ensure you create opportunities for people to take part. The more people who can get involved the more people will care about their local heritage. At the same time, they need to recognise that participants have different needs and expectations. Successful schemes build a project community with a shared interest in the scheme's outcomes.

Identify the project - One of the clearest ways of doing this is to have SMART objectives. These should be:

Specific e.g. what was the layout of an abandoned village? How did it relate to later and surviving settlements, routes and land boundaries?

Measurable e.g. setting the targeted number of participants or the survey area to be covered.

Achievable - this can often be assessed by reviewing completed projects and what they achieved.

Realistic e.g. can a project recruit and train enough volunteer surveyors?

Timely - projects need realistic phasing and timescales. They should always have a sharply-defined beginning and end.

Ensure adequate resources - It is easy to underestimate costs of transport, insurance, welfare, training and related items. People such as archivists and nature reserve wardens may well offer some help free of charge as part of their normal duties, but unreasonable demands must be avoided. Their time is becoming increasingly constrained as public sector investment in heritage has diminished in real terms.

Consents, access and neighbours - Scheduled Monument and SSSI Consents may be needed. The advice of an ecologist may be required. Adjacent landowners and local residents all need to be informed of a project at an early stage.

Plan promotion and communication Once volunteers engage with a project there can be heavy traffic on social media and the internet. Projects can also be criticised because actions like scrub clearance are misunderstood. An informative but lively website and social media presence are often needed to tell people what you are doing and why, and to share knowledge and information.

Be clear about the legacy - The main intended legacies need to be defined at the outset and achievements recorded.