# Habitat Impact and Deer Activity Assessment

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## Revision History

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## Introduction

This note describes a method of deer impact and activity survey that is quick and easy to apply and requires only basic training. It is usually used in woodlands, both to establish a deer impact baseline measure and to monitor impacts over time on a specific site. It is not designed for crop damage assessment. The method is based on a survey which is, in essence, a careful walk through the woodland, recording signs of deer and their impacts then building the findings into an assessment of gross activity and impact levels.

Deer Impact and Activity Assessment is an essential part of the WD2 WS1 (Deer) supplement. A survey must be conducted at least in years 1, 3, and 5 and to keep records and provide electronic copies in year 1,and years 3 and 5 on request.

Best Practice Guides which identify deer species, the signs that they leave in the field, and which describe all aspects of wild deer management can be found at [www.thedeerinitiative.co.uk](http://www.thedeerinitiative.co.uk)

## Preparation

### Signs

You will need to be familiar with signs of deer and be able to tell the difference between deer signs, and those of rabbits, hares and so on. Where signs are fresh it may be possible to tell the difference, but older signs are not so useful. Both rabbits and hares will stand on their hind legs to feed so their browsing height can overlap significantly with that of deer.

A little experience is required to judge the scale of impact and activity for scoring purposes, and it is useful to walk as many different woodland habitats with as many different deer species and levels of impact as possible before attempting definitive surveys. This helps to “key in” on the relevant detail.

The signs that you score each year must be “fresh”, that is belonging to the past year only. However, significant changes that may have taken place over several years should be noted in your comments, for example previously heavily browsed hardwoods may now be producing new shoots, possibly indicating a reduction of browsing pressure.

### Timing

Surveys can be carried out at any time of year, but spring is preferred. In the spring, signs such as slots and paths are especially evident and signs of feeding on new growth as well as on that from the previous year should be apparent. In summer/autumn before leaf-fall there may be abundant vegetation, and the ground may be hard after a dry summer, making slots and paths are less visible.

If individual plant species or plants at specific stages of growth will form an important part of the impact data, then it may be necessary to carry out a survey at the usual time early in the year then complete it later to include these.

Annual monitoring surveys should be ideally undertaken at the same point of emergence of vegetation rather than on calendar dates each year to provide the most consistency between surveys.

### Scope of survey

Approximate survey routes will be agreed with the FC Deer Officer.

Representative woodlands are chosen and larger blocks of woodland may need to be split up into separate surveys, perhaps relating to compartments, species type, or terrain. Typically, during a survey a wood is visited for a up to few hours, walking at least a kilometre, this is dependent upon terrain and woodland size. A 16ha wood may take 2 hours, whereas a much larger wood complex may take ½ a day or more.

If very large holdings are to be surveyed, a sample of woodlands is acceptable, focussing upon the areas that are key to the overall objectives of the holding. For example, if the main objective is for coppice re-growth and natural regeneration then the surveys ought to focus on these areas. If deer are adequately controlled across the holding and the sample survey sites appear to be meeting targets, then the chances are that impacts across the wider estate are acceptable.

It is important at the outset to decide on the key objectives for the woodland and therefore the key elements that need to be recorded in the survey. If you are not familiar with the woodland, use as many indicators as you can until it becomes obvious which are the most useful.

To record survey details an [Impact/Activity Record](https://www.gov.uk/government/publications/management-requirements-for-woodland-supplement-ws1-deer-control-and-management-operations-note-59) sheet is provided. This can be modified according to local requirements although it is strongly recommended that the core elements are kept the same.

For consistency it is preferable that the same person, or someone who has surveyed with them, undertakes any repeat surveys, and that relevant notes are kept helping successors carry out surveys in a similar manner.

### Route

For consistency over time follow roughly the same route, or a route taking in the same woodland features, on consecutive surveys.

You should record the survey route(s) This can be approximated on a paper map, or by using a GPS unit (there is no need to follow the precise GPS route on return visit). Using GPS is also the easiest way to record the distance walked.

In larger woodland blocks it may be more difficult to guess a route which ensures that a representative proportion of all habitat types is assessed. In these cases, a map showing habitat types is an essential aid, and a pre-planned approximate route can be drawn up in advance of the survey to ensure that the woodland is thoroughly assessed.

Ensure that you have the landowner’s consent before carrying out the survey

### Equipment

There is very little equipment required but this is a suggested list:

* + sensible clothing (dress to prevent ticks), and insect repellent
	+ binoculars (optional)
	+ waterproof folder
	+ score sheets/pencil (pens might not work in the wet!)
	+ means of keeping time
	+ means of measuring undergrowth heights (knee height is approx 50cm!)
	+ means of communication (in case of accident)
	+ Map and means of recording route and distance walked
	+ Phone or handheld gps unit capable of holding a signal in woodland. To prevent getting lost, record route and positions

### History

If there is a previous history of impact survey work using another method there may be no need to change methods, providing you are happy with the type of survey and the way the results are recorded. If you feel that the method described here (which is essentially the same as that used by the Deer Initiative over many years) may be more appropriate, then it is advisable that both survey methods are used in parallel for a couple of seasons to assess differences and allow a comparison to take place. Note that whichever survey method is used it must be compatible with the WS1 Survey Report Form if that is the context in which it is being used.

Adequate notes must be taken to ensure consistency and background information for the survey over a number of years, particularly where deer impact change is desired or expected. A site map that shows changes in woodland composition is also useful, particularly on larger sites.

The management history of the area surveyed must be taken into consideration, be sure that apparent deer impacts are not in fact due to some aspect of the wood’s past management.

### Indicators

Please refer to the recording form as you read this section.

The survey uses several indicators to produce an index score (None/Minimal, Low, Moderate, High) for both the likely level of ‘deer activity’ and ‘deer impacts’.

Most of the indicators on the form are likely to be common to all sites. The “Grazing (flora eaten)” indicators at the bottom of the sheet may be more site specific. If you are initially unfamiliar with the site start by looking for as many indicators as you can. It may be that in the future you can discount those that seem to be of little value but be aware that changes in the presence/absence/abundance of seemingly unimportant indicators over time may become just a significant as the seemingly more ‘useful’ indicators.

It is very important that any changes made to the recording form are “future proofed”, for instance, there may be little or no bramble in a wood but if you suspect that it might be present if impacts are reduced in future, then you should keep bramble as an indicator on the form, the same might apply to coppice which might be present in future even if it isn’t at the start.

The deer activity scores usually (but not always) correlate with the impact scores, that is there is usually more impact with more activity. Some of the activity scores allow inferences to be drawn about the relative importance of each of the deer species regarding impacts.

Impact scores are usually collated regardless of the deer species responsible (since overall impact to the wood is the key interest) but again some of the impact scores can help to infer the relative importance of each deer species present.

Deer impact scoring is based on four main elements, each of which is sub divided into a number of more specific elements. Others can be added if this helps at a site level.

The scoring system uses simple tally marks to record deer activity and impacts (see Scoring and Recording results, below)

Initially it can be difficult to give an idea of how to transform a certain number of deer sign tallies into an index score of Low, Moderate or High, but a general indication has been given in each of the relevant sections below.

### Activity indicators

The deer activity scores are not a means of estimating deer numbers, but useful comparisons can be made from year to year perhaps indicating trends in deer numbers. Depending on the site and deer species involved, some or most of these indicators may not be seen frequently. If there are signs of other grazing mammals, record these as well. (In some woodlands deer are not the only species affecting woodland condition).

#### Deer seen

Record numbers and species of deer seen, including those heard and remains/hair found. This tends to be more useful in woods with good visibility and with the non-herding deer species. It can confirm the presence of a particular species. You should keep a note of other species such as rabbits, hares, and wild boar, as these species are also likely to cause impacts to woodlands. Other domestic grazing mammals may also be present.

Bear in mind that sometimes you will see no deer, even where they are present in high numbers, or you might double count them as you conduct the survey. Repeatedly visiting the site using a consistent counting method may give a more reliable measure, or you may wish to incorporate formal census results (see the Best Practice Census guides). A thermal viewer may find more deer but is a significant distraction from the rest of the survey.

Seeing just 1 deer during the whole survey scores Low, more than 10 per km (all species combined) scores High.

Dung

Tally up all pellet groups found (a pellet group is 6 or more pellets which were produced at the same time), record the species if you can. Muntjac often deposit in a latrine and a number of pellet groups of varying ages may be found. Record each different group found in the latrine.

You will need to look hard for dung; it is easily missed whilst you are looking at everything else. If you are using a dung count to estimate deer density (see the Best Practice Dung Counts guide) you should conduct it separately.

In a deciduous woodland in the South of England finding only 1 pellet group during the whole survey scores Low, 30 or more groups per km scores High. As your experience of activity assessment on a site increases you may wish to adjust these measures.

If you come across a patch where large numbers of pellets are found; in a particular habitat type for instance, you could mark this on a map. It will be useful in monitoring for future visits and for targeting deer management activity.

Droppings from other herbivores should be noted as an indication of their presence.

Couches

Couches (beds) are places where deer have laid down, leaving flattened areas of vegetation, often oval shaped. They will often be found in groups, particularly with herding species or family groups of roe. It may be possible to determine the deer species if hair is present. Mark areas with many couches on a map, as they will often use these areas on a regular basis.

1 couch in the whole survey scores Low, 10 or more per km scores High.

Scrapes

Scrapes are often seasonal in nature and can be very localised. It is usually possible to determine the deer species. If several fresh scrapes of the territorial species are found in one small area, they should be recorded using only one tally mark as they are probably the work of a single animal.

1 scrape in the whole survey scores Low, 10 or more per km scores High.

Wallows (Red, Sika, and Fallow only)

Wallows are often seasonal in nature and can be very localised. It is usually possible to determine the deer species but only Red, Fallow and Sika regularly wallow.

1 wallow in the whole survey scores low, 4 or more per km scores high.

Racks (deer paths) and slots (individual foot marks)

Individual slots can be useful to identify the species present and may be the only hoof marks where deer are at very low densities. Usually however, racks are one of the most useful signs of deer activity (dry or hard ground does not show slots well, but deer racks are more obvious, longer lasting and give some indication of pressure of use). The species responsible for the racks might be determined from slots, droppings, height of adjacent browsed vegetation, and size of tunnels (particularly common with Muntjac) in dense bramble or other vegetation.

Count the racks as you cross them. Racks can be very long or follow features such as contours, avoid counting the same rack more than once.

You may want to make a separate count on the racks that cross rides and wood edges, especially heavily used sections of them, because the racks are often better defined there. The recording form has a space “Racks (edge)” for such rack counts.

Because decreasing deer density may be associated with a reduction in use rather than a reduction in number of paths it is important to record both number of paths and apparent frequency of use.

A “rarely” used rack will be only vaguely defined with very few or no new slots. A “regularly used” rack is better defined and will have a few newer slot marks. A “frequently used” rack will have more numerous and recent slot marks, and a “heavily” used rack will have many recent slot marks and may be wider than usual. Occasionally (especially with Muntjac and sometimes other species you will find a loose network or “maze” of racks. This is often associated with high deer densities and should be noted and scored as such.

On wet ground, racks can appear to be more heavily used than if conditions are dry.

Take care not to confuse badger paths (often wide and smoother in appearance) with deer racks (although both will use the other’s paths).

The distribution of tally marks across the grades will influence the index score, the more tallies to the right side, the higher the score. 1 rack in the whole survey gives a score of Low, 20 or more racks per km with at least some in the “frequently used” grade or above, scores High.

A high rack score will lead to the interpretation of the overall score for activity as being High, despite the other indicators in the Activity section giving low scores. This is because the other indicators may be harder to see/find and are not so reliably correlated with deer density.

### Impact indicators

These are grouped into four main categories which should be retained if the score sheet is modified, but the indicators within the categories can be used or changed according to the specific site, for instance, if there is no coppice present there is no point in including it as an indicator. Throughout the survey make notes of other mammal impacts e.g. rabbits, hares, and in some cases sheep, cattle, horses or goats.

Fraying

Fraying is often seasonal in nature and can be localised. With the larger deer species fraying may manifest itself as “thrashing” where branches and stems are broken in addition to bark removal. Take care not to confuse deer fraying with rabbit and squirrel damage.

Signs of fraying can be persistent so you must only tally for the fraying that occurred up to 1 year ago. If a number of nearby fresh frayed stems could possibly be attributed to one animal (most likely with the territorial species), they should be recorded using only one tally mark. 1 fraying site in the whole survey scores Low, 20 or more per km scores High.

Sika deer will also bole score with their antlers, this can look a little like fraying and should be scored as such.

Bark stripping

Bark stripping is often seasonal in nature and can be localised. It is normally associated with fallow, sika and red deer. Where damage is fresh, the width of the tooth marks can help to differentiate deer from rabbits or squirrels. Fresh squirrel damage is characterised by the presence of strips of uneaten outer bark. Count individual stems or, if stripping is clustered count each cluster as one occurrence. 1 bark stripped stem (cluster) in the whole survey scores Low, 5 or more per km scores High

Broken stems

These occur when deer break stems either accidentally or to browse shoots higher than they could normally reach. The height at which the stem is broken may help to identify which species was responsible. 1 broken stem in the whole survey scores Low, 10 or more per km scores High. Stems broken by rabbits and hares usually have a clean, scissor like cut.

Browse line

Although a browse line may be clearest when there are leaves on the trees, even in winter it can be obvious. A “soft” browse line occurs at lower deer densities, even palatable “favoured” plants will still have leaves and leaders at deer browse height.

From moderate deer densities and higher, expect the browse line to be clearly visible when looking through the wood at 50 – 180cm height (depending on deer species). Most favoured plants will be grazed up to the browse line, but non-favoured species will often be ignored.

A “hard” browse line caused by high deer densities is one that is sharply defined for some distance through the wood and where even plant species that are normally untouched are eaten. Grasses may be grazed but tend to persist even under high grazing pressure.

Climbing ivy will often show a clear browse line but ivy is a particularly favoured plant, so such lines are probably not that significant, except to say that if there is no deer browse line on climbing ivy then there are probably very few deer around. Ivy has been used as an indicator of deer presence in other ways3.

Larger deer may mask the browse lines of smaller deer. A list of plant species that are usually favoured or avoided by deer can be found at the end of this note.

Browsing

Because deer are selective when browsing, it is important to concentrate on plants that are significant, for instance in most woods Bracken or Wood Spurge are rarely browsed, whereas climbing ivy and bramble are always browsed if deer are present in any numbers. Hardwood tree seedlings are frequently browsed and there is no harm at all in concentrating your seedling counts in areas where there are lots of seedlings, it is here that browsing effects will be most obvious. For instance, if they have survived disease, Ash trees shed a lot of seed and growing ash seedlings attract the attention of deer.

A total lack of tree seedlings may be due to many factors other than deer. It may well be that on any one site, indicators such as coppice or bramble appear to be almost entirely absent, but if you suspect that this is due largely to deer impacts, you should consider keeping them on the recording form.

Coppice <2metres high (<1 metre high where only Muntjac are present)

These are recently coppiced stools with all new growth or older growth at or below 2 metres. They may be individual trees/stools or coppice coups. In a coppice coup examine at least 20 representative stools spread throughout the site estimating the percentage of stems with damaged shoots. Note the tree species involved. Each stool gets a tally mark in one of the percentage ranges. It may be useful to consider the expected height of stems versus what is found on site.

Live basal shoots on older coppice or tree boles

Old coppice stools and some mature trees continue to produce new shoots from the base. Check at least 20 representative stools/trees at stops throughout the site estimating the percentage of new (live) shoots that are damaged. Each stool or tree base gets a tally mark in one of the percentage ranges.

Seedlings

Count damage to tree seedlings, try to sample no less than 20 at a time wherever you stop. Each group of 20 gets a tally mark. In some woodlands there will be fewer than 20 seedlings at a stop; just count what you find. Where browsing is light, fewer seedlings will be damaged and some may be reaching 2m or more meaning that there is a range of heights, this warrants a lower impact score. Where browsing is severe no new seedlings will reach 2m and all or most will be damaged.

Take into account the height of surrounding ground flora and make a note if it appears to be “nursing” tree seedlings to their current height, ignore isolated examples of this, e.g. a single sapling protected by a fallen tree.

Where seedlings appear to all be much the same height it is worth checking how old they are, they may have been held (by browsing) at that height for some time.

Note that depending on deer species/location, some less preferred trees such as Birch might get away despite heavy browsing on other tree species. Species such as Hawthorn and Holly may still grow slowly even if browsed, eventually growing above deer browse height, even Beech can be somewhat tolerant of browsing.

Smaller shrubs may be dwarfed and shaped by deer browsing if pressure is high. In areas with fewer deer you may find heavy low browsing, but the leader eventually gets away.

Bramble

Most common species of bramble are very palatable to deer so are a good indicator of impacts. Under little or no browsing pressure bramble tends to form large clumps, or a continuous cover. At high densities larger deer begin to break up large clumps of bramble and rapidly reduce the height to below 1 metre. Sustained pressure pushes it down further reducing it to wisps or small individual plants at leaf litter level, hence the height measure on the recording form.

Bramble that is being reduced in height may eventually become “over topped” by browsing, in other words the leaves right across the tops of clumps will be browsed as well as those on the edges.

If only Muntjac are present, large clumps may persist for longer but will have a distinct low browse line with “tunnels” following the racks. In the spring and summer of good growing years, bramble may appear to be escaping serious browsing therefore the best time to use it as an indicator is in late winter/early spring when other food sources are not so abundant. Remember that bramble under a dense canopy is not likely to be as vigorous as that found under less than 50% canopy cover, impact under dense canopy may appear high, but may in fact be moderate to low depending upon shade levels. When bramble is growing in Spring it may grow so fast that deer cannot initially keep up with it. When the new shoots are forming, the absence of winter leaves may be a better indication of past browsing pressure than the presence of new ones.

Grazing

Deer of all species will selectively graze ground flora. Space has been left in the grazing section for a number of indicator species which will vary from site to site and between deer species. Each plant species will have its own response to grazing and may therefore have to have its own impact criteria and index score. Either use the grading on the recording sheet or construct your own.

You may, for example, prefer to measure impacts more precisely using a system similar to the example given in Table 1 below.

Table 1. Example of customised grading for grazing (may differ from site to site)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| index score | None/ minimal | Low | Moderate | High |
| OxlipBluebellDogs Mercury | Up to 10% loss of flower headsNo loss of flowers; up to 5% loss of leavesup to 5% bitten | 11- to 25% loss of flower headsUp to 5% loss of flowers; 5-10% loss of leaves6 to 10% bitten | 26 to 50% loss of flower heads; up to 20% loss of leaf – loss of plants6- 15% loss of flowers; 11-20% loss of leaves11-15% bitten | more than 50% loss of flower heads; more than 21% loss of leaf – loss of plantsmore than15% loss of flowers; more than 21% loss of leaves more than 15% bitten  |

Sometime the size of tooth marks can help identify the deer species or differentiate deer damage from other animals. For example, hares will often take a section of stalk and, if the damage is fresh, the remaining stalk and flowering head may be found at the base of the plant.

On taller plants it may be apparent which species was responsible for any grazing from the height of the bitten ends.

If flowering heads are being grazed it can be quite hard to see the remaining flower stalks.

Grazing on long-lived perennials can reduce their size and affect their distribution. Other species may spread at their expense e.g. grasses, sedges and ground ivy. Record plant species that appear to be un-grazed. Comment on any changes in plant distribution and consider asking local naturalists for additional information.

## Carrying out the survey

Plan the route based either on local knowledge or from a map. The route should be representative of the wood/compartment as a whole. The site should be covered by following a more or less regular zig zag path through it from one end to the other, or via a roughly circular route.

***It is perfectly legitimate to seek out areas where impact is likely to be higher or more obvious as long as the overall impact score is taken in the context of the whole surveyed area not just these “special” areas.***

If you find that the whole area appears to be similar you should still complete the whole walk as planned

Walk slowly; there is a lot to take in. Sometimes there is a danger of missing certain signs (e.g. deer dung can be hard to see amongst ground vegetation). If a particular sign is critical to the survey it might be sensible to do a separate walk looking specifically for it.

***For the majority of the survey, walk off of the rides, through woodland blocks, glades, coppice areas etc. The precise route followed is not important but unless rides are the only way of moving about the wood it is important not to simply follow them because they may not be good indicators of the true deer activity or impact,.***

***Where you cross rides any results recorded there can be included in the survey.***

Check woodland/field edges for deer racks coming in and out. This can be done while you are doing the main survey or separately. You might walk the whole boundary or a representative part of it for instance alongside permanent pasture or particularly palatable crops.

Walk a representative ride or rides through the wood, either simply checking for racks as part of the main survey, or to carry out a separate survey. Unless it is unavoidable, or your interest is purely in ride side impacts, you should not conduct your survey solely on rides.

Make sure that your survey includes scoring impact on plant species that are likely to be good indicators of impact on that specific site as well as looking for deer signs and impacts on shrubs and trees.

## Recording and scoring results

Please refer to the recording form as you read this section.

Survey results should be recorded on a standard recording form; this reduces the risk of forgetting things and should help to ensure consistency over time. Feel free to modify the form supplied but try to “future proof” changes as you need to be consistent if you are intending to monitor over the years.

The example recording form is split into two sections, one for Deer Activity (7 rows) and another for Deer Impact (9 titled rows, two with several additional rows to accommodate different tree/plant species).

As the survey proceeds, each time an example of each element is found it is given a tally mark using the “5 bar gate” tally system.

Some rows have no scoring criteria above the tally boxes (i.e. most of the rows in the “Activity” section apart from the “racks” rows, plus the “bark removal or breakage” rows). In these the more tally marks there are, the higher the score on the right hand side. In these same boxes it is useful to group the tallies according to deer species (because it may help to indicate which species is prevalent) and, if you wish, create a score for each species, although an overall score for all species is all that is required.

The other boxes are tallied regardless of deer species, according to criteria in the top box (i.e. the rows “Racks” and from “Browseline” to “Grazing”). Each row is divided into four, each with a score criterion. For these the score is assigned according to the weight of tallies across the criteria. Both activity and impact increase from left to right. i.e. if most of the tally marks are towards the right hand side the score will be High.

You should record the distance travelled on each survey in order to build up a reference record for activity signs/impacts per distance (e.g. per Km) and use that information to help assign the score in the right hand column. Guideline figures are given above in the description of the relevant Indicators.

If some data is not available merely because of the time of year, it might be best to wait for a further visit before completing the analysis of the score sheet.

The Comments area is vital for a full interpretation of your results. Comments will vary between woods, but the following are typically included:

Remarks on canopy density where appropriate, expressed as a percentage of sky visible as it would be when the trees are in leaf. Dense canopies slow woodland growth and therefore make the woodland more vulnerable to the effects of impacts.

Changes in woodland management which might affect the survey from year to year.

Notes such as:

 “in deer exclosures the plant growth is much better than growth outside” or “plant growth on open rides is as poor as under the canopy”. These might both indicate significant impact.

Presence of rabbits/hares/livestock These could be significant contributors to impacts. Signs are usually obvious. Hare and rabbit damage is easily confused with lower height deer damage.

Unpalatable plants “nursing” vulnerable plants E.g. tree seedlings concealed by Dogs Mercury or other ground flora may reach a height of 20 cm or so before being browsed off, or bramble or a fallen tree may hide a sapling which then reaches full height.

Normally unpalatable plants being grazed/browsed This may indicate very high numbers of deer. The reverse, where known palatable plants are untouched may mean lower deer numbers.

The weather Fair weather is best for surveys e.g. rain may wash away deer signs or make them harder to see (e.g. dung), prolonged dry weather may make racks less visible.

Observations of “old” impacts For instance, there might be a lot of old fraying signs but very few new ones, or previously browsed stems might be showing signs of recovery. Both situations indicate the possibility of numbers being higher in the past.

Route details will be useful to the observer that succeeds you.

## Interpretation of results

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The distribution of tally marks will enable the right hand “Score” column to be completed. For both the Activity and Impact sections decide where the majority of results / grades lie, e.g. if there is a majority of Moderate scores then the overall score for the site is Moderate.

Your overall score might need to be adjusted according to the comments that were made during the survey.

The aim of scoring is to come up with an overall impression of deer activity and impact, graded as; None/Minimal, Low, Moderate or High. Record these in the summary area at the top of the front sheet. These are the scores that will ultimately be reported in the WS1 survey summary if that is relevant.

The raw tally counts themselves are just as valuable as the index score for comparing records from year to year and may help to give a more detailed indication of trends than the overall index scores.

The boxes relating to deer species on side 2 of the record sheet help to clarify the species to which the survey relates and indicate which might be causing most impact. It may not be possible to be confident in these judgements in which case more than one species may be named.

## What the deer activity score means

The Activity score can be used to monitor the relative deer activity on a site over time and hence give a very approximate indication of relative deer density in the survey area.

The Activity score can also be used to predict the likely level of impact in an area, however, it is important to be aware that different plant species, habitats, and management objectives may have different deer activity thresholds for unacceptable damage. In the boulder clay woodlands for example the oxlip is very sensitive, perhaps because it emerges so early in the year (March), and a moderate activity score can result in high damage levels to the plant. Conversely significant damage to bluebells and Dogs mercury in the same woodlands occurs only at higher deer activity levels.

In general, however the likely implications of increasing deer activity scores are:

**None or minimal**: Activity at this level presents no problem. Grazing and browsing are probably beneficial to biodiversity, and this is likely to be the wood manager’s target. A minimal amount of deer management should be required to maintain this low level of activity.

**Low:** At this level, sensitive features are at risk. Damage is likely to occur to unprotected coppice, natural regeneration and to sensitive flora such as oxlips, anemones and orchids. Deer control should be put in place to control activity. Deer numbers should not be allowed to increase and consideration to be given to local deer management groups.

**Moderate:** These scores are associated with damage to sensitive features and loss of biodiversity. If unchecked, activity at this level could result in progressive death of coppice stools, loss of lower coppice layers and bramble thickets, little or no tree regeneration, and reduction or loss of key flora. Deer control is essential and should be targeted to reduce activity rapidly using collaborative management and deer management groups until scores reduce.

**High:** Such a level of activity results in severe damage to many features of the wood. If unchecked, biodiversity is severely affected, possibly resulting in irreversible change to woodland structure and species. Only species very unpalatable to deer survive (e.g. ground ivy, bird cherry, aspen). Unprotected coppice stools might be killed in three years. Deer management is essential and should be targeted to rapid reduction in activity. This may require a landscape scale approach involving neighbouring landowners.

## What the deer impact score means

The Impact score is a direct indicator of impact and if controlling impact is a management objective then the score should be used as the driver for impact prevention and culling strategy rather than any measure of deer abundance.

**None/ Minimal:** deer impacts at this level are unlikely to adversely affect any of the key woodland indicator species, coppice or regeneration. It is not expected that any loss of plants will occur, and the woodland should be able to regenerate without the need for fencing or tree tubes.

It is advisable though to have a deer management policy in place so that the site can be monitored. If deer do become present or increase, then control can be established quickly to prevent any impacts occurring if that is a management objective. Such levels of impact might have a positive effect on biodiversity rather than negative.

**Low:** Impacts registered at this level are unlikely to have a detrimental effect on the majority of the woodland. Plants that are particularly palatable to deer will be affected, (e.g. Oxlip). Hardwood regeneration and coppice growth will show some impact, but stems should be able to get quickly above browsing height.

Unfenced coppicing may be possible, but some browsing will occur, growth rates and the quality of stems may be reduced. Small, isolated areas of coppice or natural regeneration will be more vulnerable than large areas. At this level of deer impact most woodland features will survive.

**Moderate:** Poor growth or loss of palatable woodland plants is very likely at this level of impact; coppice re-growth and natural regeneration will be affected and is unlikely to be successful unless fenced. Understory will deteriorate and reduce in density. Continuous bramble will start to be broken into smaller patches. Brash piling around coppice stools or dense dead hedging may temporarily protect coppice stools and regeneration but after 2 -3 seasons these will be broken down and deer will start to impact on lower coppice shoots and areas between the coppice stools, affecting regeneration and ground flora.

Temporary fencing should be regarded as a breathing space in which to reduce deer numbers otherwise when deer are able re-enter the previously fenced area, they may cause considerable impact

**High:** Loss of all natural regeneration is likely, and any un-fenced coppice will be severely browsed. If this continues coppice stools are likely to begin to die off. Most of the floral interest in the woodland will be diminished or lost, and even usually non-palatable plants will be browsed, often grasses or sedges begin to dominate the woodland floor where the canopy is not dense.

Over a long period, the understory may be severely affected resulting in simplification of the woodland structure. Some changes may be permanent.

These impact grades can be viewed as roughly equivalent to the “impact stages” described by A. Cooke (2009), who describes how such stages could be used to inform woodland management for conservation.

## Further Support and Information:

Regional Deer Officers will be providing training events on a regular basis.

Wild deer Best Practice guides, available at www.thedeerinitiative.co.uk

1 Cooke, A. S. (2006) Monitoring muntjac deer Muntiacus reevesi and their impacts in Monks Wood National Nature Reserve.  English Nature Research Report No 681.  English Nature, Peterborough.

2 Cooke, A. S. (1997) Effects of grazing by muntjac (Muntiacus reevesi) on bluebells

(Hyacynthoides non-scripta) and a field technique for assessing feeding

activity. Journal of Zoology (London), 242, 365-410.

3 Cooke, A.S. (2001) Information on Muntjac from studying ivy. Deer 11 (9)

4 Cooke, A. S. (2009). Classifying the impact of deer in woodland. Deer 14(10) 35-38

5 Cooke, A. S. (2007) Deer and damage scores for woodland monitoring.  Deer 14(5), 17-20.

Table 1a: Palatable plant indicator species

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| **Species** | **Time of year** | **Important factors** |
| **Herb species** |
| **Bluebell** | Apr-May | Eaten by fallow and mainly muntjac; leaves and flowers eaten leaving stalks-easy to measure; plants get smaller after years of sustained grazing, but recover if protected. |
| **Common spotted Orchid** | Jun-July | Inflorescences eaten by fallow and muntjac; plants fail to set seed and decline; easy to measure bitten stalks; long recovery time. |
| **Dog’s mercury** | Mar-Aug | Leaves stripped from stalks by Muntjac, other deer species tend to avoid; very variable between sites; best as indicator at end of summer; poisonous. |
| **Hogweed** | May-Jul | Flowers and leafy stems taken by fallow and roe mainly; shoots bitten off at c.100cm; |
| **Oxlip** | Mar- May | Flowers eaten by muntjac & flowers and leaves eaten by fallow; very sensitive to damage; very slow to recover |
| **Pendulous sedge** | All Year | Can become dominant even with intense deer grazing. Flowers in light but not in shade.  |
| **Wood sedge** | All year | Sometimes grazed, often central core eaten out. |
| **Red Campion** | May Jun | Flowers eaten by roe; stops plants seeding causing decline; flower stalks eaten at 90-100cm. |
| **Wood anemone** | Mar-May | Flowers eaten by muntjac, roe and fallow; slow loss of population; slow to recover. |
| **Grasses**  | All year | Many species palatable but can survive heavy grazing so may come to dominate woodland floor, especially where canopy is not dense. |
| **Ferns** | All year | Some species browsed, often at core |
| **Woody species** |
| **Ash** | All Year | Young shoots eaten vigorously; stems broken down to reach them; Bark removed, mostly in winter. |

|  |  |  |
| --- | --- | --- |
| **Bramble** | All Year | Mature and young shoots favoured by all deer; browsing height may indicate species; flowering shoots lost; browse line common. All green leaf may be removed by end of winter or entire plants browsed out. |
| **Hawthorn** | Apr-Jul | Ends of young shoots eaten, often when in flower; Favoured by all deer; commonly leave browse line, or topiary effect. Can grow very slowly away from browsing with leader eventually emerging from an otherwise dwarfed plant. |
| **Hazel** | Jun-Aug | Young shoots eaten, especially coppice; may remove bark; stools may be killed eaten by all deer, height of browse line can point to species. |
| **Hornbeam** | May-Aug | Young shoots eaten vigorously by all species of deer; bark removed from poles; stems may be killed. |
| **Sweet Chestnut** | Apr-Aug | Coppice stool leader and side shoots eaten. Larger deer species may kill stools. |
| **Ivy** | All year | Climbing shoots, thin stems eaten vigorously, especially in early spring when ivy may be only green plant in wood. Bark may be taken in prolonged hard weather. |
| **Honeysuckle** | All year | Often present as short plants “nursed” to 15 cm or so by other ground flora but will climb if it finds support. May be held at 0-15 cm by heavy grazing, or prevented from climbing, or climbing plants will show clear browse line. |
| **Field maple** | Jun-Aug | Young shoots eaten vigorously by all species of deer – clear browse line.  |
| **Rosa species** | Jun-Aug | Leaves and stems eaten by all deer species – the height can be a good indicator of the species. Browse line common. |
| **Sallow** | Jun-Aug | Young shoots eaten, especially coppice; often remove bark up to 100cm |
| **Wych Elm** | May-Aug | Young shoots are favourite browse for all deer. In winter bark is very often removed and eaten when other vegetation is hidden by snow. |
| **Holly** | All year | Sometimes avoided but new growth is palatable. Is often dwarfed under canopy. Browse line may be clear and long lived. |

Table 1b: Less palatable plant indicator species

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| **False Brome** | Mar-Sept | Unpalatable to most deer; expands as other plants are eaten by deer; good indicator that sensitive ground flora being damaged. |
| **Ground Ivy**  | Apr- Jul | Unpalatable to deer; expands as other plants are eaten by deer; another good indicator of damage to sensitive ground flora. |
| **Wood Spurge** | All year | Unpalatable to most deer. Has unpleasant milky sap. |
| **Nettle** | Apr-July | Generally avoided but flowers may be eaten over very short period, mostly by fallow. |
| **Bracken** | All year | Occasionally grazed when unfurling, otherwise avoided. |