

# Managing Earthwork Monuments

A guidance manual for the care of archaeological earthworks under grassland management.

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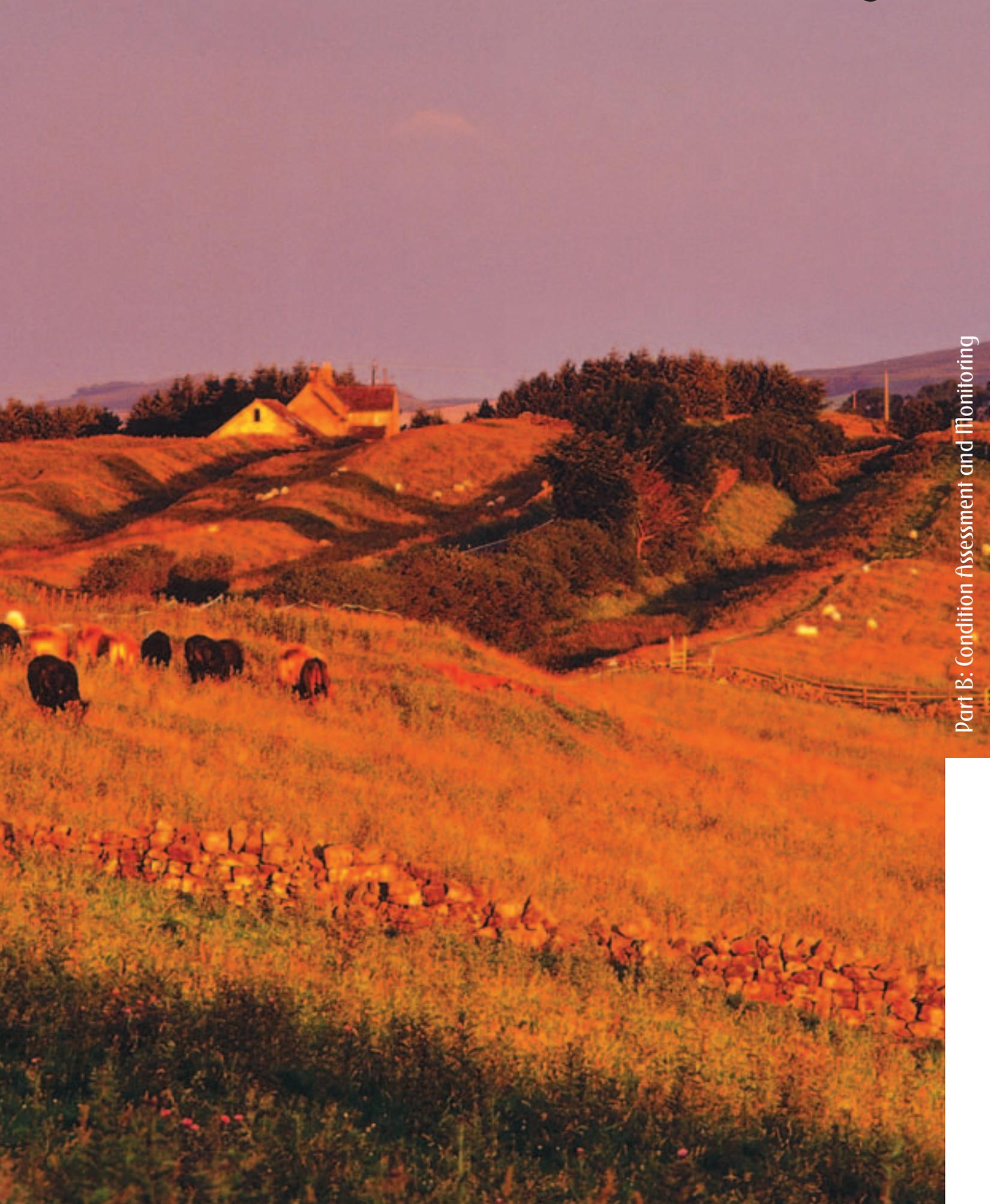
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# Part B: Condition Assessment and Monitoring



# B1 Condition Assessment

## B1.1 Introduction

Fundamental to all effective management of our archaeological earthworks are an accurate record of the present condition and how that condition is changing. The following section introduces what condition assessment is, what it aims to achieve and what to investigate before and during field assessment.

### B1.1.1 What is Condition Assessment?

Condition assessment has been defined as a “point-in-time statement of circumstances appertaining to a particular site” (Monuments at Risk Survey, Darvill and Fulton, 1998, 99). This can be further defined as the recording of the present state of the monument, the evidence for change occurring to the monument and the prediction of how that change may affect the monument in the future.

### B1.1.2 What does it aim to achieve?

By carrying out the above functions a condition assessment aims to inform on the priorities for present and future management of a monument in order to maintain it in a stable or improving condition. Often an assessment is used on a range of sites in a geographical area or a particular theme. In these circumstances the condition assessment will be able to provide an overview of the current state and influences on the sites and the priorities for funding of future management works, which can be an excellent guide to proactive management. By comparison the lack of that overview often means resources are directed into areas of perceived need, which are often reactive and costly.

### B1.1.3 Scope of guidance

The following sections of the guidance manual present and discuss the potential sources of information available to the condition assessor. It has not been designed to be an exhaustive list of all possible sources of information and assessment techniques, but rather a checklist that the reader can use to prepare for a programme of work. The use and application of the information and techniques outlined will depend on the specific project requirements, which will be governed by available resources and required output of the assessment.

# B1.2 Pre-field Visit Assessment

## B1.2.1 Introduction

The aim of the pre-field visit (or desktop assessment) is to develop an appreciation of the management issues and environmental factors relating to a monument and how they have affected the monument. The range of sources available to develop this is diverse and is discussed in the following section. It is not envisaged that every source of information should be investigated thoroughly prior to a visit, as some sources may be more usefully exploited after the field visit and some may provide little beneficial information. The reader should therefore treat the following section as a checklist when planning work.

## B1.2.2 Sources of Information

The following sources of information are available to the assessor:

**Free text reports** may be held on individual county sites and monuments records (SMR) or may be available from national agencies or heritage conservation bodies. The information they provide will be highly variable, but is likely to provide valuable insight into the past state of preservation of the monument and also record potential vulnerabilities of the monument and existing management issues.

**Photography**, both ground based and aerial, can provide excellent information on the changing condition of monument and gives the assessor a very clear appreciation of the extent and nature of any management issues at the time the photograph was taken. Ground based photographs if repeated can give an appreciation of the level of change that is occurring on the monument, particularly if taken at the same time of year. Aerial photographs can also be used to provide quantitative data on how the monument is changing, particularly with issues such as scrub development.

**Archaeological recording** provides evidence of both the above ground preservation through field survey, and of below ground survival through archaeological excavation and development watching briefs. The information can be used both to assess the changing degree of preservation and the likely impact of any management issues on the site.

**Antiquarian accounts, historical maps, paintings and photographs** provide a longer history of the state of the monument than the sources detailed above. Photographs are the best sources as they accurately depict the state of preservation. Antiquarian accounts, as with map depictions and paintings, have to be used with care due to recorder biases (e.g. painters may have been commissioned by the landowner to depict the land in a favourable light, and therefore show extremely well improved land and emphasise landscape features, which may include historic features). Often the best source of these is the County Record Offices.

**Oral accounts** can provide information on the changing state of preservation of the monument and provide insight into management issues. This is particularly true in burrowing animal control and livestock management issues, where local information can give an indication of the reasons behind some disturbances to the monument.

**Botanical and ecological surveys and natural environment designations** provide information on the type of land-use, soil condition (acid or calcareous) and the presence of any important wildlife interests that may influence management actions for the conservation of the monument. Information of this nature can be found with English Nature, Local Wildlife Trusts and Local Authorities.

**Soil and geology maps** can be used to assess drainage characteristics of the land, which will influence the ability of the grass to withstand livestock, vehicle and recreational pressures. Soil information can also give an indication of the vulnerability of the monument to erosive forces if the vegetation cover is removed. Information on soils is available from the Soil Survey and Land Research Centre. Information on geology is available from the British Geological Survey.

**Definitive Rights of Way maps** indicate where damage from recreational pressure and maintenance may occur. These maps are held by all County Councils.

**Visitor surveys** where available can indicate how many visitors a monument will receive and how those people use the monument (e.g. whether there is a particular focus of activity close to a car park).

**Management agreements** if they are active or have been used for a site in the past can give an excellent indication of management issues on a site.

### B1.2.3 What Next?

The information collated as part of the desktop assessment may be treated as purely an information gathering exercise before a field visit. Equally it can be used to assess the priority of making a field visit if the archaeological earthworks most at risk can be readily identified from the desktop study.

# B1.3 Field Assessment

## B1.3.1 Aim of the Field Assessment

The aim of the field assessment is principally to record the present state of the monument and any management issues. This should include the level of its survival, its overall condition, potential vulnerability, stability and any active damage.

In addition the field visit can be used to clarify the land use and to expand on it by recording the type and extent of vegetation present. This is particularly useful where the vegetation may cause future management issues, such as bracken and scrub.

The visit can also be used to provide baseline data for future monitoring visits such as a general photograph of the earthwork and fixed point photography of any management issues.

## B1.3.2 What to Record

The field assessment should record the following key factors:

**Survey detail:** The date, name of surveyor, time spent on site, and weather conditions at time of visit are important information to record. The date allows future assessment to be made at a similar time of year or seasonal factors to be taken account of. The weather conditions and length of visit help indicate the level of detail that the surveyor will have recorded.

**Environmental data:** The ground conditions at time of visit, character of soil, vegetation cover and extent and agricultural land-use. If ground conditions are waterlogged at the time of the visit then this can be reflected in management problems such as ground disturbance from livestock, vehicles or recreation. Character of the soil will give an indication as to the vulnerability of the monument to various management problems.

**General Monument Assessment:** An assessment of the overall condition, survival (table B), stability and vulnerability of the monument. These should be done using a qualitative scoring system to enable them to be repeated and assessment made of change.

**Specific Management Issue Assessment:** An assessment of the degree of influence that various management issues are having on the monument at the time of visit. This as with the previous factor should be recorded using a qualitative scoring system that can be repeated. It should also record whether the management issue is active or inactive, where appropriate (e.g. burrowing animals). The following management issues are a sample checklist;

Table B: A simple qualitative scoring system for the survival of the vallum on Hadrian's Wall based on its components and height of components. The vallum had a central ditch and one mound on either side.

Score	Definition
0	No above ground evidence, below ground survival only
1	At least one component visible as a poor earthwork (less than 0.25m height)
2	All three components visible as medium earthworks (more than 0.25m height and less than 1m) or one component as a good earthwork (more than 1m)
3	All components visible as good earthworks (more than 1m)

- Livestock
- Recreational use
- Vehicular
- Scrub, tree or bracken
- Burrowing animal
- Mineral extraction
- Fencing
- Road construction
- Water action
- Vandalism (including metal detecting)

Table C Methods of scoring management issues

Score	Percentage method	Definition method
0	None	None
1	Less than 15% of area	Pressure from management issue in the area of the monument but not on the monument or minor impact on the less significant parts of the monument
2	15-60% of area	Management issue affecting large areas of the monument or having a minor impact on parts of the monument which have high significance
3	More than 60% of area	Management issue affecting majority of monument or management issue causing extensive damage to parts of the monument which have high significance

The scoring has and can be done in a number of ways. The two most common ways are by assessing the percentage of the monument affected by the management issue or by the defined significance of the management issue (table C).

**Local Insight:** Record oral evidence from landowners or tenants of the monument or adjacent land, which can help explain how and when a management issue has and does develop.

**Recommendations:** Recommendations should be made as to how to alleviate or remove any identified management issues and the timescale that this should be instigated on.

In addition the surveyor can make a photographic archive of the present management issues and carry out any necessary measuring of features to provide a baseline for future monitoring.

## B2.1 Introduction

Monitoring is essential to site management. It maintains a periodic assessment of specific management issues or the general state of the monument that enables the trend to be established. It is of particular importance as our understanding of management issues and techniques of management for archaeological earthworks is still in its infancy.

The length of time between monitoring visits will depend on the specifics of the management issue based on a variety of factors. Examples of these are how quickly the problem might develop (e.g. spread of scrub or bracken may be on a 5 year monitoring period) or how often it is at its worst extent (e.g. ground disturbance by livestock monitored on an annual basis).

Monitoring is also important in assessing the effectiveness of management techniques used and to detect whether further action is required.

## B2.2 Methods of Monitoring

The following section presents a range of methods that can be used to monitor archaeological earthworks. These are:

- Visual assessment
- Qualitative scoring
- Semi-quantitative and quantitative scoring
- Photography
- Transect and quadrat surveys
- Measured survey

**Visual assessment** is the recording of key diagnostic features that assist in the clarification of management issues. These features are specific to the individual management issues (see individual management issue sections in Part C) for example for rabbit burrowing on a site the presence or absence of fresh soil scrapes, cobwebs over burrow entrances or presence of closely cropped grass sward around burrow entrances can help to define whether the burrow system is active or abandoned.

**Qualitative scoring** is outlined in the condition assessment section (section B1) and is a repeat of general monument assessment and specific management issue assessments. This can give a very rapid assessment of the trend in change, which in itself can be turned into a qualitative scoring such as this example below which combines condition and trend;

- 1 = Favourable and improving
- 2 = Favourable and stable
- 3 = Favourable but declining / Unfavourable but improving
- 4 = Unfavourable but stable
- 5 = Unfavourable and declining

**Semi-quantitative or quantitative scoring** uses approximate measures to assess changes in pressure from a management issue. Two examples are presented below.

The approximate measurement of erosion scars can highlight any dramatic changes in the form of the erosion scar. This can simply be achieved by measuring the axes of the erosion scar at their longest points or by measuring from a fixed reference point or points.

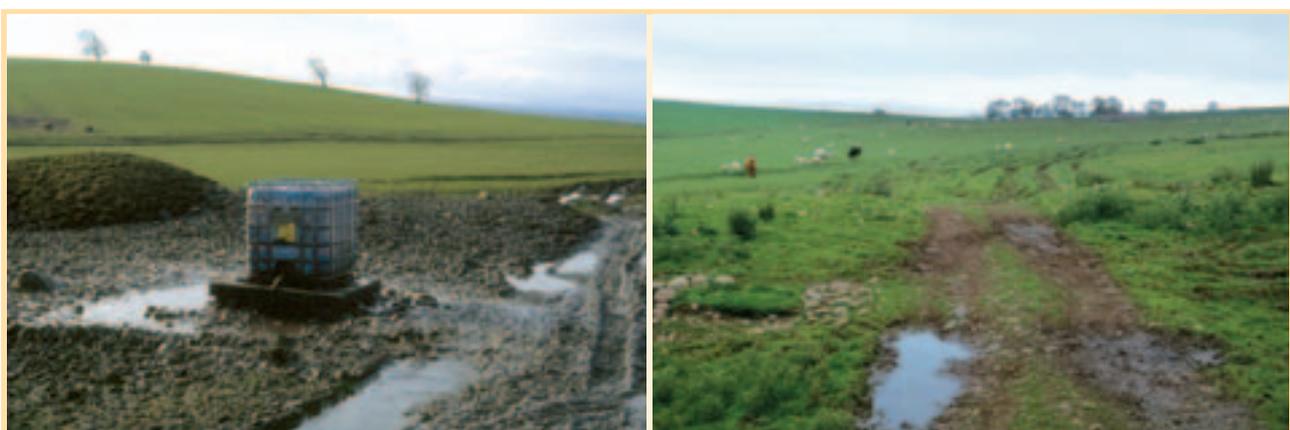
Another example is the assessment of rabbit activity. A very rapid assessment but not reliable technique is the counting of rabbit identifying features (such as burrow entrances, runs, patches of droppings etc...) on a set length or area of the monument. This will give a rough guide to the level of activity. A more reliable method is to carry out night counts along a set length or area. This is purely a physical count of the number of rabbits observed an hour after dark using a lamping lamp (one million candle power). This second technique is particularly useful for assessing the impact of any rabbit control work.

**Photography** encompasses general, fixed-point, rectified and aerial photography. General photography is photography taken without any position referencing records or with only basic position referencing records (approximate position and general direction or compass bearing). This is a rapid method of monitoring the site and recording management issues. If the photographs from a previous site visit are taken on site then a fairly similar repeat photograph can be taken for the comparison of change.

Fixed-point photography (see monitoring case study) is photography that is taken from a known point and in a known direction. This technique permits the photograph to be repeated at a higher degree of accuracy than general photography. The fixed-point can be a survey peg, fence post, or landscape feature (e.g. boulder). A record of the fixed point including a photograph of it and grid reference should be made in order that re-identification is made easier. A handheld global positioning system (GPS) can be used to locate the position of the fixed-point, although some feature on the ground will still be required to repeat the photograph. A GPS is particularly useful in open, relatively featureless landscapes. Reference features should be noted in the frame of the photograph and if features such as trees on the horizon are used to locate the corners of the frame then the direction of the photograph will be more consistently accurate. A record of the direction of the photograph should be taken as a compass bearing.

Rectified photography is an expensive method to employ and will rarely be used in the monitoring of management issues on archaeological earthworks where other techniques can produce similar results. The advantage of rectified photography is that the information can be used to produce accurate two-dimensional measurements of features such as erosion scars.

Aerial photographs are particularly useful for the regular monitoring of area management issues including scrub or bracken cover of the monument, the extent of ground disturbance from livestock or farm vehicles or for natural erosion factors such as river or coastal erosion. Colour photography is best, particularly with bracken, which can be readily picked out from other vegetation in autumn and early winter by its rust-like colour.



**Figure 6: Farm access track across the vallum of Hadrian's Wall in the winter (left) and in the summer (right).**

Critical to photography is to record the time of year the photograph was taken as the management issue can be significantly different in one season when compared to another. This is particularly the case with vehicle and livestock erosion, which are often very visible in winter months and not visible in summer months (figure 6).

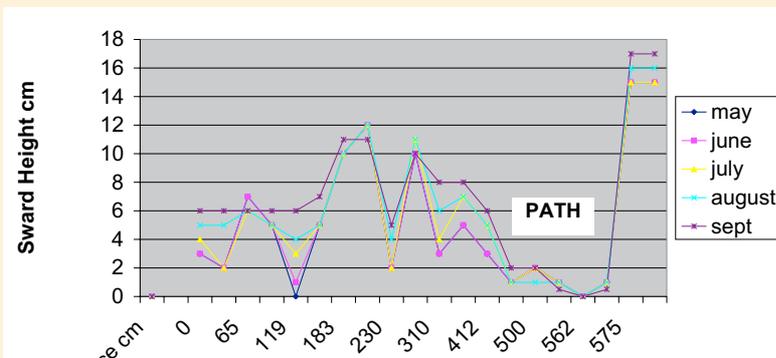
Transect and quadrat surveys (figure 7) can be used to assess changes to ground cover over the monument. They are particularly useful in monitoring recreational pressures on the monument.

The use of a combination of transect, quadrat and photographic recording on sample lengths of the Hadrian's Wall Path National Trail enabled the monitoring of the impact of the Trail use on the archaeology. The transect and photographs on this page highlight this impact on a section of the Trail following the southern scarp of Hadrian's Wall ditch.



Trail route in June 2003

Soon after the opening of the Trail in May 2003 the favoured route (desire line) became apparent on this section as a trample line in the grass sward where the growth of the grass was suppressed (see photograph above) by the pressure of feet. This route then became self-reinforcing as the presence of a line encouraged most people to use this route and the lack of use around allowed the surrounding vegetation to increase in height thus further focusing the use of this narrow



Low Teppermoor Sample Site 2 Transect Data

route. The transect data suggests that this route becomes narrow in late summer as the presence of thistles and other taller surrounding vegetation further narrows the route. The impact on the archaeology has been to alter the form of the slope as the use has formed a terrace by the action of erosion and compaction of the soil.

This information can guide future management. To alleviate this impact periodic mowing of a strip to widen the route and the placing of simple obstacles on the desire line to force a change in route could be implemented.



Trail route in September 2003

Figure 7 - Monitoring Hadrian's Wall Path National Trail

Transect surveys can be used to measure factors such as the trampled path width, worn path or bare width between two known points. These points can either be survey pegs or readily identifiable features such as a marker on a fence post. If the vertical position of the marker is stable then these can also be used to assess soil loss and entrenching of recreational routes.

Quadrat surveys can also be used to assess the impact of recreation on ground cover. Like the transect surveys an assessment can be made of the extent of vegetation loss and bare ground. However, their principal use is to assess changes in plant species caused by the use of the area as some species are more resistant to wear than others. In turn this method can also be used to quantify the effectiveness of any grassland management regime employed to alleviate the pressures of recreation.

**Measured survey** can be used to provide accurate records of management issues such as the extent and profile of erosion scars, extent of ground disturbance by livestock or the location and extent of burrowing animal burrows. These surveys can be repeated to provide an assessment of change.

### B2.3 Putting it all together

Records from a single monitoring visit will rarely permit the surveyor to establish the change that is occurring on the site and therefore to establish what, if any, action is required, repeat visits will be necessary. The exception to this is where there is already a good site archive that illustrates the change that is occurring and the direction of that change. Repeat visiting will allow the surveyor to establish;

- what is changing and the trend in that change,
- why it is changing,
- what management action is required,
- and what future monitoring is required.

The monitoring information can be combined with other records such as people counts, meteorological data and information from the landowner or tenant to provide a better understanding of why and when an archaeological earthwork is vulnerable.

# Case Study 1: Fixed-Point Photographs

## Introduction

Fixed-point photographs are an essential part of monitoring. The record they provide can inform on the severity of a management issue and on the action, if any, that may be necessary to resolve the management issue.

Steel Rigg, situated 2<sup>1</sup>/<sub>2</sub> miles west of Housesteads Roman Fort, is a popular stop-off point on Hadrian's Wall. It has a small car park that is used by both cars and coaches. Visitors often stop for only a short time, to walk the Hadrian's Wall Path National Trail for less than 200m to take one of the iconic views of Hadrian's Wall. In each of the months April, May and June 2003 the number of people counted passing along the footpath was consistently over 6000. This level of use has meant that at times of the year the grass growing on the thin soils has struggled to cope with the pressure, leaving the ground bare and susceptible to erosion, which is damaging to the setting of the monument and any



Figure 8: Iconic view of Hadrian's Wall from Steel Rigg.

archaeological deposits that survive buried in the soil. There is evidence around some of the geological outcrops that the soil level has dropped a few centimetres due to this pressure.

In 2001 and the first part of 2002, the Foot and Mouth Outbreak meant that the site had a chance to recover and partially grass over. After this the site was once again open to the public, although it was not until the summer that visitors started to return in significant numbers. A monitoring regime of fixed-point photographs was set up to assess the impact of access on the ground cover. Photographs were taken prior to Easter 2002, then repeated at the end of the school summer holidays and at similar times the following year.

## How to take Fixed Point Photographs

The following steps are a basic procedure for taking fixed-point photographs;

1. Walk over the site to assess where fixed-point photographs may be most usefully taken from. Make a note of the locations and any features that could be used to locate the fixed-point.
2. Stand in the chosen position and look through the viewfinder or if a digital camera the monitor on the back. Look for objects in the view that will help when repeating the picture (e.g. trees or buildings on the skyline, gates, rocks or archaeological features in the foreground).

3. Once satisfied, make a note of where you are standing (e.g. back is against third fencepost from corner, 10 paces along wall from gateway), the main reference features in the photograph and the compass bearing that it has been taken on. A handheld global positioning system (GPS) can be used to provide location information of the photograph. A GPS is particularly useful in open, relatively featureless landscapes. Now take the photograph.
4. Take a photograph of the position that you have taken the picture from for ease of re-identification.
5. If using a 35mm compact camera or single lens reflex (SLR) camera then make a note of the type of lens used (e.g. 50mm lens). This is always written on front of the lens. Most digital cameras record this with the image so there is no need to make a separate note.



**Figure 9: Photographs from one of the ten fixed-points at Steel Rigg.**  
April 2002 (upper left), April 2003 (bottom left), July 2002 (upper right) and June 2003 (lower right).

## Results at Steel Rigg

Two seasons of photographs have now been collected and the results suggest the level of wear is relatively stable (figure 9) and that no immediate action is required. However, the recent opening of the National Trail along Hadrian's Wall has raised its media profile and the number of visitors has probably increased, which may be sufficient to start the deterioration of the site. Therefore, monitoring should be continued at the site over the next few years to build up a long-term record of change.