THE NATIONAL FOREST

Grey Squirrel Activity and Impact Assessment

Autumn 2025

Introduction

Grey squirrels are estimated to cause around £37m of damage to trees in England and Wales each year[1]. Monitoring the activity and impact of grey squirrels in woodlands is therefore vital for maintaining a healthy environment. The method described here allows volunteers, land managers or any other interested parties to collect robust data regardless of experience level. The method is flexible to fit the surveyors' objectives and will allow for comparisons over time providing it is performed in the same way each year.

Signs of Squirrel Presence

This survey method involves identifying and counting three main signs of squirrel presence: dreys, feeding sites and tree damage.

Dreys

Dreys are normally spherical balls of twigs and leaves that you can typically find where multiple tree branches grow close together to provide structural support.

Feeding sites

Feeding sites will be prominent features (tree stumps/exposed branches) that have the remnants of food sources, for example, hazelnuts, acorns, or pinecones. The nuts be broken into, rather than chewed into as a mouse would.

Tree damage

Squirrel damage to trees is usually in the form of bark stripping and must be carefully differentiated from damage caused by other animals such as deer or rabbit. A straightforward way to differentiate damage is based on height – deer and rabbit will cause damage under 1.8m in height, whereas squirrels can cause damage all over the tree. To be able to differentiate damage at the base of a tree, look to see if the bark has been discarded on the floor or eaten – squirrels will discard the bark, whereas rabbits will eat it. Deer damage could be from browsing of the bark or fraying, and more information can be found on identifying deer damage through the Deer Initiative[2]. Surveyors will need to be able to estimate the extent of damage on each tree surveyed, and a guide for that is provided in Annex 1 and 2.

Planning for your Survey

Rationale

The survey should be completed with a clear rationale behind them, which then informs where, when, and how surveys are undertaken. A couple of examples include:

- an audit of all the woodland on an estate growing high-grade timber trees, and therefore a thorough survey of all woodland types on the estate should be undertaken using a repeatable transect line to provide as accurate information as possible.
- a small woodland owner looking to monitor the levels of squirrel activity and impact after a thinning to ensure that their trees are thriving to protect the environmental value of the woodland. In this case, the methodology would not have to be as thorough, and the data produced would be more of an indication rather than scientific proof.

History

The management history of the woodland needs to be considered whilst undertaking the survey. If the woodland has been recently thinned, the results of the survey could be affected as damaged trees may have been removed while new damage may not have occurred yet on the remaining trees. Ensure to take note on any management activities that may affect the consistency of the results.

Timing

Surveys can be undertaken at any time of year, but it is preferable to undertake the survey when the leaf canopy is minimal since this enables the surveyor to see up into the canopy to view bark stripping damage and dreys. It is typical to see fresh squirrel damage in the springtime when the sap is rising in the trees. The chance of seeing fresh damage is enhanced when a forestry thinning has been undertaken, as the trees have additional light and can produce more sap.

Route

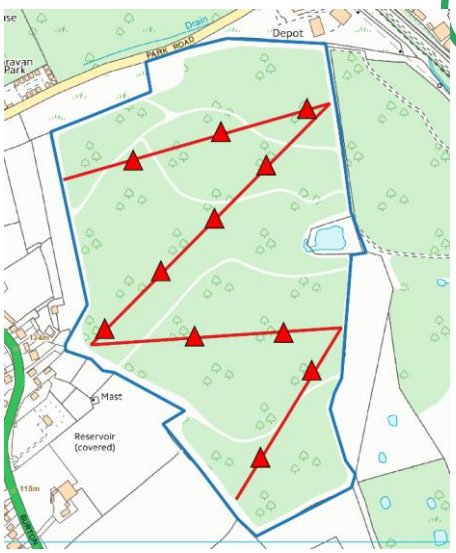
The method involves walking a representative transect through the woodland, avoiding rides and open ground wherever possible. Ideally, this route will be planned based on the survey objectives and local knowledge of the structure and layout of the woodland. The method requires that stops are made every 100 m to collect data.

Where a woodland contains areas of steep ground, a line transect might not be possible and the woodland survey should either be separated to multiple transects to avoid such features or a randomised one stop per hectare approach should be taken. If using a randomised approach, then consider looking at a one-hectare grid to calculate where to stop.

The map opposite shows an indicative line transect through a woodland site, taking a representative sample across the whole woodland.

One survey stop per hectare is required, with a minimum of three stops in any woodland. The woodland opposite is 11 hectares; therefore, it includes 11 survey stops.

If a woodland has many varying habitat types which are of interest to squirrels and importance to the woodland owner, samples of these should be incorporated into the transects.



For larger woodlands, separating the survey into multiple transects could enable the work to be split over multiple days. If a woodland forms part of a larger woodland estate, then consider how to balance the survey workload and immediate need of each woodland. Furthermore, look at an appropriate timeframe to repeat the survey if you do not need to repeat annually. To eliminate the need for an annual survey you would expect to see an initial damage score below the threshold, explained later in the methodology. If completing as part of a grant scheme you should then check with the grant awarding body if this is possible.

Equipment

- GPS – to record and follow strict transect routes to enable the surveyor to repeat this in future surveys. Alternatively, what3words can be used through an application available on most mobile phones. The recording sheets have a column, for a location from either method.
- Tablet – to record survey data clearly and concisely whilst also being able to calculate results automatically using a spreadsheet. Alternatively, data sheets can be printed and completed manually, however data will then need to be entered into the accompanying spreadsheet to calculate results.
- Binoculars – to see high into a canopy to record damage, however, consider that each survey repeated will also need to use binoculars to achieve consistency.

Completing the Survey

The surveyor(s) should walk the agreed transect route, stopping every 100 m to collect data. The following information should be recorded at each stop:

Squirrel activity indicators

- Dreys seen – the number of squirrel dreys located within a 30m radius of each stop.
- Feeding sites seen – the number of feeding sites located within a 30m radius of each stop.

Squirrel impact indicators

- Cumulative bark stripping – this indicator will assist the surveyor to develop an understanding of what the cumulative impact, both historic and fresh damage, is within the woodland. The data collected here can provide a wider context for future control and monitoring activities.
- Fresh bark stripping – this indicator will present the surveyor with the fresh damage figure. The average score for fresh damage will provide an indication of the current impact of squirrel damage within the woodland, helping to direct appropriate control efforts.

How to assess bark stripping

Several measures are needed to assess severity of both fresh and cumulative squirrel damage. The surveyor should first identify the five closest trees to the stop point that have a diameter at breast height (DBH) greater than 7cm. For each tree, the following data should be recorded:

- Tree species
- Location of fresh damage on the tree: basal, mid-stem or crown. Multiple locations are acceptable here.
- Severity of the fresh damage. This is on a scale from zero (total absence of fresh damage) to 5 (freshly stripped area large enough to kill entire canopy). Definitions and examples for this scale are given in Annex 1.
- The above should then be repeated for cumulative damage (fresh and historic) and recorded alongside the fresh damage score within the recording sheet. Definitions and examples for this scale are given in Annex 2.

Fresh vs Cumulative Damage

Differentiating between fresh and old damage will depend on the time of year the survey is conducted, with a recommendation to complete the survey at the same time of year each year. This is because we are classifying fresh damage as anything from within the previous twelve months.

Fresh damage visually will also differ between tree species, with distinct colours of wood under the bark layer. Following bark stripping wounds will begin to occlude around the edges and fade into a grey or black colour. Fresh damage will usually have a brighter colour with rougher edges, teeth marks and with bark discarded at the base of the tree.

The example damage score images in Annex 1 highlight different fresh damage colouring, field maple in image 1, sycamore [5] and oak [2, 3 & 4].

Recording Form

The survey results can be collected on the recording sheet found in the accompanying Excel document: NFC Squirrel Activity and Impact Recording Sheet. The first tab of this document explains in detail how to use this to accurately record your data and view your results.

Interpreting the Results

The survey data will provide three main results relating to the average fresh damage, average activity and tree species being damaged.

Average fresh damage scores

This will provide an understanding of how severe the fresh damage impact is to the trees. A site management aim should be to keep this score as low as possible and monitor via repeat surveys.

- Average of 3 or below: damage occurring within the transect lines of the survey is low enough that it is not having a significant impact on the trees.
- Average of 5 or above: the damage is having a significant impact on the woodland and the woodland will be declining in health and tree form.

Average activity scores

This data will be most valuable when it can be compared with historic data to show if the activity of squirrels is increasing or decreasing. If the score is increasing, it would suggest that population levels are increasing and that could result in more impact on the woodland. If it is decreasing, it shows that there could be a factor causing the population to decrease (control methods/natural predator) and therefore it would be expected that the impact on the woodland will also decrease.

Average cumulative damage score

This represents the total damage on each tree, so cannot reduce over time. However, the purpose of recording cumulative damage is to reflect upon any issues present either before starting control or to highlight what has happened historically, within the woodland. The primary focus for woodland managers and surveyors should be to keep the fresh damage score as low as possible, reducing any rises to the cumulative score into the future.

Species results

The list of species can be used to understand if there is a particular species of tree which is more susceptible to squirrel damage. For example, this could give the squirrel controller an idea of where to focus their attention when placing bait stations for air rifle shooting.

Variables

It is important to consider all the possible variables when analysing the data from these surveys. Surveying grey squirrel damage in this manner is inherently subjective. Whilst a scoring method will be used (Annex 1 & 2), the score given against levels of damage may differ between personnel. Care should be taken to ensure that data collection is as consistent as possible, but some variability is to be expected. There could also have been management differences that are causing a change in data, such as cull effort, forestry practices, mast years and climatic differences.

Summary

1. One stop per hectare of woodland is required to give a representative sample, with the closest five trees surveyed for fresh damage, cumulative damage and the surrounding 30m for activity, per stop. A minimum of three survey stops is required in any woodland (even for woodlands less than 3 hectares in size).
2. The results should be recorded using the survey sheet provided, using Annex 1 & 2 to assist in ensuring the data collected is standardised.
3. Photographic evidence should be provided as part of the survey for each woodland.
4. If possible, record the route of travel through the woodland to enable annual surveys to be repeatable. It is not necessary, however following a similar route will increase the quality of the data collected. Remember that the same trees may not be present at each survey stop in future surveys if a forestry thinning has occurred.

References

1. The cost of squirrel damage to woodland in England and Wales. Royal Forestry Society, 2021. https://rfs.org.uk/insights-publications/rfs-reports/an-analysis-of-the-cost-of-grey-squirrel-damage-to-woodland/
2. Wild deer monitoring and best practice guides. The Deer Initiative website - https://www.thedeerinitiative.co.uk/

Webinar

youtube.com/watch?v=xaRFYUy04Yc&feature=youtu.be

Acknowledgements

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Annex 1
Fresh Damage Assessment Scale

0 – Total absence of damage

F1 – Coin sized flakes of bark removed from the tree

F2 – Hand sized areas of bark removed from the tree

F3 – Stripped area of bark has the potential to kill <50% of the canopy

F4 – Stripped area of bark has the potential to kill >50% of the canopy

F5 – Stripped area of bark has the potential to kill the entire canopy

NOTE: Image 4 illustrates an oak with a forked stem, one stem stripped entirely. Differentiating between scores will require personal judgement and keeping to this judgement, for future surveys.

Annex 2
Cumulative Damage Scale

Fresh and Historic Damage Combined Score

0 – Total absence of damage

C1 – Cumulative coin sized flakes of bark removed from the tree.

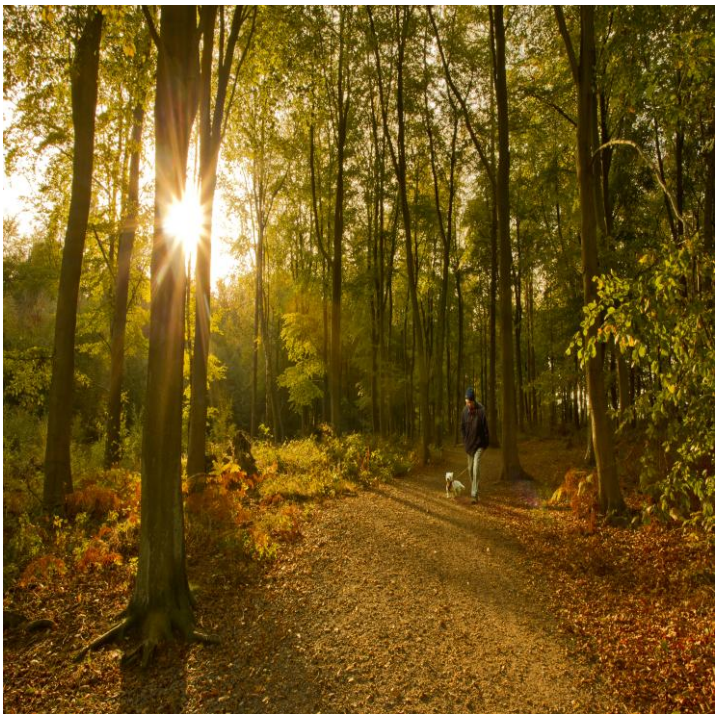
C2 – Cumulative areas of bark stripped result in hand sized areas of bark removed from the tree.

C3 – Cumulative areas stripped are large enough to kill <50% of the canopy.

C4 – Cumulative areas stripped are large enough to kill >50% of the canopy.

C5 – Cumulative areas stripped are large enough to kill entire canopy.

NOTE: A description of fresh damage vs historic damage can be found on page 5.



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Thank you to all our partners.

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