Red squirrels and forestry operations in England

Summary

This note sets out advice on how to plan and carry out forest operations in woodlands to minimise the possible impacts on red squirrels. The Forestry Commission (FC) has written this with help from The UK Squirrel Accord and its component organisations.

Remember, it is your responsibility to ensure your actions follow the law. If you cannot avoid unlawful impacts with activities as planned, you should seek specialist advice and modify activities to follow this guidance.

The most important things you can do are to:

- make sure the forest plan considers the presence of red squirrels
- make sure you make effort to detect red squirrels and to locate their dreys when you draw up the harvesting schedule
- avoid felling in red squirrel areas during the breeding season (February – September) -this is especially important where planning clear-felling
- consider availability of nearby suitable red squirrel habitat to which the squirrels might move
- leave connective links when planning harvesting
- always carry out a pre-operation check and mark red squirrel drey trees
- leave drey trees standing, consider leaving a group of trees around the drey tree and some connectivity to adjacent tree canopies
- instruct operators to look out for red squirrels and dreys when working
- consider whether to delay or move operations if you encounter active red squirrel dreys during felling operations
- make sure you record any incidents involving red squirrels

Introduction

This guidance applies to England only and you should use it to inform forestry operations in any woodland with red squirrels. The Forestry Commission (FC) has written this with help from The UK Squirrel Accord, its component organisations and squirrel experts.

This guidance does not address grey squirrel management methods. Grey squirrel management is essential for the recovery of the red squirrel population in England. For more information on grey squirrel management, please see Controlling grey squirrels in forests and woodlands in the UK from Forest Research.

About red squirrels

Conservation status and legal protection

In England, the red squirrel is endangered (Mathews & Harrower 2020) with the national population is estimated to be around 38,900 individuals (Matthews *et al* 2018). Owing to its rarity and vulnerability to habitat changes, the law protects red squirrels against intentional acts of damage or disturbance. They receive protection under the UK Wildlife and Countryside Act (1981) Schedule 5 and they are listed as a Section 41 species of Principal Importance for Conservation under the Natural Environment & Rural Communities (NERC) Act (2006). The Environment Act (2021) includes a legally binding target on species abundance for 2030, which is intended to help reverse declines of priority species including red squirrels.

Subject to certain exceptions, it is an offence to 'intentionally or recklessly:

- kill, injure or take (capture) a red squirrel;
- damage, destroy or obstruct access to any structure or place which a red squirrel uses for shelter or protection; or to
- disturb a red squirrel while it is occupying a structure or place which it uses for that purpose.'

Anyone who carries out, or knowingly causes or permits these acts to occur could be committing an offence.

Structures and places used by red squirrels for shelter or protection

For red squirrels, places used for shelter or protection will typically encompass a series of nests called dreys. They will also nest within tree cavities formed by decay in trunk or large boughs. These features provide the same function as dreys.

Red squirrels spend 70% of their time in the tree canopy, coming down to the ground only to find or bury food or to cross open areas.

Red squirrels are active all year and do not hibernate. Daily activity reduces in winter to one main active phase in the morning. This increases to two main active phases per day during the summer. Poor weather, especially rain, may reduce activity at any time of year.

Daily ranging activity can be between 0.2km and 1.8km depending on the food supply.

When not feeding, red squirrels spend time in their dreys - resting, sleeping, sheltering, grooming, and breeding. Individuals may have several actively used dreys at any one time within the forest area where they live. They can build a new drey in a few days. The most important dreys are those used for breeding. Young are typically present between February and September although occasionally they may be present outside this period.

There are woodland features that together describe favourable and less favourable red squirrel habitat. Forests and woods with plenty of the favourable features are likely to have higher populations and densities of red squirrels

Favourable woodland habitats contain:
- suitable food supplies and trees for drey building (see Annex I)
- 200ha and above of suitable habitat. Small, connected woodlands of favoured species can also provide this habitat
- a wide range of favourable tree species of differing age classes – see Annex I for more information
- older trees with holes to use as nesting places (tree dens)
- species-rich scrub on woodland margins, forest road and ridesides or in patches
- canopy connections across forest roads and ridesides or thick, wide hedgerow connections to other nearby suitable habitat
- abundant fungi

Additional favourable features for woodlands in areas with no grey squirrels are:
- fruiting trees especially hazel or sweet chestnut – ideally as managed as coppice to provide continuous supply of food
- shrub layer, especially with hazel

Less favourable habitats contain:
- isolated small, (under 200ha) woodland blocks - the smaller the patch the less favourable it is
- monoculture tree species composition

- an even aged conifer plantation
- a densely shaded understorey with little or no shrub layer
- a lack of connections to other nearby suitable habitat

Additional less favourable features for woodlands in areas with no grey squirrels are:
- an absence of large fruiting trees
- short rotation (<7 yrs) hazel coppice in cycle

Damage and disturbance

Damage is either:

1. Damage or destruction of actively used dreys, whether the squirrel is inside at the time when the damage occurs. For breeding dreys, there is a risk of young squirrels being killed or injured if the drey tree is felled.
2. Obstruction of access to used dreys - this is less likely but could occur, for example, where a felled branch from a neighbouring tree becomes lodged against the drey.

Disturbance offences relate to animals occupying a drey: the squirrel is inside or at the drey when the operation occurs. Disturbance might occur without any damage to the drey, for example when adjacent trees are felled. The degree of disturbance is likely to be greatest for dreys with young squirrels present. If the area around the drey tree is clear-felled it is likely that the drey will no longer be suitable. Adults can move readily but young squirrels may not be old enough to move and, even if the mother moves them herself (as has been known), this would be a stressful and risky process

Operations and activities that might kill, damage, or disturb red squirrels

1. Felling trees containing active dreys, or trees immediately adjacent
2. Other noisy operations or recreational activities, such as motor sport events, carried out close to dreys may cause disturbance, at least during the breeding season.

There is no mechanism for licensing forestry operations where they may cause damage or disturbance to red squirrels. There are some exceptions in very restricted circumstances, such as felling trees for public safety reasons. To avoid an offence, foresters and woodland owners need to be able to show that they took reasonable precautions to avoid causing damage or disturbance. If damage or disturbance does occur, managers must show that they took reasonable steps to minimise or prevent further damage or disturbance.

How to minimise damage or disturbance to red squirrels

The only way to guarantee a complete lack of damage and disturbance would be to locate all active red squirrels dreys and avoid all felling or noisy activities nearby at all times of year. However, this is not practical or reasonable because cutting trees and removing timber is an essential part of forest management and is essential in creating woodland habitats for future generations of red squirrels to use. To complicate management:

- red squirrels live at relatively low densities in our woodlands (see Annex II)
- dreys in tree crowns are often very hard to find
- it is often not possible to distinguish actively used red squirrel dreys from old birds' nests, grey squirrel dreys or disused dreys

Damage and disturbance impacts will depend on the scale of available habitat, it's connectivity to other suitable habitat and the type and scale of planned management. Research has shown that standard thinning operations have minimal impact on red squirrels even during the breeding season.

Natural annual mortality of adult red squirrels in woodlands is typically 30-40%. Red squirrel productivity and numbers respond to natural fluctuations in seasonal food resources, such as tree-cone crops. Whilst it is necessary to minimise damage and disturbance to individual squirrels and dreys, this high natural population flux should be considered when assessing the significance of impacts of forest operations on red squirrel populations.

Following this advice and recording decisions is valuable evidence that you have taken all reasonable steps to follow the law when managing forests and woodlands containing red squirrels. See Annex IV for a check list.

Local Red Squirrel Groups can offer advice and support. It is advisable for forest and woodland owners and managers to cultivate a collaborative working relationship with their local red squirrel group. The UK Squirrel Accord website has links to local groups on their volunteering page.

Key steps

Forest managers need to minimise or mitigate impacts on dreys and individual animals by:

- trying to locate any red squirrel populations and active red squirrel dreys
- identifying squirrel presence in the locality
- surveying woodlands to locate populations of red squirrels
- surveying shortly before operations to locate active red squirrel dreys/signs of red squirrel presence
- planning and carrying out operations to minimise impacts
- zoning or timing operations to reduce risk of significant damage or disturbance
- planning the way felling is carried out to avoid or minimise impacts on dreys

You should:

- take any other reasonable measures to minimise or mitigate damage or disturbance as soon as the need becomes apparent during management operations.
- keep a record of procedures followed where red squirrels are encountered

Figure 1 summarises the decision process required

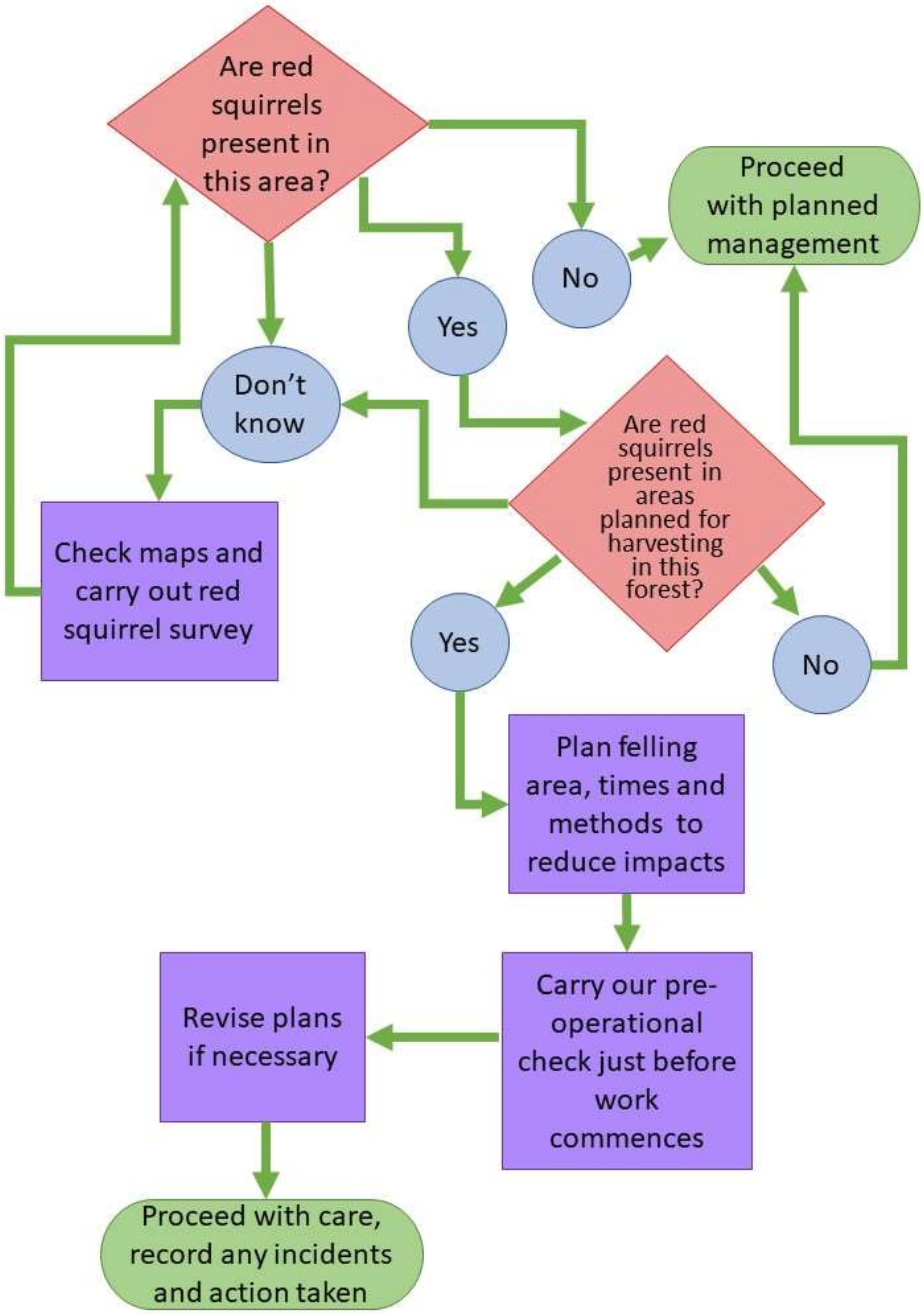

Figure 1: Decision key for planning and harvesting to minimise impacts on red squirrels (after FCS Guidance note 33)

Locating red squirrels and their dreys

Where they occur

Most of England's red squirrels are found in Northern England (spread across Cumbria, Northumberland, County Durham, Merseyside, and North Yorkshire). However, there are isolated populations on islands in Poole Harbour (Dorset), on the Isle of Wight and the Isles of Scilly (Cornwall) where they have recently been introduced. Figure 2 shows the distribution of red and grey squirrels in the UK in 2010 and the range of red squirrels in Northern England in 2021.

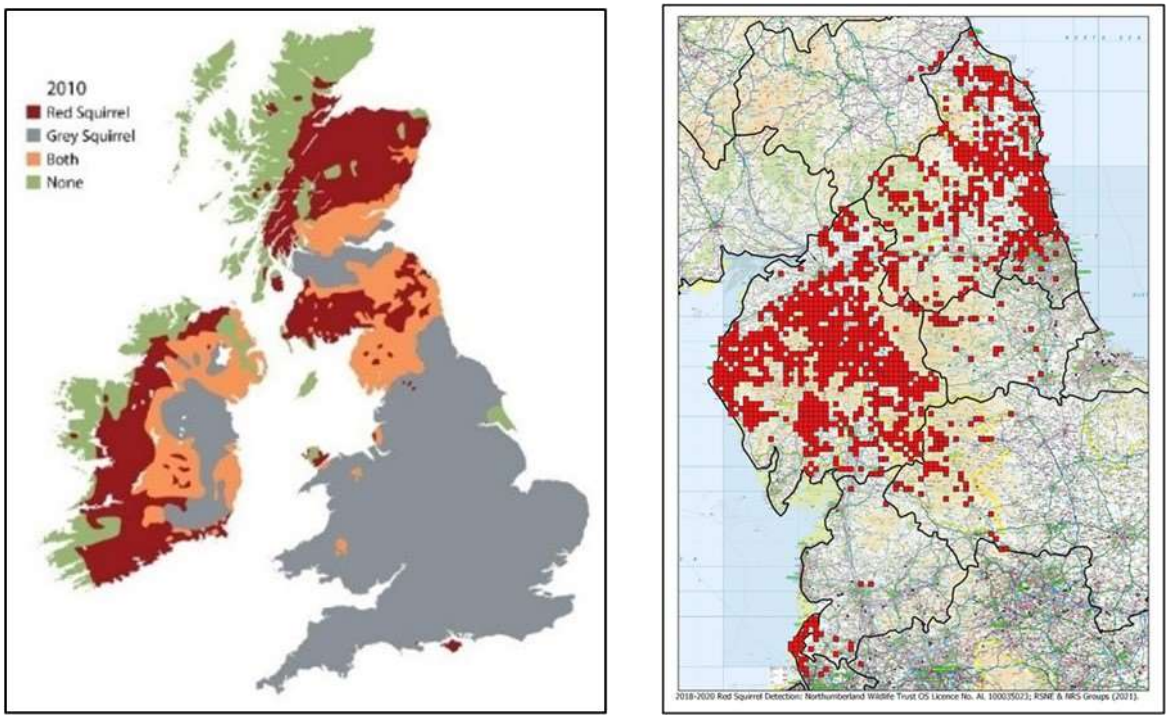

Figure 2: The UK red squirrel range by 2010 (Red Squirrel Survival Trust) the mainland distribution of red squirrels in England by 2021 (after Red Squirrels Northern England and Northern Red Squirrels, 2021)

Within their current range, red squirrels can be found in most woodland habitats, ranging from upland conifer forests to lowland mixed deciduous woodlands, suburban parks and gardens. The occurrence of red squirrels and their habitat use is determined by the age of trees (the trees must be old enough to produce seeds) and the species of trees and shrub present.

Red squirrels can thrive in both broadleaf woodland (especially where hazel nuts are plentiful) and conifer forests. Densities tend to be lower in spruce dominated plantation

forests. See Annex II which sets out the variety of red squirrel densities that have been reported in different types of woodland across the UK.

In Northern England, 17 red squirrel strongholds have been identified (due to be reviewed). These strongholds are largely coniferous and mixed forest and are areas where red squirrel populations have been sustained by a concerted conservation effort despite the spread of the non-native grey squirrel.

Are red squirrels present in your woodland?

Desk study

If you are not sure whether you have red squirrels in your woodland, you should complete a desk study to collect any information already known about red squirrels in the local area. It is important to check current records as the population and local range can change rapidly.

Desk studies should include (but not necessarily be limited to):

- information stored in the MAGIC interactive map showing the range of the red squirrel in and around your woodland (map is in countryside stewardship targeting layers)
- information from the Local Records Centre
- National Biodiversity Network (NBN) Atlas
- Global Biodiversity Information Facility (GBIF)
- information from your local wildlife trust
- information from your local squirrel group

If you have red squirrels or the desk study shows your woodland is in the red squirrel range (see Figure 2) you should complete a survey in the areas zoned for management activity.

Site survey

Where red squirrels are present, surveys should be carried out at one or more stages in planning forest operations. Drey surveys alone are not an effective means of identifying red squirrel presence so you should include methods that record feeding and other signs too. In addition to structured surveys, you should record any incidental sightings of red and grey squirrels in your woodland.

Due to the risks of squirrel pox virus infection regular equipment cleaning, using an antiviral disinfectant, is essential in any surveying method that may bring grey and red squirrels into contact (e.g., use of feeding stations).

Conservation planning survey at the Forest Design Plan or Forest Plan stage (desirable). A population survey can be used to inform forest planning, e.g., to retain areas of old conifers in places with the highest potential value for red squirrels. Detailed descriptions of methodology for population surveys are outside the scope of this guidance see Annex III for an overview of techniques.

Harvesting plan survey - prior to drawing up a felling schedule (recommended). This is carried out to determine the present and predicted areas of the woodland used by red squirrels for feeding and nesting, and plan to reduce likely impacts by timing or locating harvesting areas and choice of harvesting method.

Pre-operation Check - shortly before operations commence (essential). This will be a quick check for animal sightings, signs and dreys. Areas in active use can be noted and drey trees marked, allowing for last minute changes in the felling schedule. New dreys can be built in 1-2 days so pre-operation checks, particularly in the breeding season, should be within a week of the start of operations. Dreys can be difficult to see so other signs of squirrel presence must be noted.

A more detailed description of survey methods is given in Annex III. Whatever method is used, there is no certain way of finding all squirrel dreys in a wood. You also cannot be sure whether they are breeding dreys, other active dreys, nor which species is using them in areas where both reds and greys are found.

Planning management and harvesting to minimise disturbance

Management options for felling operations need to be flexible and adapted to local conditions. The advice here focuses on conifer plantations that have been surveyed and are known to contain red squirrels, although the concepts are transferable to other woodland types.

Where and when to fell

Red squirrels occupy forest areas with adequate food supply. Likely feeding and drey building areas can be predicted based on a knowledge of the tree species and coning sequences (see Annex I). Where possible plan to avoid clear-felling in the richest red squirrel habitat, particularly Norway spruce during mast years (including the summer before the cones are ripe and extending until the following summer). Within conifer plantations adjacent or mixed stands of Norway spruce and Scots pine generally provide the best red squirrel habitat and should be surveyed with extra caution.

Although harvesting operations may disturb red squirrels and damage dreys at any time, the potential impacts are higher during the breeding season. Squirrels will breed twice in years when food supplies are good, although in poor cone years there may be one brood and the young will be weaned by the end of June. Ideally, avoid clear-felling in the breeding season from February – September. Where this is not possible, try to zone felling away from the richest red squirrel areas and the period up to the end of June.

Detailed operational planning

When drawing up a harvesting schedule the accessibility of nearby feeding and shelter areas to which red squirrels can escape should always be taken into account.

If felling or thinning during the breeding season is unavoidable, trees containing dreys should be marked and left unfelled, together with immediately adjacent trees. Ideally arboreal connection should be retained to dreys by means of remaining tree crowns linking to adjacent woodland areas. Every effort should be made to avoid accidental loss or damage to dreys in clear-felling harvesting operations, however it is acknowledged it will not always be possible.

You must plan the order and direction of felling work to progress towards favourable red squirrel habitat, maintaining viable tree canopy escape routes for any squirrels within felling area.

Thinning operations can disturb foraging red squirrels. They will move to nearby feeding areas but remain within 200m and return after operations cease. Although disturbance of a foraging animal is lawful, it is best practice to minimise disturbance. Consider splitting larger (over 30ha) sites into smaller sections and thin them in different years.

Low impact silvicultural systems in sheltered locations should cause less disturbance to squirrels and dreys than clear-felling because they maintain an almost continuous canopy layer. These systems will probably also result in improved habitat value in future by stimulating coning and provide a mix of age classes for continuity of food sources. It should be possible to plan small group fellings or thinning operations to avoid most identified dreys.

Clear felling and large group felling will create the highest disturbance/ damage risk. Retaining small clumps of unfelled trees around dreys should be considered (a 5m buffer around the drey tree for example), but these are likely to blow over on exposed or wet sites and it may not be practical, nor effective for red squirrel conservation, to retain them. In unthinned Sitka spruce plantations, dreys may be almost impossible to find before trees are felled.

Special attention should be paid to ride management. You should maintain branch connectivity at intervals over-rides and tracks by marking crossing points for retention, interval will be informed by size of block, length of corridor and stand characteristics but as a minimum should be every 100m. Where the branch connectivity cannot be maintained for any reason, you should allow rides to scrub up in places to create patches of cover. The margins of rides often support seed and fruit bearing species and care should be taken to minimise loss of this feature during management operations.

During Felling

Harvesting operatives should be trained, informed, and instructed to look for dreys as they work. Forked trees in areas of Norway spruce and larch should be treated with extra caution as these are favoured drey trees.

If suspected active red squirrel dreys are encountered during operations, you must:

- stop work, leave the tree with the drey standing
- consider whether to delay or relocate operations
- record all incidents and the action taken when red squirrels or their dreys are encountered during operations

If a tree containing an active drey with young is felled and the drey is still intact, you should try to recover it. You can do this by placing large logs leaning upright against a nearby tree trunk and placing the drey on the top of this, so it is at least 1m above the ground. You should also move machines and people away and fell elsewhere to allow female red squirrel to come and recover the young. If necessary, you should seek further advice from an ecologist or red squirrel expert through your local red squirrel group.

Other forest operations

In planning and delivering other operations you should assess the potential for these works to create disturbance to red squirrels and adjust work practices as appropriate to each situation. For example, you should:

- carefully consider the position of timber stacks, keeping away from known red squirrel dreys
- avoid noisy machinery operations or large recreational events adjacent to high quality habitat in peak breeding seasons
- protect shrub components (food sources) on interior and boundary of coupe

You should also consider the impact of new access infrastructure, and as far as possible, plan access routes away from higher priority areas to reduce disturbance from traffic or public access.

Keeping records

A checklist (Annex IV) has been developed to guide woodland owners and managers through the decision-making process.

Immediately prior to woodland management operations taking place an Operational Site Assessment Form should be completed. This has been developed to help woodland owners and managers consider the potential impacts of operations on site features and identify the measures required to follow good practice.

Long-term habitat planning

As well as minimising the short-term effects of harvesting activity on individual red squirrels, you should consider measures for long term conservation and improvement of habitat for red squirrels. Include this in forest and woodland management plans.

Better habitat across the whole forest block may help offset any short-term effects on individual squirrels from felling trees and will make an important contribution to the recovery of the species in the medium to long-term. Evidence of planning in this way will help to demonstrate a reasonable and responsible approach to red squirrel protection.

You should understand how forest operations could improve the value of the woodland or forest for red squirrels; enhance the shrub layer and understorey by coppicing, thinning or group felling to open up canopy gaps and promote woodland regeneration while retaining canopy connectivity through the stand.

When thinning stands of conifer or the conifer component within Plantations on Ancient Woodland Sites (PAWS) for restoration, you should consider the short-medium term impacts on the local red squirrel population. You should consider planting new conifer or mixed stands on non-ancient woodland locations (avoiding loss of other existing semi-natural habitat) to help offset this loss of feeding habitat in the long-term.

Restructuring in second rotation plantation forest stands can play a crucial role in improving red squirrel habitat and the transition to continuous cover forestry (CCF) will in time benefit red squirrels with the development of a more diverse forest structure.

Effective grey squirrel management is one of the most important measures that forestry managers can put in place to benefit of red squirrels. Creating grey squirrel-free zones will lead to recovery and healthy red squirrel populations.

Forest Design for Red Squirrels

You should aim for a mix of species and age classes for a continuity of food supply. Ideally about two-thirds of the forest should be of seed or fruit producing age.

Suggested age class mixes for conifer forests for optimal red squirrel habitat (after Scottish guidance) in Spruce and Larch dominated woodland are:

- 20-30% of 0-15 years
- 20-30% of 15-30 years
- At least 40% or more of 30 plus years

In pine dominated woodland the recommended age class mix is:

- 20-30% of 0-20 years
- 20-30% of 20-40 years
- At least 40% or more of 40 plus years

For woodlands where grey squirrels are also present, or nearby, focus on diversifying the conifer element on non-ancient woodland sites. Plant species to benefit red squirrels in groups within the plantation or along rides or edges.

Establish south facing plantations with irregular boundaries to increase edge length and long south-facing edges to east-west rides to improve seed production.

Factor in long-term resilience for red squirrels by considering the effect of future climate change and make use of climate matching tools in considering tree species selection.

A wide variety of tree species can benefit red squirrels. However, care must be taken where grey squirrels are also present. You should avoid planting large seeded species or keep them restricted to a minor component within the woodland (no more than 10%).

Tree species and red squirrels

The following tree species are suitable for planting in woodlands with or near to red squirrel populations:

- blackthorn
- bird cherry
- crab apple
- dog rose
- Douglas fir
- guelder rose
- hawthorn
- holly
- lodgepole pine

- Norway spruce
- Scots pine
- western red cedar
- wild cherry
- yew

The following trees species should not be planted unless they can be used where red squirrel populations are isolated from grey squirrels in places like the Isle of Wight and other island populations:

- beech
- chestnut
- hazel
- oak
- walnut

These species may also be planted as they have no direct benefit for red squirrels but also do not benefit grey squirrels:

- alder
- aspen
- birch
- black poplar
- Cypress spp
- field maple
- hemlock
- juniper
- lime spp
- rowan
- sycamore
- whitebeam
- willows
- wych elm

These lists have been adapted from Forestry Commission Scotland (2006) & Northern Ireland Squirrel Forum (2015) guidance.

What about other protected species which might be present in the woodland?

This guidance should be used in conjunction with wider guidance on forestry and woodland management and should not be followed in isolation. Managers should be aware that there is the potential for more than one protected species in their woodland,

which for example may support bats and dormice, and will need to follow the approved guidance for each of the species present. Please see our Manage and protect woodland wildlife webpage for further information.

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UK red squirrel range, red squirrels united 2019 © Red Squirrel Survival Trust

Annex I: Conifer species and their coning characteristics

Red squirrel habitat depends entirely on the presence of suitable food supplies and trees for drey building. Knowledge of coning is a useful way to predict good feeding areas in the forest.

Norway spruce

Norway spruce (NS):

- is a preferred species for dreys
- has cone production that fluctuates dramatically between years
- provides abundant food in high mast years
- is a crucial component for red squirrels in forests dominated by Sitka spruce (SS)
- has cones that ripen later than SS and most seed is shed the following spring
- has a good crop interval every 3-11 years

Note that masting in NS and SS tend to be synchronous so include an alternative food supply such as Scots pine.

Scots pine

Scots pine (SP):

- retains cones and seeds until the following late spring, provides food supply in cone failure years for other conifer species
- is a useful component in forests dominated by SS
- has good crop interval every 2-5 years

Larch

Larch (L):

- is an important food source in years of low pine and spruce seed production
- retains cones
- has a 3-5 year interval for good crop years

Note that larch has been included for management of existing stands unaffected by disease. Planting new larch stands is not recommended.

Douglas fir

Douglas fir (DF):

- is useful to provide a continuity of seed
- has good crop interval every 4-7 years
- sheds most its seeds in autumn

Sitka spruce

Sitka spruce (SS):

- is a less preferred food source
- tends to shed most of seeds from cones in first 4 months after maturing in September
- only provides a source of food in autumn with a shortage from December onwards
- has a cone production that fluctuates dramatically between years
- has good crop interval every 3-5 years

Note that masting in NS and SS tend to be synchronous so include an alternative food supply such as Scots pine.

Corsican pine

Corsican pine (CP):

- is less favourable for red squirrels than SP as it produces fewer cones
- has good crop interval every 3-4 years
- retains cones and seeds until the following late spring, provides food supply in cone failure years for other conifer species

Note that Corsican pine has been included for management of existing stands unaffected by disease. Planting new stands is not recommended.

Lodgepole pine

Lodgepole pine (LP):

- holds cones for over 12 months and coning is less erratic than in SS and NS
- provides a dependable food supply in cone failure years for SS and NS
- has a good crop every 1-3 years

Annex II: Squirrel population density in different UK woodland types

No. per ha	Forest type & region	Dominant tree species
0.00 – 0.11	Conifer (Northern England)	Sitka spruce
0.33	Conifer (Scotland)	Scots pine
0.31 – 0.43	Conifer (Northern England)	Lodgepole pine
0.21 – 0.41	Conifer (Northern England)	Norway spruce
0.68 – 1.21	Suburban (Jersey)	Oak, Sweet chestnut, Scots pine
0.90	Deciduous (Southern England)	Oak - hazel

0.50 – 0.81	Deciduous (Northern England)	Oak – hazel

Table 4: Typical red squirrel densities in different types of woodland (modified from Gurnell et al 2009)

Annex III: Survey methods and circumstances for use

This has been adapted from Forestry Commission Scotland 2006, for more information see Gurnell et al, 2009.

Animal sightings

Remember not all red squirrels are red, nor are all greys grey – colour alone is not sufficient to distinguish them. If confirmation is not possible (for example you observe that cone scales are being shed but the animal is hidden in the canopy) then the record is uncertain.

This survey method is suitable for pre-op, as part of a check or harvesting plan survey.

You should note down any sightings of red or grey squirrels, including the location and date.

Feeding signs

The feeding signs of reds and greys are very similar so cannot be used as a distinguishing factor. Feeding signs are easy to detect and a feeding 'table' such as a tree stump is often used. Look for scattered fragments of shells, husks of nuts and acorns, stripped centres of cones, remains of cone scales and seedwings without the seeds. Newly eaten cones have a freshly cut appearance but edges soon fade to a duller brown shade. Squirrels remove most of the scales on the cone but leave some strands behind giving it a messier appearance – mice leave a 'tidier' cone core and birds often leave ragged edges all over the cone and generally do not remove the scales.

In the first half of the year terminal shoots, leaf buds and flower buds are cut through leaving sharp edges and, mainly in early summer, bark stripping is visible as long, sometimes spiralling, strips on the trunks. Fungi can show incisor tooth marks – the size of the tooth marks will distinguish squirrels from mice and voles. Food is sometimes hoarded under the soil or leaf litter or in a hole in a tree.

This survey method is suitable for pre-op, as part of a check or harvesting plan survey.

You should note the presence of feeding signs, type of sign, location and date.

Other signs

The squirrel call is a variation on 'chuck' which can vary from soft to loud and young squirrels emit a shrill piping call or whistle. Droppings are small and widely scattered and vary with diet and so are not very useful. They can be confused with rat droppings. Tracks are about 3cm across each print, the fore-feet showing four toes with claws and hind feet five toes with claws. Prints are far apart due to a bounding gait and no tail scuff is present. Regular runs can sometimes be seen as chipped bark on tree trunks or worn ground between trees. Tracks are more likely to be seen in areas containing grey squirrels.

This survey method is suitable for pre-op, as part of a check or harvesting plan survey.

You should note the presence of feeding signs, type of sign, location and date.

Drey check

Individual squirrels usually use several dreys at a time and possibly move between them depending on the food supply. Squirrel dreys are very difficult to find, particularly in conifers (especially in dense spruce). In broadleaves the best time to search for dreys will be in the winter. Red squirrel dreys are usually built in the fork of the main trunk or main branches of conifers – Norway spruce in particular and Scots pine being favoured species. Sitka spruce and larch trees are less likely to have dreys in them. The majority of dreys are above 8m and they are always above 3m. Occasionally holes in trees will be used as dens.

Grey squirrel dreys are more often in broadleaved trees, are messier (falling twigs, light shining through) and more likely to be further from the main branch.

Drey appearance cannot reliably distinguish between red and grey squirrel presence. Breeding dreys have fresh leaves and thicker linings but cannot be reliably identified.

This survey method is suitable for pre-op, as part of a check or harvesting plan survey.

You should note the presence, location and date plus any indication of active use by red or grey squirrels. If there has been no indication of the presence of red squirrels for a year or more prior to harvesting, then dreys can be assumed to belong to grey squirrels.

Hair tube survey

This method is useful for distinguishing between species in red and grey squirrel areas, particularly where visibility is poor e.g. in Sitka spruce plantations. It cannot however be

used in red/grey areas threatened by squirrelpox virus. It also requires specialised equipment, time and a degree of expertise in identifying hairs (see *Gurnell et al*, 2009). This survey method is suitable for a harvesting plan. You should note any red or grey squirrel presence, location and date.

Feeding stations

A whole maize bait feeding station is monitored in person or by CCTV or by a sticky block on the feeder box which can be used to collect hair from the visiting animal. The method is not suitable for red/grey areas threatened by squirrelpox virus due to the possible transmission of disease.

This survey method is suitable for a harvesting plan survey.

You should note the presence, location and date or red or grey squirrels.

Camera trapping

Camera trapping can be a cost-effective option whereby photographic and video recording of red squirrels can be used to confirm presence.

This survey method is suitable for a harvesting plan survey.

You should note the presence, location and date or red or grey squirrels.

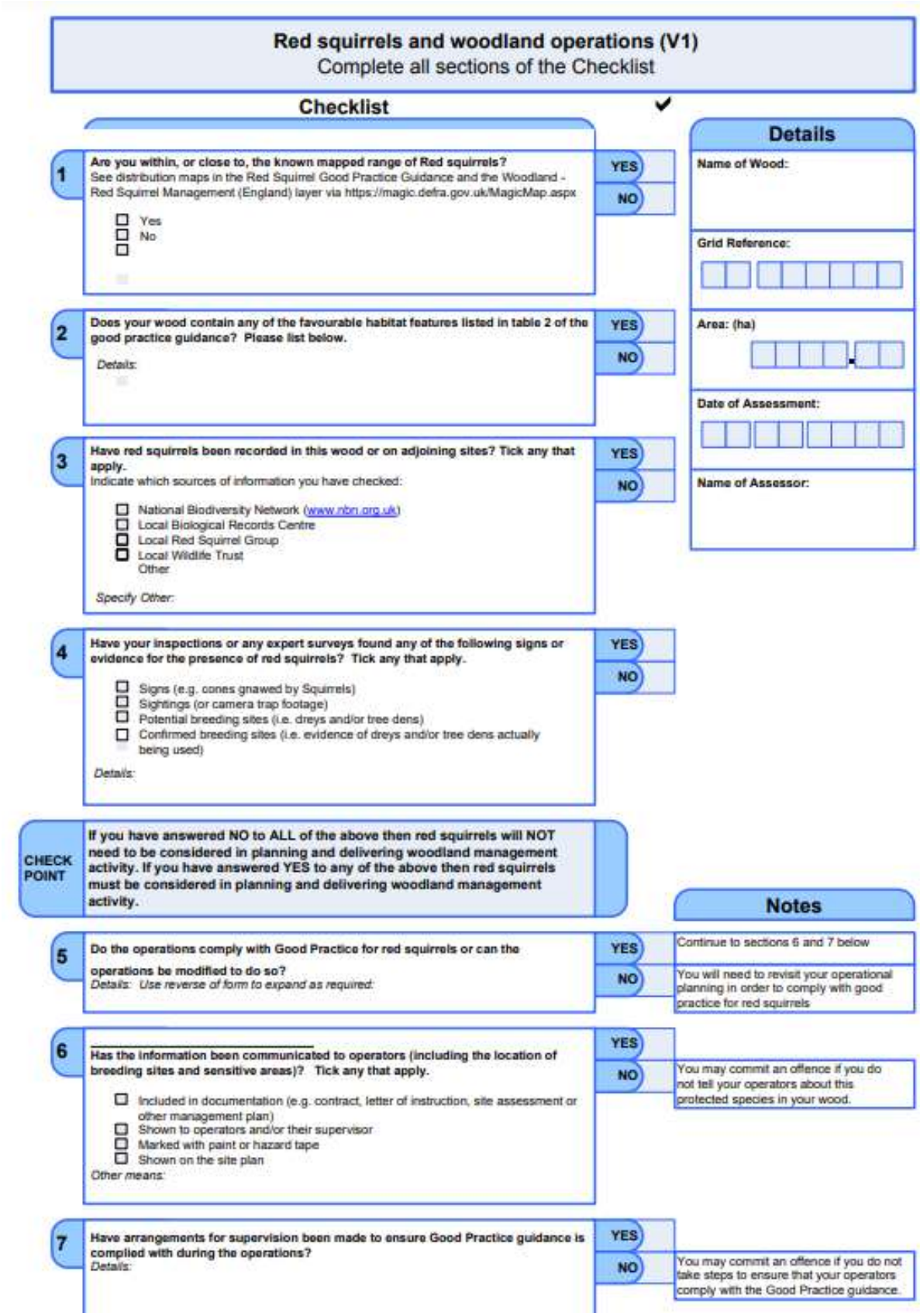
Thermal imaging

Thermal imaging either from hand-held devices or in the case of expansive areas of forest even drone assisted thermal imaging will likely make an increasing contribution to surveying for red squirrels in those areas free of grey squirrels in the future.

This survey method is suitable for pre-op, as part of a check or harvesting plan survey.

You should note the presence, location and date or red or grey squirrels.

Annex IV



Red squirrels and woodland operations (V1)
Complete all sections of the Checklist

Checklist ✔

Details

Name of Wood:

Grid Reference:

Area: (ha)

Date of Assessment:

Name of Assessor:

1 Are you within, or close to, the known mapped range of Red squirrels?
See distribution maps in the Red Squirrel Good Practice Guidance and the Woodland - Red Squirrel Management (England) layer via https://magic.defra.gov.uk/MagicMap.aspx
☐ Yes ☐ No ☐ — YES / NO

2 Does your wood contain any of the favourable habitat features listed in table 2 of the good practice guidance? Please list below.
Details: — YES / NO

3 Have red squirrels been recorded in this wood or on adjoining sites? Tick any that apply.
Indicate which sources of information you have checked:
☐ National Biodiversity Network (www.nbn.org.uk)
☐ Local Biological Records Centre
☐ Local Red Squirrel Group
☐ Local Wildlife Trust
Other
Specify Other: — YES / NO

4 Have your inspections or any expert surveys found any of the following signs or evidence for the presence of red squirrels? Tick any that apply.
☐ Signs (e.g. cones gnawed by Squirrels)
☐ Sightings (or camera trap footage)
☐ Potential breeding sites (i.e. dreys and/or tree dens)
☐ Confirmed breeding sites (i.e. evidence of dreys and/or tree dens actually being used)
Details: — YES / NO

CHECK POINT If you have answered NO to ALL of the above then red squirrels will NOT need to be considered in planning and delivering woodland management activity. If you have answered YES to any of the above then red squirrels must be considered in planning and delivering woodland management activity.

Notes

5 Do the operations comply with Good Practice for red squirrels or can the operations be modified to do so?
Details: Use reverse of form to expand as required:
YES — Continue to sections 6 and 7 below
NO — You will need to revisit your operational planning in order to comply with good practice for red squirrels

6 Has the information been communicated to operators (including the location of breeding sites and sensitive areas)? Tick any that apply.
☐ Included in documentation (e.g. contract, letter of instruction, site assessment or other management plan)
☐ Shown to operators and/or their supervisor
☐ Marked with paint or hazard tape
☐ Shown on the site plan
Other means:
YES
NO — You may commit an offence if you do not tell your operators about this protected species in your wood.

7 Have arrangements for supervision been made to ensure Good Practice guidance is complied with during the operations?
Details:
YES
NO — You may commit an offence if you do not take steps to ensure that your operators comply with the Good Practice guidance.