Chapter 4: Section Stratification

Contents

4.0 Section Stratification

In a New Square Assessment, the surveyor is required to divide or 'stratify' the NFI Sample Square into Sections. A Section is defined as a woodland or open area of relatively homogenous character and composition, at least 0.05Ha in extent and at least 5m wide, although there are some exceptions to this that are allowed (see Chapter 4.6).

Sections are differentiated on the basis of:

- Landuse
- Habitat type
- Tree/shrub species composition
- Tree age (distinct differences)
- Tree height (distinct differences)
- Tree storey structure (distinct differences)
- Tree regeneration
- Silvicultural system
- Woodland origin (e.g. Ancient Woodland, Plantation etc.).
- Management (e.g. thinning, livestock grazing etc.).

This is not an exhaustive list, and some judgement is required. Each Section needs to be as homogenous as possible, without unduly creating more sampling in the field.

In a Re-measure Square Assessment, the original NFI 1st Cycle Section mapping is supplied to the surveyor for verification. The Section mapping must be amended by the surveyor where it is found to be incorrect or outwith tolerance (see Chapter 4.9).

4.1 Section types

There are 4 types of Section, each classified according to whether the land is NFI or Non-NFI and Treed (has trees on it) or Open. Each Section type requires a different level of assessment in the field. NFI Treed Sections are the only type requiring a Mensuration Assessment.

NFI Treed	NFI Open	Non-NFI Treed	Non-NFI Open

4.2 Distinguishing between NFI and Non-NFI land

NFI land is land that conforms to the NFI definition of woodland and as such it is referred to as "NFI Woodland". The two terms are interchangeable. See Chapter 4.2.1.

Non-NFI land is simply everything else. See Chapter 4.2.2.

In order to distinguish between NFI and Non-NFI land, surveyors must, in the first instance, refer to the 2014 NFI Woodland Map. This is a digital map showing the location and extent of NFI Woodland across GB. See Chapter 4.2.3.

The NFI Woodland Map was created from desk-based aerial photograph interpretation in 2010, and has subsequently been updated on an annual basis through a combination of remote sensing and aerial imagery analysis. Consequently, it may not necessarily be correct in every Sample Square at the time of field survey.

Surveyors **must**, therefore, routinely check the accuracy of the NFI Woodland Map within every Sample Square. Specifically, surveyors must check that:

- NFI Woodland is correctly identified as such.
- NFI Woodland external boundaries are correctly mapped. This includes identifying instances where the boundaries need to be updated to reflect areas of new planting or permanent woodland loss (e.g. to housing development).

In order to do this, surveyors must have a clear understanding of what does and does not constitute NFI Woodland, and of the mapping rules employed in creation of the 2014 NFI Woodland Map. They must also ensure that subsequent amendments and additions to these rules are implemented on the ground when undertaking field survey of the Sample Squares.

4.2.1 Definition of NFI Woodland

NFI Woodland is defined as:

> An area of land **≥0.5Ha** in extent and **≥20m** wide, which has **≥20%** combined canopy cover of tree species and "shrubs acting as trees", or the potential to achieve this through maturation of the existing crop of trees (saplings and seedlings included) and "shrubs acting as trees".

A **tree** is defined as:

> A woody perennial of a species typically forming a single self-supporting main stem and having a definite crown. NFI tree species are listed in Chapter 8.9. Note that hawthorn and blackthorn are always regarded as trees in the NFI, whatever their form.

> A **shrub is deemed to be acting as a tree** when it displays the morphology of a tree i.e. when it has a single, self-supporting main stem at least 4cm diameter (measured at 1.3m above the ground) and a definite crown, with the potential to reach 5m.

NFI Woodland may be land conventionally regarded as woodland, but equally the land beneath the tree canopy may be a residential garden, amenity grassland, urban parkland, grazing pasture, a cemetery etc. However, as long as the area, width and tree canopy cover thresholds are met, the land is classed as NFI Woodland. Clearfell land is included on the presumption that the land will be restocked under law.

4.2.2 Definition of Non-NFI Land

Non-NFI land is simply land that does **not** conform to the definition of NFI Woodland outlined above.

Non-NFI land includes:

- Woodland blocks and strips with ≥20% canopy cover of tree species and "shrubs acting as trees" (or the potential to achieve this), but which are <20m wide or <0.5Ha in extent, and so too narrow or too small to qualify as NFI Woodland. These areas are regarded as Non-NFI Woodland if at least 5m wide, or Non-NFI Treed Areas if <5m wide. A block of woodland may be split into NFI and Non-NFI parts, as in Figure 4-1 overleaf.

- Areas of low density woodland with <20% combined canopy cover of tree species and 'shrubs acting as trees', and **no** potential to achieve this through maturation of the existing crop of trees (saplings and seedlings included) and 'shrubs acting as trees'.

- Rural and urban open land, including hedgerows and lines of trees.

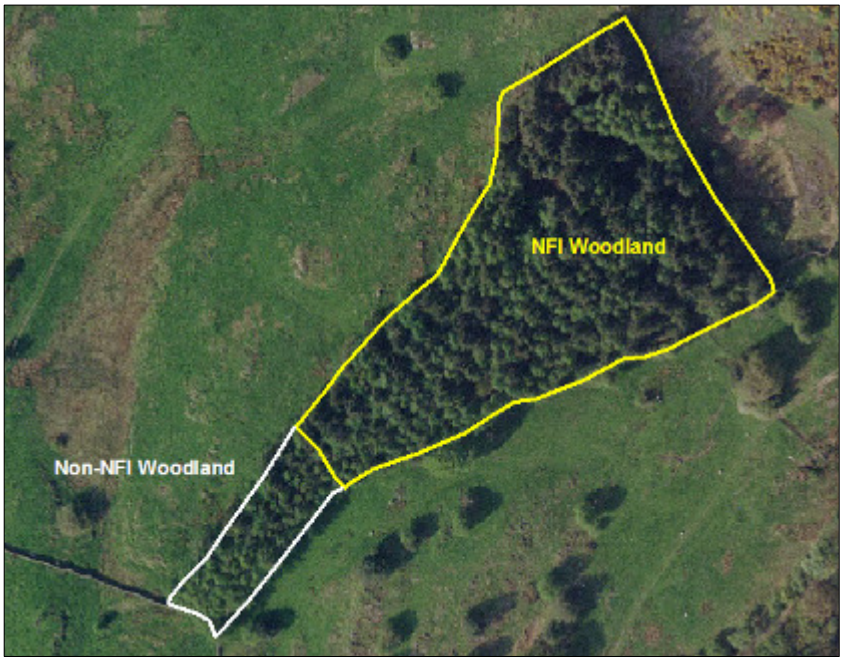


Figure 4- 1: Woodland split into NFI and Non-NFI parts

In figure 4-1, the area of trees bounded white have been classified as Non-NFI as the woodland is less than 20m wide there.

4.2.3 The 2014 NFI Woodland Map

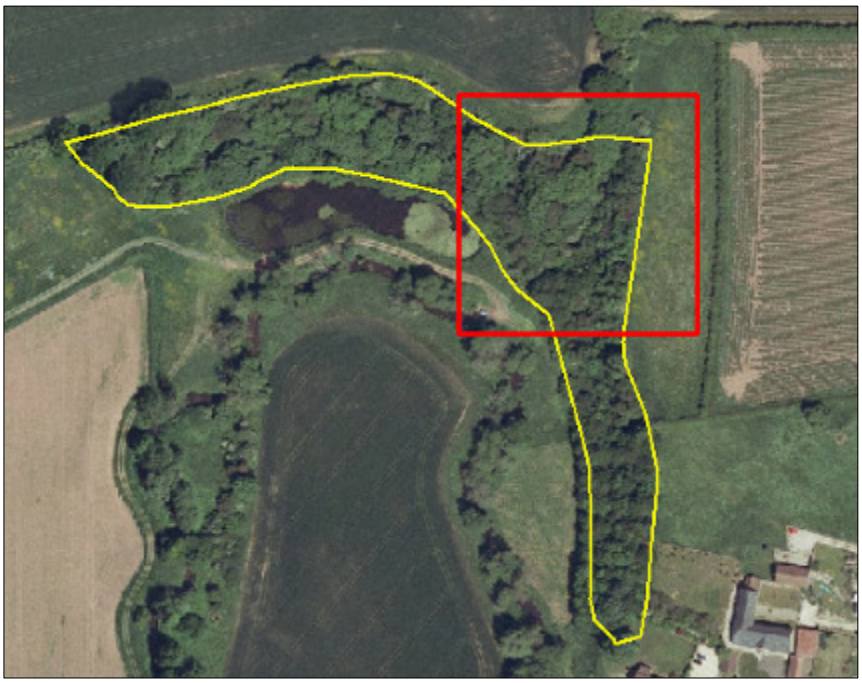
The 2014 NFI Woodland Map is a digital map showing the location and extent of NFI Woodland across GB.

The map is supplied as a GIS layer which automatically loads into Forester when the Sample Square geodatabase and default map schema are opened.

Place a tick against the "GB_NFI_Map" Layer in the Table of Contents to see the extent of NFI Woodland within the Sample Square (see overleaf).

Change the NFI Woodland Map symbology from opaque to hollow for a clearer view.

Zoom out to see the full extent of the NFI Woodland beyond the Sample Square.



4.2.3.1 Interpreted Forest Types and Interpreted Open Areas

The NFI Woodland Map is broadly differentiated into Interpreted Forest Type (IFT) and Interpreted Open Area (IOA) categories, each ≥0.5Ha in extent and ≥20m wide.

Interpreted Forest Types are assigned to parcels of land with **≥20%** tree canopy cover or the potential to achieve this through maturation of the existing trees (saplings and seedlings included). The minimum size of an IFT is 0.5ha.

Interpreted Open Areas are assigned to parcels of land with **<20%** tree canopy cover and no potential to achieve this through maturation of any existing trees (saplings and seedlings included). Open areas less than 0.5ha are not mapped out and are included in the surrounding IFT's.

A NFI Woodland may be comprised of a single IFT, or multiple IFT and IOA categories displayed as a patchwork of internal polygons (see example overleaf).

A listing and description of the various IFT and IOA categories is presented in Table 1 overleaf. Surveyors are required to view the IFT/IOA categories for specific polygons when carrying out a Native Relevant Adjacent Stand Assessment (see Chapter 11) and this can also be useful when checking the accuracy of the NFI Woodland Map as part of the sectioning procedure.

Interpreted Forest Type (IFT)	Description
Assumed woodland	Areas assumed to have been newly planted based on private sector grant scheme applications and FC new planting data.
Broadleaved	Canopy "open to the sky" is comprised of ≥80% broadleaf species.
Cloud/shadow	Land cover obscured by cloud/shadow.
Conifer	Canopy "open to the sky" is comprised of ≥80% conifer species.
Coppice	Woodland actively managed under a coppice system whereby the trees and shrubs are periodically cut back to ground level to provide firewood or timber. Usually broadleaf, occasionally conifer (e.g. coast redwood).
Coppice with standards	Areas of coppice underwood including a partial overstorey of standard trees grown to produce large timber.
Felled	Area of woodland where the trees have been harvested or felled within the last 10 years. Not to be confused with recently-cut coppice.
Ground prep	Ground prepared for replanting or new planting of trees e.g. ploughed, mounded, scarified etc.
Low density	A 'borderline' area of woodland that based on aerial photography interpretation could be either 19% or 20% canopy cover. It is for the surveyor on the ground to determine this.
Mixed mainly broadleaved	Canopy "open to the sky" is comprised of >50% and <80% broadleaf species.
Mixed mainly conifer	Canopy "open to the sky" is comprised of >50% and <80% conifer species.
Nursery	Land where young trees are raised commercially in nurseries.
Orchard	Commercial orchard.
Shrub	Area dominated by low-growing scrubby vegetation.
Young trees	Area replanted or newly planted with young trees.
Uncertain	IFT/IOA not discernible.

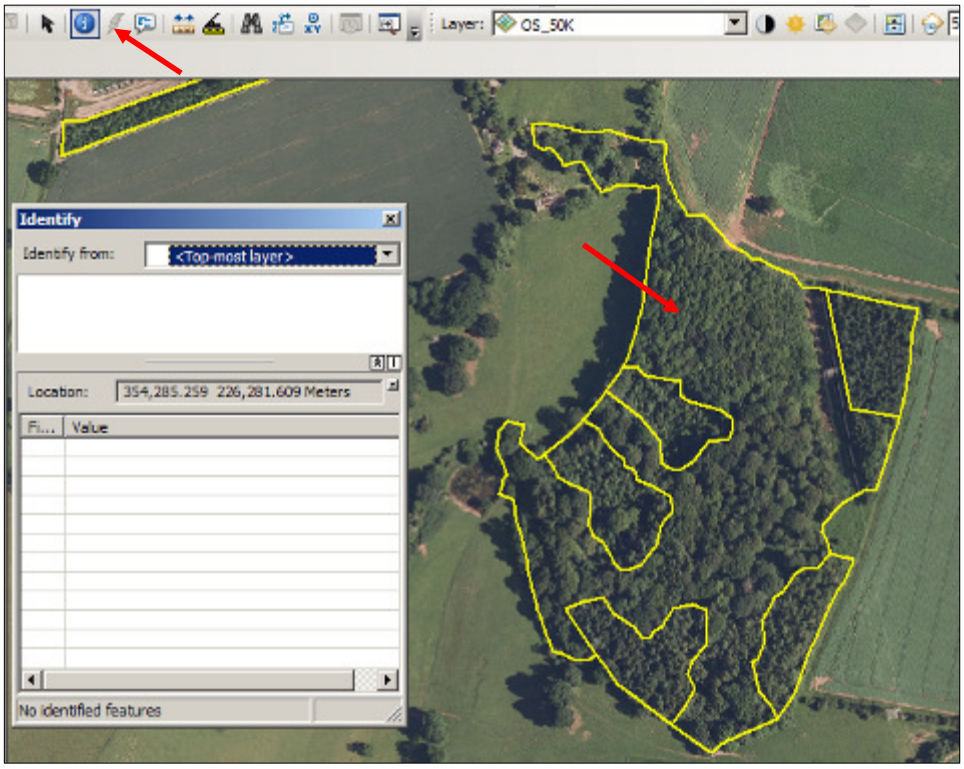
Table 1: Interpreted Forest Type categories

Interpreted Open Area (IOA)	Description
Agriculture	Agricultural land- arable or pasture.
Bare	Bare ground/rock.
Grassland	A predominantly grassy area.
Open water	
Other vegetation	Anything other than grass e.g. gorse, rhododendron, bracken, heather.
Powerline	Overhead electricity line.
Quarry	
River	
Road	
Urban	Buildings and surrounds.
Windfarm	Land with groups of energy producing wind turbines.

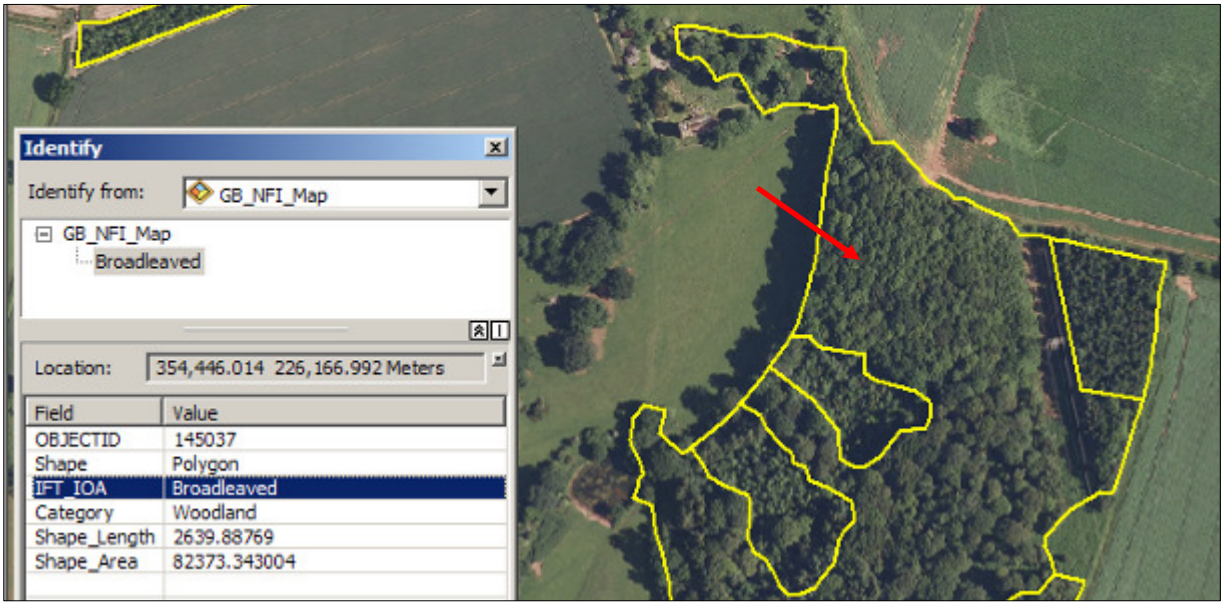
Table 2: Interpreted Open Area categories

To view the IFT/IOA for a particular polygon:

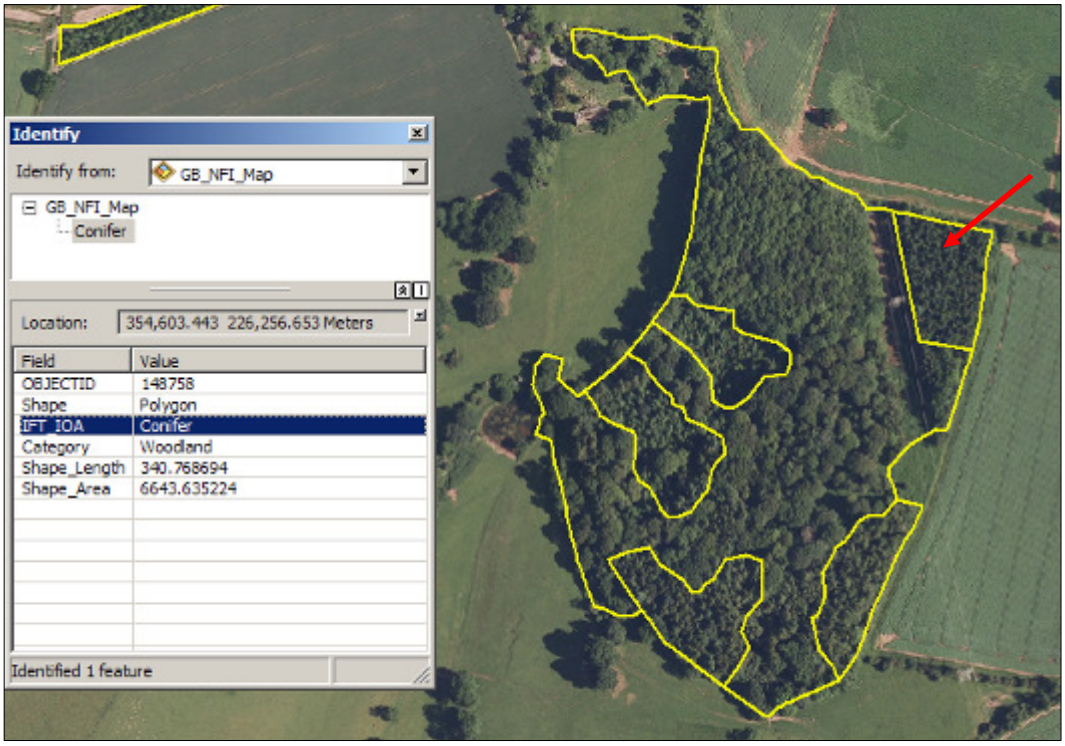
- Click on the blue "Identify" button and then left-click within the woodland polygon.



- In the Identify window, select GB_NFI_Map Layer. Click in the polygon again. The IFT/IOA and polygon area are displayed in the Identify window (see overleaf).



- Click in each polygon in turn to view the IFT/IOA.



- Close the Identify box. Click on the "Select Elements" button on the ArcMap toolbar to finish.

4.2.4 NFI Woodland identification rules

Surveyors must identify the full extent of NFI Woodland within the sample square, using the 2014 NFI Woodland Map as a starting point and checking the accuracy of this on the ground.

Surveyors must implement the following rules to ensure that NFI Woodland is correctly identified on the ground. Any deviation from the rules employed in creation of the 2014 NFI Woodland Map is referred to in italics.

4.2.4.1 Orchards

a. NFI Woodland **does** include **traditional** orchards.

b. NFI Woodland does **not** include **commercial** orchards intensively managed for fruit production. They are always classed as **Non-NFI** land.

The 2014 NFI Woodland Map does include nursery crops although classes them as Non-NFI land. NFI Woodland does include coppice crops (some of which may be SRC crops) and classes them as NFI land. Surveyors must implement the updated rulings as outlined.

See also Chapter 4.3.1.1.

4.2.4.2 Nurseries and short rotation coppice

a. NFI Woodland does **not** include nursery crops. These are always classed as **Non-NFI** land.

b. NFI Woodland does **not** include short rotation coppice (SRC) crops. These are always classed as **Non-NFI** land.

The 2014 NFI Woodland Map does not include nursery crops but does include coppice crops (some of which may be SRC crops). Surveyors must implement the updated rulings as outlined.

See also Chapter 4.3.1.2.

4.2.4.3 Christmas trees

a. NFI Woodland **does** include areas where Christmas trees are planted in a **mixture** with timber species or broadleaves.

b. NFI Woodland does **not** include crops grown specifically and **purely** as Christmas trees. These areas are always classed as **Non-NFI** land.

The 2014 NFI Woodland Map includes Christmas tree crops. Surveyors must implement the updated rulings as outlined.

See also Chapter 4.3.1.3.

4.2.4.4 Temporarily unstocked woodland

a. NFI Woodland **does** include areas that are temporarily unstocked as a result of human intervention or natural causes, but which are expected to revert to woodland within 10 years. Examples include:

- Clearfell sites
- Windblown crops
- Failed crops
- Burnt crops
- Recently-cut coppice crops

b. NFI Woodland **does** also include areas where the ground has been prepared for new planting (e.g. ploughed, mounded, scarified etc.) within the last 10 years.

The 2014 NFI Woodland Map includes temporarily unstocked woodland areas. Surveyors should continue to implement this ruling.

4.2.4.5 Shrub land

a. NFI Woodland **does** include shrubby areas that conform to the definition of Treed land. See Chapter 4.3.1.

b. NFI Woodland does **not** include shrubby areas that conform to the definition of Open land (see Chapter 4.3.2) **unless** the shrubby area is totally enclosed by NFI Woodland **and** is <0.5Ha in extent **or** <20m wide.

The 2014 NFI Woodland Map includes areas of Shrub Land (defined as scrubby vegetation where low woody growth seems to dominate a likely woodland site) but excludes pure areas of rhododendron or gorse not totally enclosed by NFI Woodland. Surveyors must implement the updated rulings as outlined. Mistakes can occur in the mapping process, especially when discerning between woodland and scrub, orchard or not, Christmas trees or not. The field surveyor needs to be aware of this and to assign the correct classifications based upon field observation.

For example; in the figure below, an area of Shrub Land included within the 2014 NFI Woodland Map was found to conform to the definition of Open land during field survey and because it is not totally enclosed by NFI Woodland, it has been re-classified as Non-NFI land.

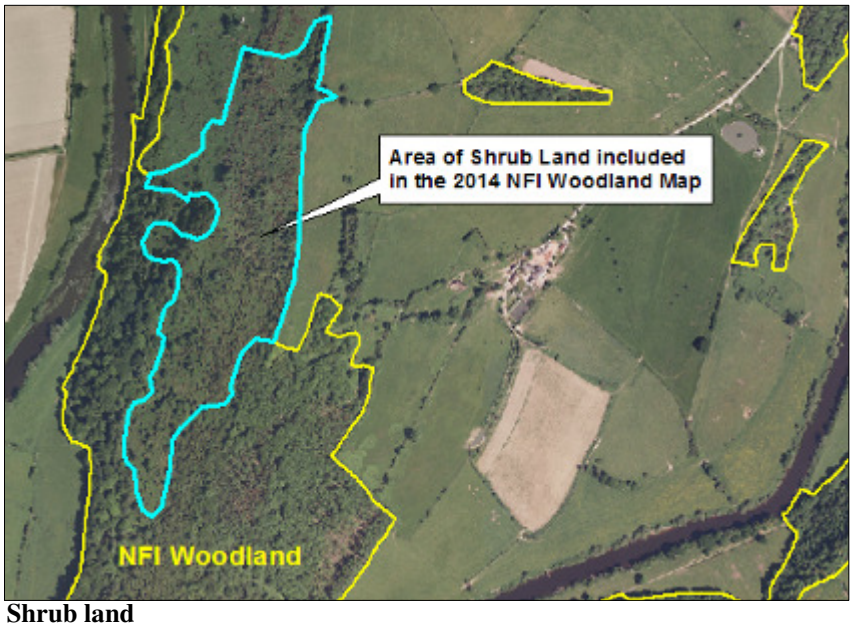


Figure 4-2: Shrub land

4.2.4.6 Open land totally enclosed by NFI Woodland

a. NFI Woodland does **not** include areas that conform to the definition of Open land (see Chapter 4.3.2), where the Open land is completely surrounded by the NFI Woodland and forms a "hole" ≥20m wide **and** ≥0.5Ha in extent. These Open land "holes" are classed as **Non-NFI** land.
b. Where there is woodland surrounding an Open land "hole" is <0.5 Ha in extent, the Open land "hole" is classed as **NFI** land.
c. Where the woodland surrounding a Non-NFI Open land "hole" is <0.5 Ha in extent, it is also classed as **Non-NFI** land.

d. If any part of the woodland surrounding a Non-NFI Open land "hole" is <20m wide for a stretch of 20m or more, that part is also classed as **Non-NFI** land, as per the NFI Woodland mapping rule for "narrow necks of woodland" (see Chapter 4.5.3).

The 2014 NFI Woodland Map includes Open land of any size that is totally enclosed by the NFI Woodland. Surveyors must implement the updated rulings as outlined.

In the figure below, the larger of the two Open land "holes" included in the 2014 NFI Woodland Map has been reclassified as Non-NFI land. All parts of the surrounding woodland polygon are ≥20m wide and the woodland polygon is still ≥0.5 Ha in extent, so it remains NFI Woodland.

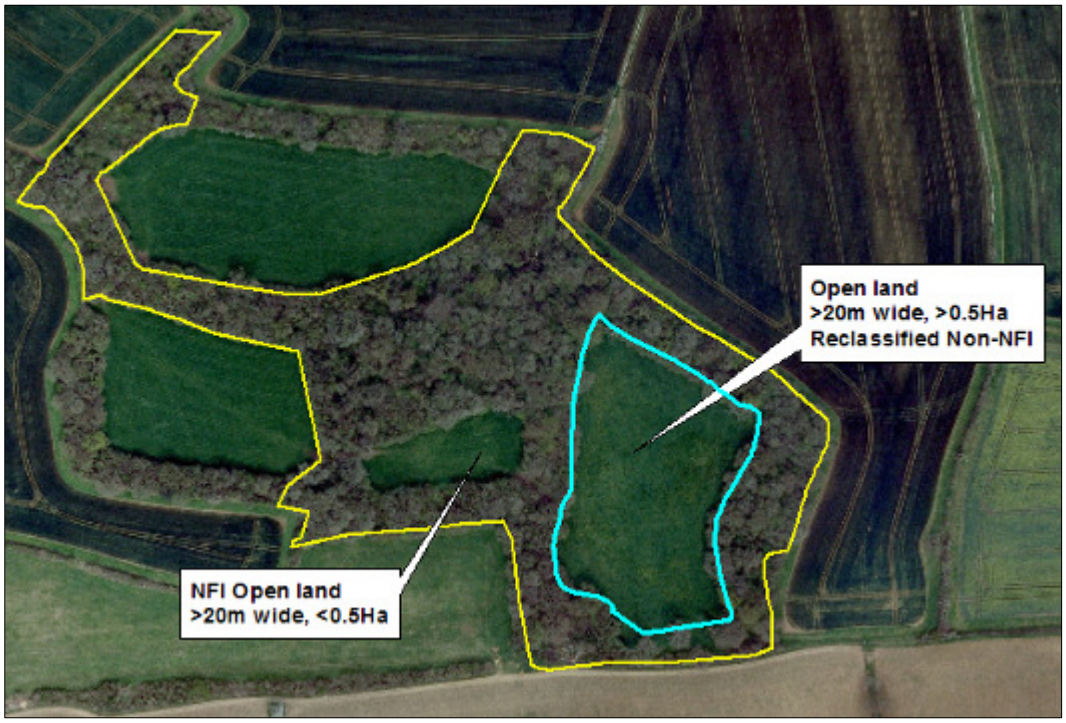


Figure 4-3: Open "holes" within NFI Woodland

4.2.4.7 Open land at the edge of NFI Woodland

The following rule relates to areas that conform to the definition of Open land (see Chapter 4.3.2), where the Open land creates a "gap" in the woodland edge and the "gap" contains a scatter of trees (saplings and seedlings included).

a. NFI Woodland **does** include such areas, as long as the scattered trees are located within 20m of the trees in the adjacent woodland.

The following rules relates to areas that conform to the definition of Open land (see Chapter 4.3.2), where the Open land creates a "gap" in the woodland edge and the "gap" does not contain any trees (saplings and seedlings included).

b. NFI Woodland does **not** include such areas where the gap is ≥20m wide. These Open land "gaps" are classed as **Non-NFI** land. See Figure 4- 4 below.

c. NFI Woodland **does** include such areas where the gap is <20m wide and the Open area can sensibly be regarded as a continuation of the adjacent woodland, either in terms of ground flora or observed landuse (e.g. a woodland glade, deer lawn etc.).

d. NFI Woodland does **not** include such areas where the gap is <20m wide and the Open area **cannot** sensibly be regarded as a continuation of the adjacent woodland (e.g. a pond, agricultural land, moorland, urban development etc.).

The 2014 NFI Woodland Map includes all areas of Open land that create a "gap" in the woodland edge <20m wide. Surveyors must implement the new rulings as outlined.

In Figure 4- 4 below, the 2014 NFI Woodland Map included this area of Open land at the woodland edge. During field survey, the Open land was found to be bare of trees (seedlings and saplings included) so it has been re-classified as Non-NFI land and effectively removed from the NFI Woodland polygon.

Figure 4- 4: Open "gaps" at the edge of NFI Woodland

4.3 Distinguishing between Treed and Open land

Surveyors are required to break NFI land down into mappable Treed and Open Sections, and to do the same for the Non-NFI land.

4.3.1 Definition of Treed land

Treed land is defined as:

> Land with **≥20%** combined canopy cover of tree species and "shrubs acting as trees", or the potential to achieve this through maturation of the existing crop of trees (saplings and seedlings included) and "shrubs acting as trees".

> NFI tree species are listed in Chapter 8.9. Note that hawthorn and blackthorn are always regarded as trees in the NFI, whatever their form.

> A **shrub is deemed to be acting as a tree** when it displays the morphology of a tree i.e. when it has a single, self-supporting main stem at least 4cm diameter (measured at 1.3m above the ground) and a definite crown.

4.3.1.1 Orchards

Treed land **does** include both commercial and traditional orchards.

Traditional orchards are recognisable as groups of fruit or nut trees planted at low densities in permanent grassland that is grazed or cut for hay. Trees are usually of varying age structure, with an abundance of standing and fallen deadwood. Scrub may be present on unmanaged sites. Young trees and newly planted orchards managed in a low intensity way also fall into this category. See Figure 4- 5. Such sites are determined to be have a degree of 'woodland character'.

Commercial orchards are intensively managed for fruit production. They are comprised of short-lived dwarf or bush fruit trees planted at high density in permanent grassland

that is mown, usually with strips of bare herbicide-treated ground running along the tree rows. See Figure 4- 6. These sites are determined not to have woodland character.

Figure 4-5-: Traditional orchard

Figure 4-6-: Commercial orchard

4.3.1.2 Nurseries and short rotation coppice

Treed land **does** include both nursery and short rotation coppice (SRC) crops.

SRC or "Biofuel" crops usually consist of densely-planted, fast-growing, high-yielding varieties of willow (less frequently poplar). The crop is mechanically harvested every 3-5 years (either cut-and-chipped, or baled). See Figures 4- 7 and 4- 8.

Figure 4- 7- : Harvesting of poplar Biofuel crop into bales

Figure 4- 8-: Willow Biofuel crop

4.3.1.3 Christmas trees

Treed land **does** include Christmas trees crops, whether they are planted in a mixture with timber species/broadleaves, or crops grown specifically and purely as Christmas trees.

Christmas tree crops may be located within existing woodland, in a fenced-off area or beneath a powerline. Crops are traditionally Norway spruce, pine or fir. Trees are planted at 1-1.2m spacing, with regular paths allowing access for management. They are grown on a 4-10 year cycle, maintained by pruning/shearing and generally <1.8m tall.

4.3.1.4 Temporarily unstocked woodland

Treed land **does** include areas that are temporarily unstocked as a result of human intervention or natural causes, but which are expected to revert to woodland within 10 years. Examples include:

- Clearfell sites
- Windblown crops
- Failed crops
- Burnt crops
- Recently-cut coppice crops

Treed land **does** also include areas where the ground has been prepared for new planting (e.g. ploughed, mounded, scarified etc.) within the last 10 years.

4.3.1.5 Shrub land

Treed land **does** include shrubby areas that meet the 20% threshold for canopy cover of tree species and "shrubs acting as trees", as per the definition given in Chapter 4.3.1.

4.3.1.6 Thin bands of trees

Treed land **does** include thin bands of trees >1 tree wide. They are recorded as a Treed Component Group if <5m wide, being too narrow to qualify as a Section (see Chapter 4.6).

4.3.1.7 Single lines of trees and hedgerows

Treed land **does not** include hedgerows and single lines of trees. These are recorded as Linear Features in NFI. See Chapter 19.2.3.

4.3.2 Definition of Open land

Open land is defined as:

> Land with **<20%** combined canopy cover of tree species and "shrubs acting as trees", and no potential to achieve this through maturation of any existing trees (saplings and seedlings included) or "shrubs acting as trees".

> NFI tree species are listed in Chapter 8.9. Note that hawthorn and blackthorn are always regarded as trees in the NFI, whatever their form.

> A **shrub is deemed to be acting as a tree** when it displays the morphology of a tree i.e. when it has a single, self-supporting main stem at least 4cm diameter (measured at 1.3m above the ground) and a definite crown.

4.3.2.1 Definition of permanent open space

For the purposes of the NFI, we differentiate between permanent open space (which must be recorded so that it can be deducted from the NFI GB Woodland total area) and temporary open space (which must not be recorded but will be accounted for in the stocking density assessment).

Permanent open space is defined as land that will not, under existing circumstances, become woodland. Land beneath Linear Features can fall into this category (see Chapter 4.4).

Permanent open space includes:

- Areas of concrete, tarmac and other impenetrable surfaces e.g. urban land, caravan standings, sealed/unsealed roads and operational railway tracks.
- Areas of open water e.g. lakes, ponds and rivers.
- Unsurfaced rides and streams that are ≥50% unobscured by the overhead canopy from adjacent trees.
- Tree canopy gaps that will persist once the existing trees have grown to maturity.
- Shrubby areas that do **not** meet the 20% threshold for canopy cover of tree species and "shrubs acting as trees", as per the definition for Open land given above.
- Clearfell which, after 10 years, has not achieved at least 20% stocking of tree species and/or "shrubs acting as trees" through planting or natural regeneration.
- Heathland and Blanket Bog restoration sites where the intention to maintain the land in an open state is confirmed by the landowner or on-site signage.

4.3.2.2 Definition of temporary open space

Temporary open space is defined as land that is open now but will probably come under canopy cover either through colonisation or canopy spread.

Temporary open space includes:

- Tree canopy gaps that will come under canopy once the existing trees have grown to maturity.
- Unmaintained unsealed roads, unsurfaced rides and streams that are >50% obscured by the overhead canopy of adjacent trees.

4.4 Classification of land beneath Linear Features

Linear Features are linear landscape elements which surveyors are required to map as lines in the NFI (see Chapter 19). Examples include transport routes (such as roads, tracks and rides), recreational routes (such as cycle ways, disabled access routes and footpaths), water courses (canals, rivers and streams), railway tracks and overhead powerlines.

Where Linear Features pass through NFI Woodland, surveyors must implement the following rules to determine whether they are classed as permanent or temporary open space, and NFI or Non-NFI land.

Any deviation from the rules employed in creation of the 2014 NFI Woodland Map is referred to in italics.

4.4.1 Sealed routes

Sealed routes are those surfaced with tarmac or concrete. These include roads, driveways, cycle ways, disabled access routes and walkways.

The following rules apply to sealed routes located on the ground or in fly-overs above woodland. Sealed routes in tunnels beneath woodland go unrecorded.

4.4.1.1 Open space rules

a. Sealed roads and driveways are always classed as permanent open space because they are effectively unable to grow trees. This rule also applies to sealed cycle ways, disabled access routes and walkways of any width.

4.4.1.2 NFI land rules

a. Sealed roads and driveways are classed as **NFI** or **Non-NFI** land depending upon whether they are greater than 0.5 ha or not, including land outside the square as long as this is within woodland. They are always mapped as a Section. This rule also applies to sealed cycle ways, disabled access routes and walkways ≥3m wide (of an equivalent width to a road/driveway).

b. Sealed cycle ways, disabled access routes and walkways <3m wide are classed as **NFI** or **Non-NFI** land depending upon if they are greater than 0.5 ha or not. They are always recorded as a Component Group, never mapped as a Section and should not be used to divide up areas of woodland/tree cover.

c. Where a sealed feature, e.g. road or driveway, is >3m wide and splits a NFI Woodland in two, such that one part no longer conforms to the definition of NFI Woodland because it is too narrow or too small in extent, that part is also classed as **Non-NFI** land. See Figure 4- 9 and Figure 4- 10 below.

Figure 4- 9: Sealed driveway passes through NFI Woodland

Figure 4- 10: Woodland split into NFI and Non-NFI parts

In Figure 4- 10, the woodland polygon north of the driveway is still ≥0.5 Ha in extent, so it remains NFI Woodland. The woodland polygon south of the driveway is reduced to <0.5Ha in extent, so is reclassified as Non-NFI Woodland.

The 2014 NFI Woodland Map excludes sealed roads where these are visible from aerial photography, but includes sealed footpaths and cycle ways. Surveyors must implement the new rulings as outlined.

4.4.2 Unsealed routes

Unsealed ("metalled") routes are those surfaced with rubble, crushed rock, gravel or coarse chippings. These include private driveways, forest roads, farm tracks, cycle ways and walkways.

The following rules apply to unsealed routes located on the ground or in fly-overs above woodland. Unsealed routes in tunnels beneath woodland go unrecorded.

4.4.2.1 Open space rules

Distinction is made between **maintained** and **unmaintained** unsealed roads. Maintained roads are the better quality roads maintained for use by vehicles. Unmaintained roads are the minor roads that are little-used and left to nature. They are typically heavily-vegetated, but there will be evidence that the road was surfaced at one time.

a. Maintained unsealed roads and driveways are always classed as permanent open space because they are effectively unable to grow trees. This rule also applies to maintained unsealed cycle ways, disabled access routes and walkways ≥3m wide. This rule also applies to unsealed cycle ways, disabled access routes and walkways <3m wide?

b. Unmaintained unsealed roads and driveways are classed as permanent open space if **≥50%** of the area is "open to the sky" i.e. unobscured by the canopy of trees when viewed from above. Routes that are >50% obscured by tree canopy do **not** qualify as open space. This rule also applies to maintained unsealed cycle ways, disabled access routes and walkways ≥3m wide. This rule also applies to unsealed cycle ways, disabled access routes and walkways <3m wide.

4.4.2.2 NFI land rules

Distinction between NFI and Non-NFI land is based on the size of the woodland gap created by the Linear Feature and any parallel Open land.

a. NFI Woodland **does** include unsealed routes of any description, where the gap created by the unsealed route and any parallel Open land (as defined in Chapter 4.3.2) is <20m wide. See Figure 4- 11 below.

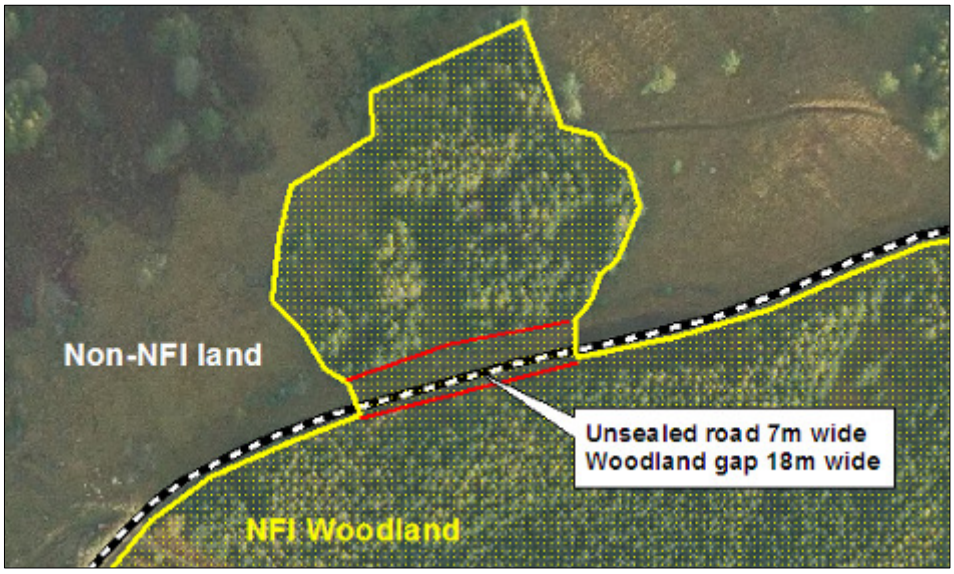


Figure 4- 11: Unsealed road passing through NFI Woodland

b. NFI Woodland does **not** include unsealed routes of any description, where the gap created by the unsealed route and any parallel Open land (as defined in Chapter 4.3.2) is ≥20m wide and >0.5ha. In such cases, the gap containing the unsealed route is classed as **Non-NFI** land.

c. NFI Woodland does **not** include unsealed roads and driveways that run along the outside edge of the woodland. See Figure 4- 10.

d. Where the width of the woodland gap created by the Linear Feature and any parallel Open land is variable, such that the gap narrows to <20m wide in some places and then expands to >20m wide elsewhere (creating "pinch points") then the area of the woodland gap is also taken into consideration, as per the rule for Open land "holes" (see Chapter 4.2.4.6).

Accordingly, NFI Woodland does **not** include unsealed routes of any description that create, or form part of, an Open land "hole" ≥20m wide and ≥0.5Ha in extent.

In such cases, the Open land "hole" containing the unsealed route is classed as **Non-NFI** land. See Figure 4- 12.

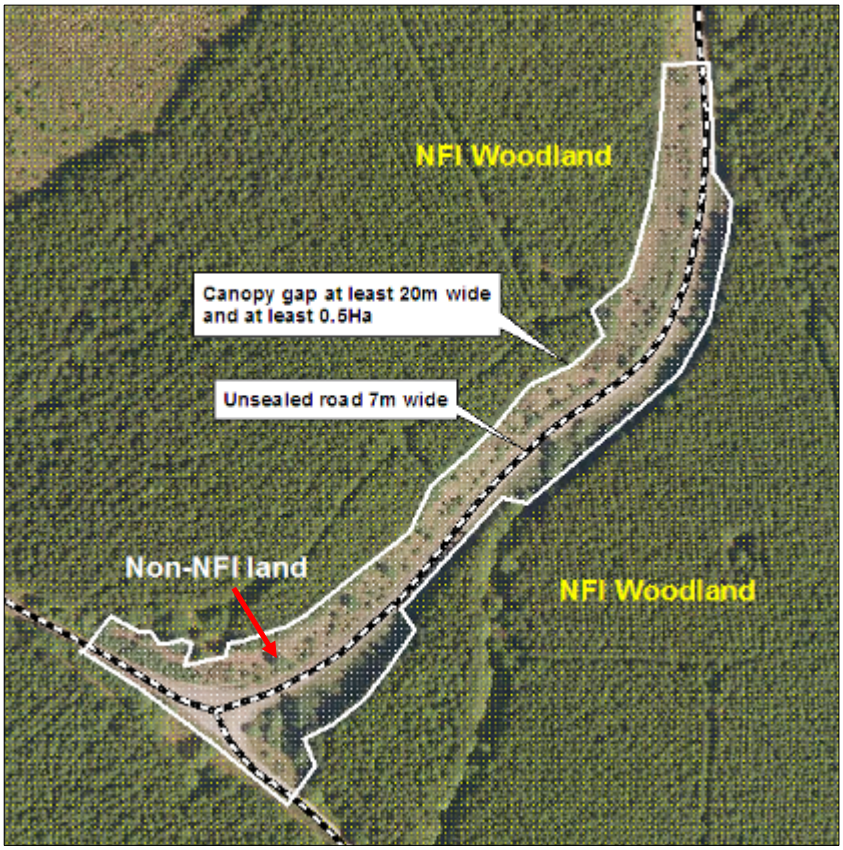


Figure 4- 12: Unsealed road within NFI Woodland

In Figure 4- 12 above, the Open land "hole" containing the maintained unsealed road is ≥20m wide and ≥ 0.5Ha in extent, therefore the "hole" is classed as Non-NFI land. Beyond this, the road cuts directly through the trees creating a 7m wide gap, which is therefore classed as NFI land.

The 2014 NFI Woodland Map excludes unsealed roads and tracks where the woodland gap is visibly ≥20m wide. Surveyors must implement the new rulings as outlined.

4.4.3 Unsurfaced routes

Unsurfaced routes are those with a natural earth and stone surface which has not been prepared for use by vehicles. These include unsurfaced tracks, rides, firebreaks, Greenways and Bridleways.

The following rules apply to unsurfaced routes located on the ground or in fly-overs above woodland. Unsurfaced routes in tunnels beneath woodland go unrecorded.

4.4.3.1 Open space rules

a. Unsurfaced routes of any description are classed as permanent open space if **≥50%** of the area is "open to the sky" i.e. unobscured by the canopy of trees when viewed from above. Routes that are >50% obscured by tree canopy do **not** qualify as open space.

4.4.3.2 NFI land rules

Unsurfaced routes that conform to the definition of permanent open space (as defined in Chapter 4.4.3.1) are subject to the same rulings as unsealed routes. See Chapter 4.4.2.2.

The 2014 NFI Woodland Map excludes unsurfaced tracks and rides where the woodland gap is visibly ≥20m wide. Surveyors must implement the new rulings as outlined.

4.4.4 Operational railway tracks and sidings

Operational railway tracks are those maintained in working order. This category covers operational railway tracks of any gauge: Standard (14.33m), Narrow (>5m), Minimum (5 -3.8m), ride-able miniature railways (6.1 -2.6m) and extremely narrow gauge (<1m).

Figure 4- 13: Miniature railway track through woodland

Funicular railways (where carriages are pulled up steep slopes by a cable) and tramways are also included here.

A siding is a short stretch of railway track connected to the main line, used for loading and unloading freight and storing engines and carriages.

The following rules apply to operational railway tracks located on the ground or in viaducts above woodland. Operational railway tracks in tunnels beneath woodland go unrecorded.

4.4.4.1 Open space rules

a. Operational railway tracks and sidings of any gauge are always classed as permanent open space because they are effectively unable to grow trees.

b. Railway embankments are classed as Treed land or Open land according to the usual criteria (see Chapters 4.3.1 and 4.3.2).

4.4.4.2 NFI land rules

a. Operational railway tracks and sidings of any gauge are classed as **NFI** or **Non-NFI** land according to the 0.5 ha rule. Those ≥3m wide are always mapped as a Section and those <3m wide are always recorded as a Component Group, never as a Section (in sync with the protocol for sealed roads.

b. Where an operational railway splits a woodland area in two, such that one part no longer conforms to the definition of NFI Woodland because it is too narrow or too small in extent (see Chapter 4.2.1), that part is also classed as **Non-NFI** land.

c. NFI Woodland **does** include railway embankments where these conform to the definition of Treed land (see Chapter 4.3.1).

The 2014 NFI Woodland Map excludes Standard gauge railways that are visible from aerial photography. Surveyors must implement the new rulings as outlined.

4.4.5 Disused railway tracks and sidings

Disused railway tracks and sidings are those where the tracks remain in place but are longer maintained in working order. Some degree of colonisation by herbaceous and woody vegetation will usually be evident.

The following rules apply to disused railway tracks located on the ground or in viaducts above woodland. Disused railway tracks in tunnels beneath woodland go unrecorded.

4.4.5.1 Open space rules

a. Disused railway tracks and sidings are classed as permanent open space if **≥50%** of the area is "open to the sky" i.e. unobscured by the canopy of trees when viewed from above. See Figure 4- 14.

Figure 4- 14: Disused railway track (Open land)

b. Disused tracks and sidings that are >50% obscured by tree canopy do **not** qualify as open space. They are absorbed into the adjacent Treed land. See Figure 4- 15 overleaf.

Figure 4- 15: Disused railway tracks (Treed land)

4.4.5.2 NFI land rules

Disused railway tracks and sidings that conform to the definition of permanent open space (as defined in Chapter 4.4.5.1) are subject to the same rulings as unsealed routes. See Chapter 4.4.2.2.

The 2014 NFI Woodland Map excludes Standard gauge railways that are visible from aerial photography. Surveyors must implement the new rulings as outlined.

4.4.6 Canals, rivers and streams

A **canal** is defined as an artificial waterway constructed for navigation or irrigation. The following rules apply to canals located on the ground or in aqueducts above woodland.

A **river** is defined as a natural watercourse ≥5m average width (bank-top to bank-top), which flows towards the sea, a lake or another river.

A **stream** is defined as a natural watercourse <5m average width.

4.4.6.1 Open space rules

a. Rivers and canals are always classed as permanent open space because they are effectively unable to grow trees.

b. Streams lined with concrete are classed as permanent open space.

c. Streams lined with natural materials are classed as permanent open space if **≥50%** of the area is "open to the sky" i.e. unobscured by the canopy of trees when viewed from above. Streams that are >50% obscured by tree canopy do **not** qualify as open space.

4.4.6.2 NFI land rules

a. Rivers and canals are subject to the same rulings as unsealed routes. See Chapter 4.4.2.2.

b. Streams that conform to the definition of permanent open space (as defined in Chapter 4.4.6.1) are subject to the same rulings as unsealed routes. See Chapter 4.4.2.2. By definition, streams are <5m wide therefore they should always be recorded as a Component Group, never mapped as a Section.

In Figure 4- 16 below, the stretch of river <20m wide is included within the NFI Woodland polygon, whereas the stretch ≥20m wide is not.

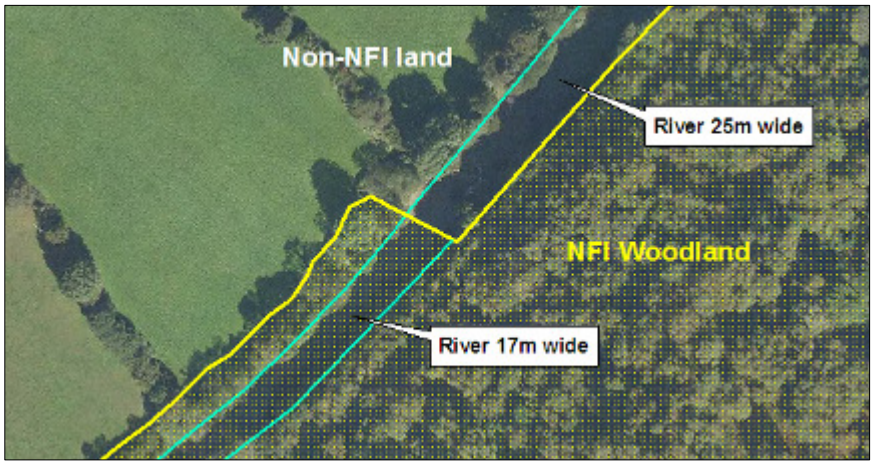


Figure 4- 16: River through NFI Woodland

The 2014 NFI Woodland Map excludes rivers and canals ≥20m wide where visible from aerial photography. Surveyors must implement the new ruling as outlined.

4.4.7 Overhead powerlines

An overhead **powerline** is an electricity line suspended by towers (pylons) or utility poles (made of wood, metal, concrete, fibreglass etc.). This category includes overhead powerlines of all voltages.

A powerline **corridor** is the strip of land running beneath and to the side of the powerline, within which a safe distance must be maintained between the overhead line and vegetation. Powerline corridors through woodland are typically 12-60m wide, depending on the voltage of the line.

4.4.7.1 Open space rules

a. Powerline corridors are classed as permanent open space where there are no trees beneath, or where the trees beneath are managed to remain clear of the powerline.

b. Powerline corridors are **not** classed as permanent open space where the trees beneath do **not** require management to remain clear of the powerline. For example, Christmas tree crops planted beneath high voltage powerlines, or where a powerline crosses a wooded gorge.

4.4.7.2 NFI land rules

a. Powerline corridors that conform to the definition of permanent open space (as defined in Chapter 4.4.7.1) are subject to the same rulings as unsealed routes (see Chapter 4.4.2.2).

   In Figure 4- 17 overleaf, the powerline corridor varies in width as it passes through the NFI Woodland, narrowing to <20m in places and expanding to >20m wide elsewhere (creating "pinch points"). The stretch that is <20m wide is classed as NFI land. Where it expands to ≥20m wide, the Open land "holes" created are <0.5Ha in extent therefore they remain NFI land. If the "holes" had been ≥0.5Ha in extent, they would have been classed as Non-NFI land.

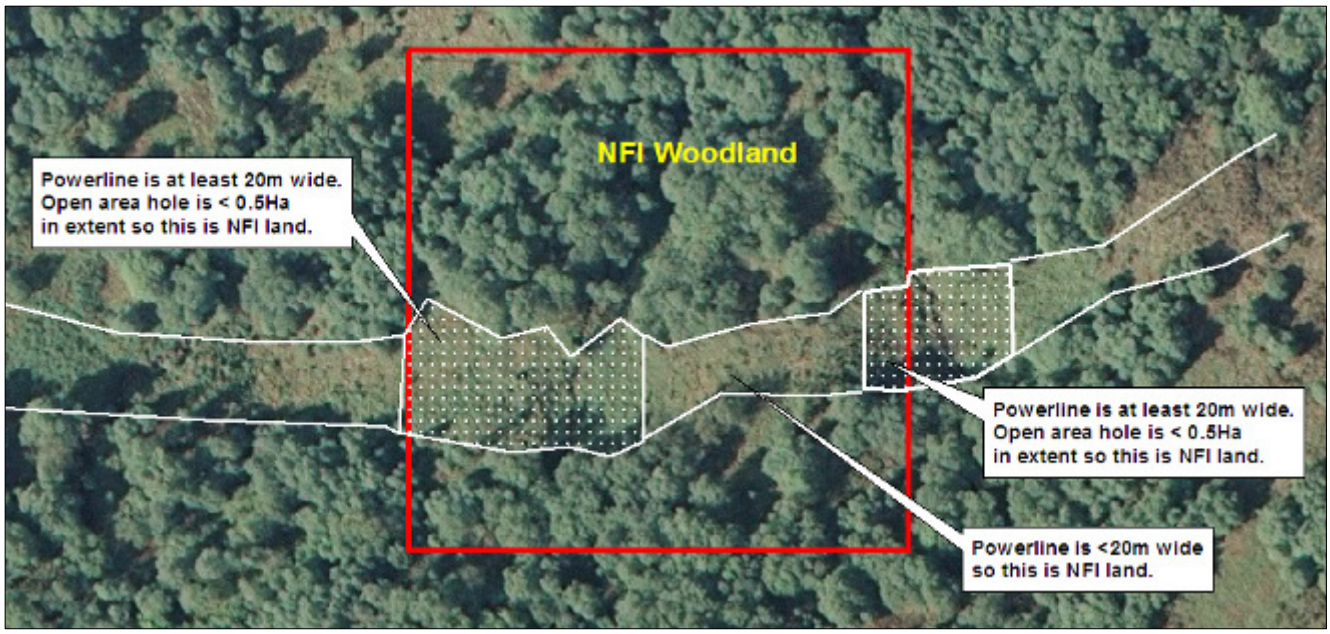


Figure 4- 17: Powerline through NFI Woodland

The 2014 NFI Woodland Map excludes overhead powerlines ≥20m wide where visible from aerial photography. Surveyors must implement the new ruling as outlined.

4.5 NFI Woodland mapping rules

Surveyors must implement the following rules to ensure that NFI Woodland is correctly identified and accurately mapped within the Sample Square.

4.5.1 NFI Woodland external boundary

The following rules relate to placement of the NFI Woodland edge in relation to hard features on the ground that may or not be depicted on the Ordnance Survey (OS) 10k Map GIS layer.

a. Where the true woodland edge is exactly coincident with a hard feature on the ground (such as a fence, wall, ditch etc.) then the hard feature is taken as the NFI Woodland boundary. Where the hard feature is depicted on the OS 10k Map GIS layer, surveyors must check the accuracy of the OS mapping, and then either trace along the OS detail or map the woodland boundary in freehand, as appropriate.

b. Where the true woodland edge is set **back** from a hard feature on the ground by **<5m** (measured to the outside face of the tree stems) then the hard feature is taken as the NFI Woodland boundary i.e. the intervening strip of Open land is included within the NFI Woodland (but may need to be classed as a separate Component Group).

c. Where the true woodland edge is set **back** from a hard feature on the ground by **≥5m** (measured to the outside face of the tree stems) then the true woodland edge is taken as the NFI Woodland boundary. This should be mapped in freehand, taking the boundary to the outside face of the tree stems.

d. Where the true woodland edge **overlaps** a hard feature on the ground then the true woodland edge is always taken as the NFI Woodland boundary. This should be mapped in freehand, taking the boundary to the outside face of the tree stems.

e. Do **not** extend the NFI Woodland boundary across a hard feature on the ground to take in single trees.

4.5.1.1 2014 NFI Woodland Map rules

For comparison, these are the mapping rules employed in creation of the 2014 NFI Woodland Map. Ordnance Survey MasterMap (OSMM) features were used as woodland boundaries because of the better fit with the agricultural "Integrated Administration and Control System" (IACS) and equivalents within Scotland and Wales. Where the MasterMap boundary was coincident with the woodland boundary on the aerial image, or within 10 meters of the perceived edge, then the MasterMap boundary was followed.

The figure below shows the woodland boundary is within 10m of an existing MasterMap® line. In this example, the boundary **was** snapped to the MasterMap® line.

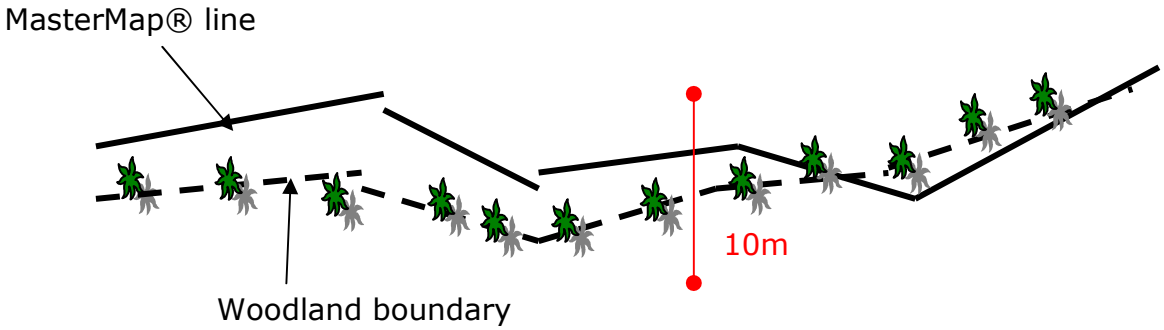


Figure 4- 18: 2014 NFI Woodland Mapping rule - OSMM parallel and within 10m of woodland edge

Where the OSMM line deviated by >10m from the perceived woodland edge on the aerial image, the perceived woodland edge was mapped along the tree stems, not along the edge of the canopy (drip line).

The woodland boundary is >10m and/or crosses over the line in such a way as to give a completely different shape from the MasterMap® line therefore the woodland boundary is not snapped to MasterMap®

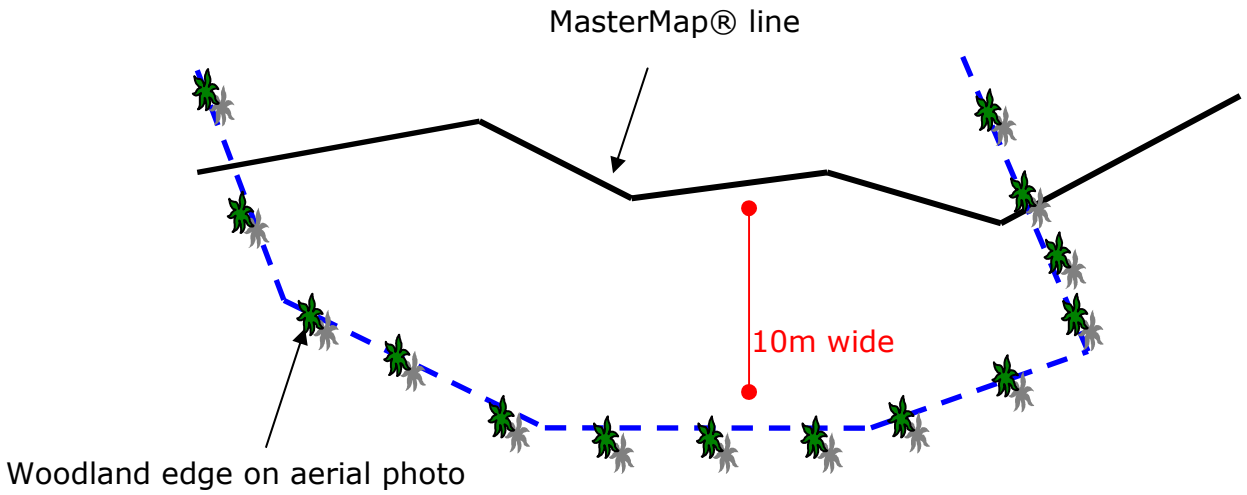


Figure 4- 19: 2014 NFI Woodland Mapping rule - OSMM not parallel and/or within 10m of woodland edge

This resulted in some trees and thin bands being ignored. Single trees outside the woodland boundary are covered in the "Small Woodlands" Survey.

4.5.2 NFI Woodland protrusions

NFI Woodland by definition must be at least 20m wide. However, stubby protrusions <20m wide and <20m long are considered to be part of the NFI Woodland and so are mapped as such.

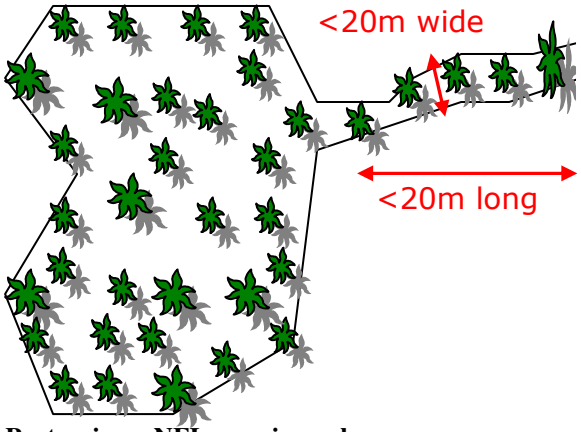


Figure 4- 20: Woodland Protrusions: NFI mapping rule

Where the NFI Woodland protrusion is <20m wide for ≥20m, it is chopped off along the dashed blue line at the point at which it narrows to <20m. The chopped off part is classed as Non-NFI Woodland.

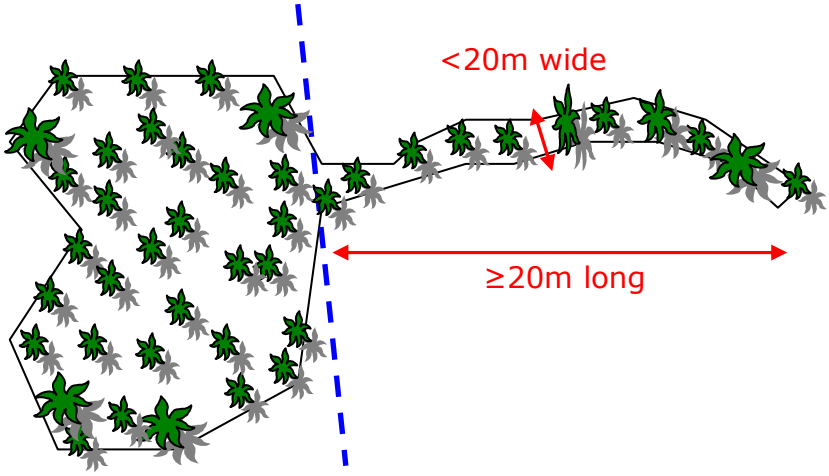


Figure 4- 21: Mapping rule for NFI Woodland protrusion <20m width and ≥20m long

NFI Woodland corners are **not** chopped off where they narrow to <20 wide.

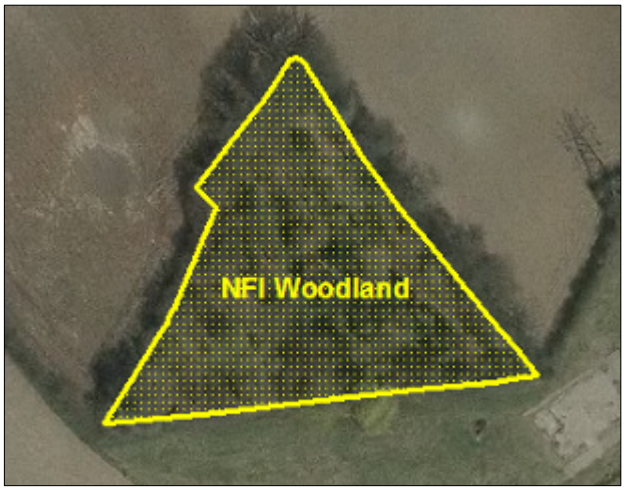


Figure 4- 22: NFI woodland corners – mapping rule

4.5.3 Connecting bridges ("necks") between woodlands

The minimum width for woodland is 20m, although where woodlands are connected by a narrow neck of woodland less than 20m wide, the wooded bridge may be included as part of the woodland area if less than 20m in length.

For example: Where a small, continuous section or narrow neck of woodland is connected to two NFI Treed areas (giving a shape akin to an hourglass):

Bridge <20m wide for <20m = then capture as part of the woodland area.

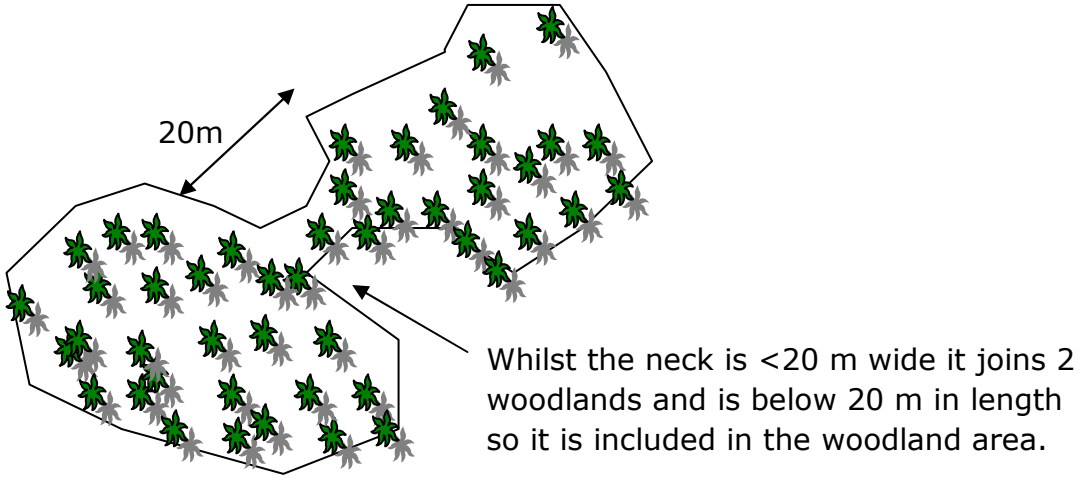


Figure 4- 23: Woodland neck connecting two NFI Woodlands

Whilst small area of woodland (excluding the bridge) must be ≥20m wide they can be less than 0.5ha. When connected together the entire area must be ≥0.5ha for the woodland to be considered NFI.

4.6 Minimum Section Size

A Section must be comprised of either:

a) A single polygon at least 0.05Ha in extent, or
b) Two or more separate but identical polygons ("multi-parts"), each at least 0.01Ha in extent and which sum to at least 0.05Ha.

Sections and individual multi-parts must be at least 5m average width, although an exception is made for certain Non NFI Open Sections.

Non-NFI land should always be mapped separately to NFI land where possible. To facilitate this, the minimum size for a Non-NFI Section is 0.01Ha where the remainder of the square is NFI land. For example, if a Non-NFI tarmacadam road runs the entire length of the Square, but the road margin extends only 1m into the Square, and the remainder of the Square is NFI woodland, then the Non-NFI polygon should be mapped out as a separate Section, even though only 0.01Ha in extent.

Normal rules apply to situations where the total extent of NFI land within the Square is <0.05Ha i.e. the NFI land must not be mapped out as a separate Section (but can instead be recorded as an NFI "Component Group" within the adjacent Non-NFI Section, as outlined below).

Always double-check that each of the mapped Sections is at least 0.05Ha in extent (exceptionally 0.01Ha for certain Non-NFI Sections). The software will automatically calculate Section area but does not alert surveyors when the area is <0.05Ha. Squares containing Sections less than the minimum permitted size will automatically **fail** Quality Assurance Assessment and be returned for re-survey.

Homogenous areas too small to map as discrete or multi-part Sections should be identified as "Component Groups" and included in either the most similar adjacent section or the largest adjacent Section if no adjacent section is similar. For example a small area of oak adjacent to a section of Sitka spruce and a section of Douglas fir. Neither adjacent section is similar so the oak is included in the larger section. See Chapter 7.0 for a fuller discussion of Component Groups.

4.7 Summary of Sectioning Procedure

At every Sample Square, surveyors must first distinguish NFI land from Non-NFI land and map these areas separately to one another where minimum Section size rules allow. Surveyors must then divide the NFI land down into Treed and Open Sections, and do the same for the Non-NFI land.

1. Distinguish NFI land from Non-NFI land (see Chapter 4.2 Distinguishing between NFI and Non-NFI Land)

2. Map NFI land separately to Non-NFI land where minimum Section size rules allow (see Chapter 4.5 Minimum Section Size).

3. Break the NFI land down into Treed and Open areas (see Chapter 4.3 Distinguishing between Treed and Open areas)

4. Map NFI Treed areas separately to NFI Open areas where minimum Section size rules allow (see Chapter 4.6 Minimum Section Size).

5. Break the Non-NFI land down into Treed and Open areas (see Chapter 4.3 Distinguishing between Treed and Open areas).

6. Map Non-NFI Treed areas separately to Non-NFI Open areas where minimum Section size rules allow (see Chapter 4.6 Minimum Section Size).

7. Lump areas too small to be a separate Section with their like i.e. Treed with Treed, Open with Open. Where possible, combine into a multi-part Section to give the maximum spatial data.

4.8 Section Boundaries

4.8.1 Boundary lines

There are three methods, described in priority order, for determining where the boundary line should be drawn within the Square when creating Sections:

1. Where landuse or habitat changes, e.g. at the interface with non-woodland areas
2. The "drip line" (or the potential drip line when a young crop matures)
3. Sphere of Influence

4.8.1.1 Square boundary

This is an artificial boundary imposed by the sampling methodology and does not take into account any land features, only geographical location. In nearly all Sample Squares the Square boundary will divide Sections arbitrarily. When carrying out Mensuration plot work within a Section and a circular plot crosses the Square boundary line, all the area of the plot that would have been in the Section had the Square boundary not existed is assessed.

4.8.1.2 Landuse changes: the interface with/between land that is non-woodland

Where the tree canopy extends over an area that could not support trees (e.g. open water, a road, a quarry etc.), the boundary of that non-woodland area is taken as the Section boundary. This rule takes precedence over the drip line and it is generally a more objective boundary than interpreting the drip line boundary. It is not subject to change over time to the same extent as the drip line. The branches of the treed Section do not determine that the open water or road below it is a forest as it is not the PRINCIPLE landuse; the open water or road is the predominant landuse.

Where Landuses overlap

Where a non-treed area is overlapped by another non-treed area

- Permanent non-treed areas take precedence over temporary non-treed areas:
    - E.g. where a tarmacadam/metalled road, or railway, and a powerline cross, the tarmacadam road is mapped and the powerline is therefore truncated

by the road. Note that a Linear Feature for the entire length of both the road and the powerline individually, still need to be mapped.

- A powerline crosses a river: the river takes precedence
- A wayleave crosses agricultural land: the agricultural land takes precedence but the wayleave is still mapped as a Linear Feature.
- Where there are two Permanent or Temporary Landuses (e.g. a road crossing over a railway) map the uppermost Landuse.
- A powerline over a minor road (unsealed) or ride where the ground vegetation is actively managed for the powerline – the powerline takes precedence. If in doubt about the active ground management then the powerline will take precedence.
- Tarmacadam/metalled road, or railway, over a river/ride: road/railway takes precedence.
- Where a treed area is overlapped by a non-treed area:
    - Road/railway: a flyover above a Christmas tree crop – the road/railway takes precedence.

<u>Powerlines:</u>

- A powerline through a wooded gorge where the trees are not affected by the powerline then the woodland takes precedence.
- A powerline where a wayleave is cut through NFI areas (the ground vegetation actively managed to prevent tree growth) the powerline takes precedence.
- A powerline over a Christmas tree plantation: Christmas tree area takes precedence.

4.8.1.3 Drip line

To establish a treed Section boundary in the vast majority of cases the drip line (of the uppermost storey) will be used. The drip line is the furthest tip of the widest branch in the crown; the last point from which the tree can drip if wet.

- **If two treed sections have drip lines that cross over each other use the centre line of the cross over.**

An area of ambiguity is where to locate a drip line boundary for a young crop. In this instance the Section boundary is located where the surveyor thinks the drip line will be upon maturity of that crop. For example if a young crop is planted on ground prepared for planting it makes sense for the Section to contain the entire area prepared for planting rather than trying to map to the drip line of newly planted or young trees.

Surveyors have to be careful not to mistake areas deliberately left unplanted and which would be classed as Open for areas the drip line may extend to. Using a planted area next to a road as an example, surveyors may find a 10m strip left open (no trees planted) between the planted site and the forest road. This strip may be to encourage greater biodiversity of flora and fauna and even when the crop matures it will be obvious that this is an open strip.

4.8.1.4 Sphere of influence

This is probably the least likely method to create a Section boundary as it is the least likely situation to occur, especially in production forests. However, it holds greater importance in many respects as we wish to know about how tree storeys influence the land around them. It is more subjective than the other methods and harder to implement correctly.

In some crops, seed tree stands for example; the upper storey is sparse but still exerts an influence over the storeys below it.

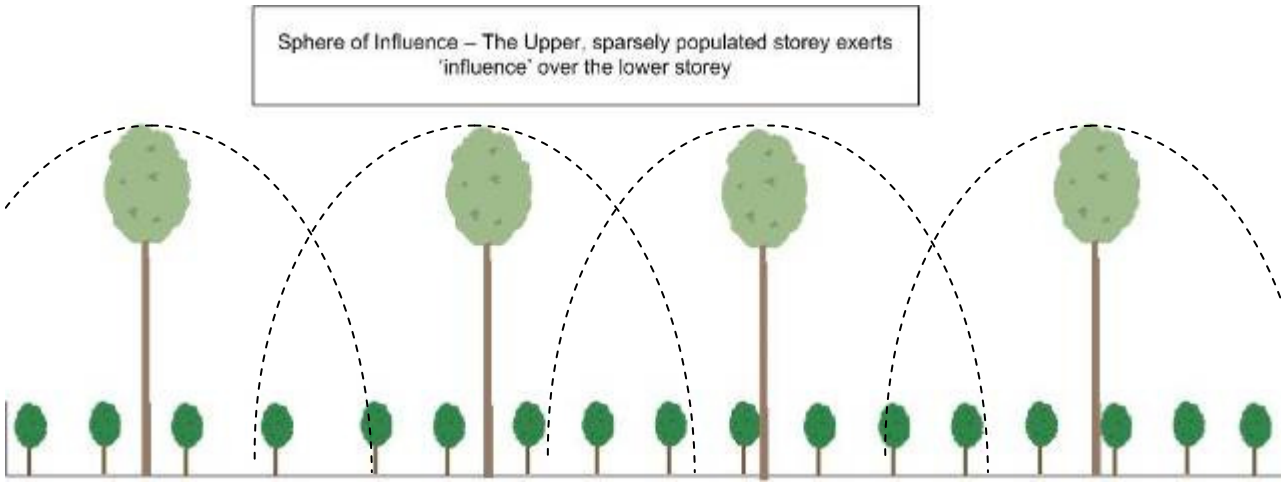


Figure 4- 24: Sphere of Influence.

In Figure 4 - 24 the sparse upper storey is exerting an influence over the lower storey, such that the 2 storeys are working together as a Component Group, and this is of sectionable size. The drip line of the lower storey is used to determine the Section boundary.

The dotted lines denote one tree length, a useful rule of thumb when assessing the Sphere of Influence exerted by this storey.

Surveyors must consider the Sphere of Influence of the uppermost canopy, in that how far does, and can, a sparsely occupied upper canopy hold claim to a lower storey, before we declare it is too far away from the lower canopy trees and is in a different section? Generally the rule here is one tree length from the nearest uppermost canopy tree.

In exceptional circumstances this distance can be extended if the surveyor decides that the upper canopy trees, even though sparse and more than one tree length away are still having an impact upon the lower storey, enough to influence the growth of the lower storey. An example of this would be:

- Light competition
- Shelter
- Microclimate (humidity, gaseous composition)
- Physical protection from predation
- Proximity to next upper storey tree or trees

In these instances longer than one tree length distance may be appropriate. Ultimately this is a more subjective assessment than drip line or landuse changes.

4.8.2 Multiple storeys and silvicultural systems

Where there are multiple storeys of trees occupying one area of land the drip line rules can become more complicated to implement. It is then necessary for the surveyor to determine the extent over which the storeys are working together as a Component Group and specifically over how far the uppermost storey extends its influence.

The extent of the Component Group is determined by the maximum extent of the storeys within it. If the Component Group is large enough to be a Section, then a Section boundary must be drawn in.

The following scenarios will help to clarify the rules.

In Figure 4 - 25 the upper and lower storeys are working together as a Component Group of sectionable size. The drip line of the upper storey is used to determine the Section boundary.

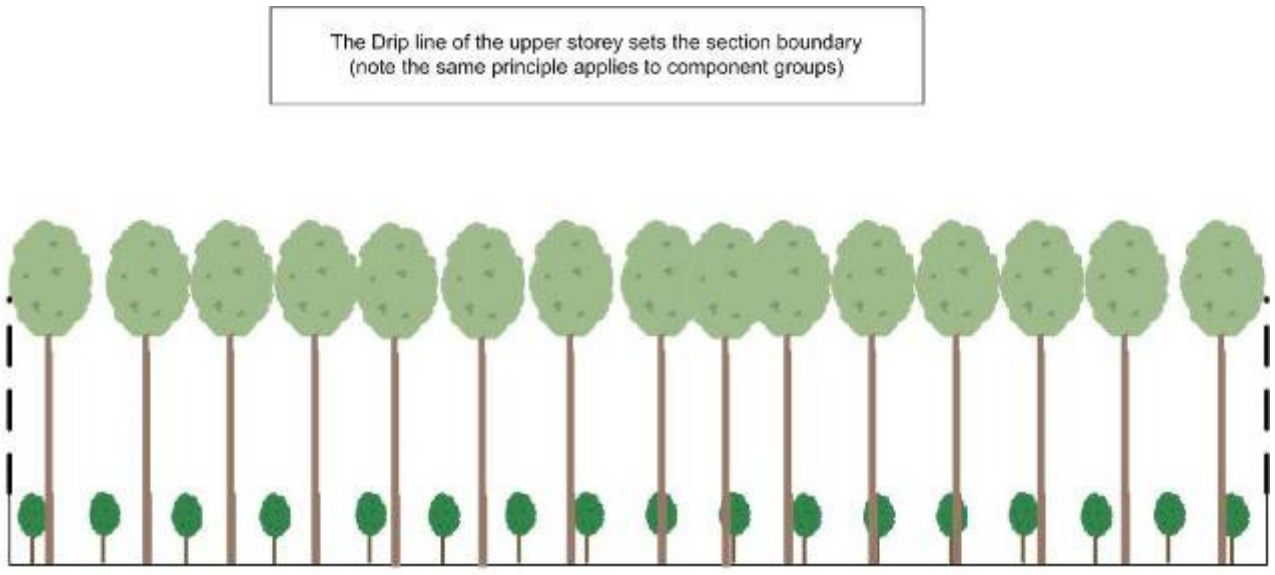


Figure 4- 25: Drip line of the upper storey is used to determine the Section boundary

In Figure 4 - 25 the upper storey is exerting an influence over the lower storey, such that the 2 storeys are working together as a Component Group, and this is of sectionable size. The drip line of the upper storey is used to determine the Section boundary.

In Figure 4 - 26 the clustered upper storey is exerting an influence over the lower storey, such that the 2 storeys are working together as a Component Group, and this is of sectionable size. The combination of the drip lines of the two stories sets the section boundaries.

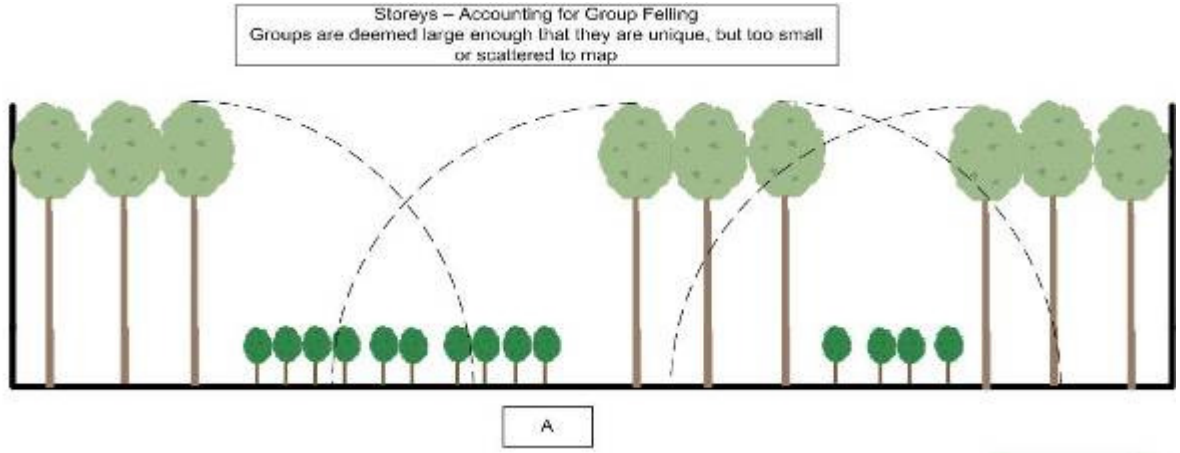


Figure 4- 26: A single Component Group across the Section.

The upper storey can be said to be extending its influence (the dotted curves) over the lower storey.

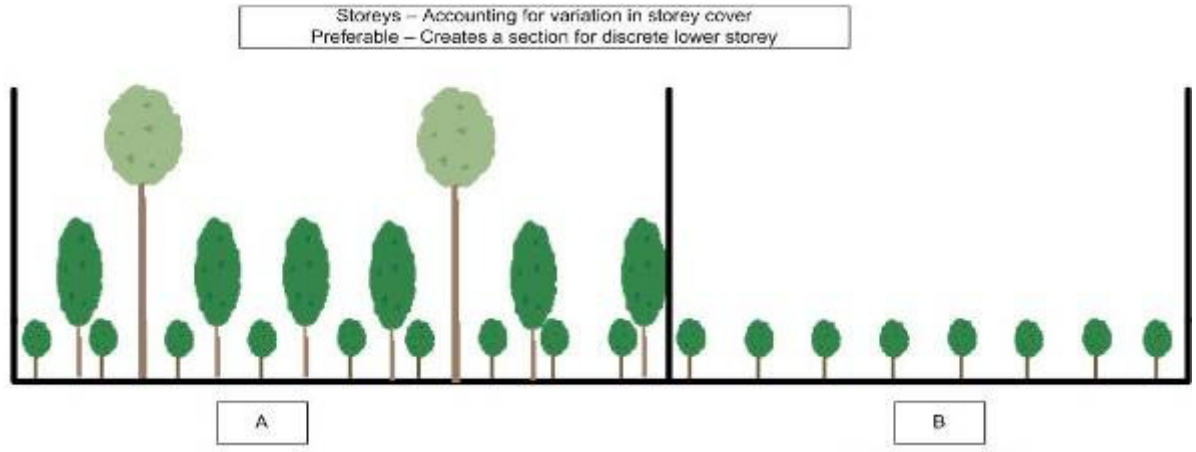


Figure 4- 27: Section border locations

In Figure 4 - 27 the upper, middle and lower storeys to the left are working together as a Component Group of sectionable size (A) to produce a section of unique character. The single-storied area is determined not to under the influence of the upper canopy and to have its own unique character and is of sectionable size (B). The drip line of the lower storey on the left hand side of Section A is used to determine the Section boundary on

that side and the middle storey of the section is used to determine the section boundary on the right hand side.

Section/Component Group Boundary examples for:

1. Treed area abutting non-treed areas:

    a. Agriculture:

        i. Fence/wall – boundary follows fence/wall line
        ii. Unfenced – boundary follows tree stem line (face of), this takes into account the field margin which is part of the agricultural habitat.
        iii. Ditch/Woodbank - boundary follows ditch/Woodbank on the agricultural side.

    b. Roads, tracks and rides (sealed and unsealed) – to face of tree stems UNLESS where the road, track or ride has associated with it a:

        i. Fence/wall/hedge – map to fence/wall/hedge
        ii. Ditch – map to centre of ditch
        iii. Non-treed verge:

            1. If ≥5m wide on average and ≥0.05ha, map verge as a separate Section using the road edge/centre of ditch, as appropriate (ditch takes precedence over road edge), as the roadside boundary

            2. If the verge is too small to section separately, include as a Component Group of the road and map as appropriate to fence/wall/hedge/field/face of tree stems etc.

    c. Railway lines – Map to associated fence/wall where applicable

    d. Water bodies (rivers/open water):

        i. Where trees grow down to the waters' edge map to the waters' edge otherwise:

        ii. map to the bank top, or the waters' edge where there is no bank top, UNLESS the water body has associated with it a:

1. Fence/wall/hedge - map to fence/wall/hedge

e. Quarries – where there is a fence/wall associated with the quarry, map to this boundary otherwise map to edge of excavation.

f. Wayleaves - map to face of stems of treed sections and/or edge of non-treed sections where these abut the wayleave. Wayleaves should have parallel borders following powerlines, gas lines etc.

g. Glade – map to face of stems.

2. Treed area abutting Treed areas:

a. If two treed sections have drip lines that cross over each other use the centre line of the cross over.

4.9 Re-measure Square Assessments

In a Re-measure Square Assessment, the original NFI 1st Cycle Section mapping is supplied to the surveyor for verification or amendment, as appropriate.

Surveyors must alter any Section boundaries if they observe that they do not reflect what is on the ground and are outwith tolerances (see chapters 5, 6 and 7). This will sometimes be necessary as the Section boundaries provided will have changed on the ground due to events such as felling or they may have been based on less accurate historical aerial photography. As the Sectioning provided was assessed roughly 5 years earlier and real change may have occurred since then, you must consider where real change will have occurred. For example clearfelling occurs at a rate of roughly 1% of total forest area per year, so over 5 years we would expect 5% of the squares to reflect new felling. In turn, a similar area of felled land will be restocked between survey cycles. The 'Variations for Second Cycle' sections at the end of chapters 5, 6 and 7 set out what to look out for when assessing a Re-measure square and how to classify and record what you observe.

4.9.1 External Section boundaries

These should only be changed in exceptional circumstances, where the designated tolerances are exceeded, for example:

- >10m difference between what is observed on the ground and the 2014 NFI Woodland Map Boundary.
- <20% tree canopy cover or ability to achieve this from the trees currently on site (based upon the NFI definition of woodland).
- Where the 2014 NFI Woodland Map has identified shrubs or other land cover as trees in error.

The 'Variations for Second Cycle' sections at the end of chapters 5, 6 and 7 set out what to look out for when assessing a Re-measure square and how to classify and record what you observe.

4.9.2 Internal Section boundaries

There can be a degree of subjectivity in setting these where there are no clear boundaries on the ground or if the GPS readings or aerial photography give different baselines between the two surveys. If differences are observed, unless there is strong evidence of actual change, a tolerance of **10m** or **10% of section area** compared to the previous surveyor is acceptable.

The 'Variations for Second Cycle' sections at the end of chapters 5, 6 and 7 set out what to look out for when assessing a Re-measure square and how to classify and record what you observe.