

TreE PlaNat



Woodland creation: monitoring natural processes and hybrid approaches



Introduction

Creating new woodlands via natural processes or hybrid methods that combine planting and natural processes can be a great way to support nature recovery and reduce resource use (e.g. reduced need for nursery tree production, tree protection etc).

However, the process is highly variable and keeping an eye on how things are going will help to ensure the woodland is developing as you intended.

The method described here allows land managers, volunteers or any other interested parties to survey sites to collect robust data on the progress of natural processes regardless of experience level. The method is flexible to fit the surveyors' objectives and allows for comparisons over time providing it is carried out the same way at each time point.

What to look for

What you survey may vary slightly depending on your objective(s), but generally you'll be looking for:



Tree & shrub species (count & ID)



Signs of natural processes (regeneration or colonisation) occurring



Herbivore damage

Planning for your survey

Rationale

The surveys should be completed with a clear rationale or objective behind them, which will then inform how surveys are undertaken. Examples might include:

- You are prioritising nature recovery to support a variety of species in your new woodland. You're either planning to or are currently testing an intervention (e.g. cattle grazing) to support this, and you'd like to know if things are going in the right direction.
- You are registered with the Woodland Carbon Code, and you want to understand if you are on track for delivering your Woodland Carbon Units. Projects like this will be verified externally, but you may want to be sure things are going in the right direction.
- You are concerned about herbivore pressure or disease presence near your site and how this may affect your growing woodland.

Timing

Surveys should generally be undertaken when trees, shrubs and other vegetation are in leaf, as this will make species identification easier. If you are repeating your survey over multiple years, try to undertake the survey at the same time of year so that data is as comparable as possible.

Make sure to take note of any interventions or management activities that have been carried out in the growing woodland that may affect the consistency of the results.

Sampling/route

Your 'seed source' is the main area of woodland habitat that you are expecting trees and shrub to spread from, via seed dispersal or suckering. Measure the length of this seed source. Sometimes this will be complicated by having other woodland patches or individual trees around the site, but try to decide on and work from the source you think will be most influential.

Separate your site into three zones (see Figure 1):

- Adjacent: 0 – 10 metres from the main seed source
- Near: 10m – 75-100m (or the max grant distance, if applicable) from the main seed source
- Far: beyond the furthest edge of the 'Near' zone

Calculate the number of plots required by working out 5% of the area of the 'adjacent' zone. The data collection spreadsheet is provided for you to calculate this using the length of your seed source. For example, if your seed source is 320 m long, then the total area of the adjacent zone will be 3200 m². To cover 5% (160 m²) of this area you'd need 5 plots of 32 m² (use a circular plot with a 3.19 m radius or a 5.66m x 5.66 square plot to achieve this). You should then match this survey area in the other two zones, so 15 plots overall for the site in this example (see Figure 1).

The spreadsheet allows you adjust how much of the area you want to cover (we recommend 5% minimum for a robust sample), and how many plots you are able to do per zone. For example, if you have a very large site, you may prefer to do fewer, large plots, as opposed to many smaller ones.

Within each zone, you can use a 'Z-walk', or 'W-walk' transect to help to randomise where you locate your plots (see Figure 1).

If your site has many varying habitat types which you think might have an effect on woodland establishment, try to incorporate these into your plots.

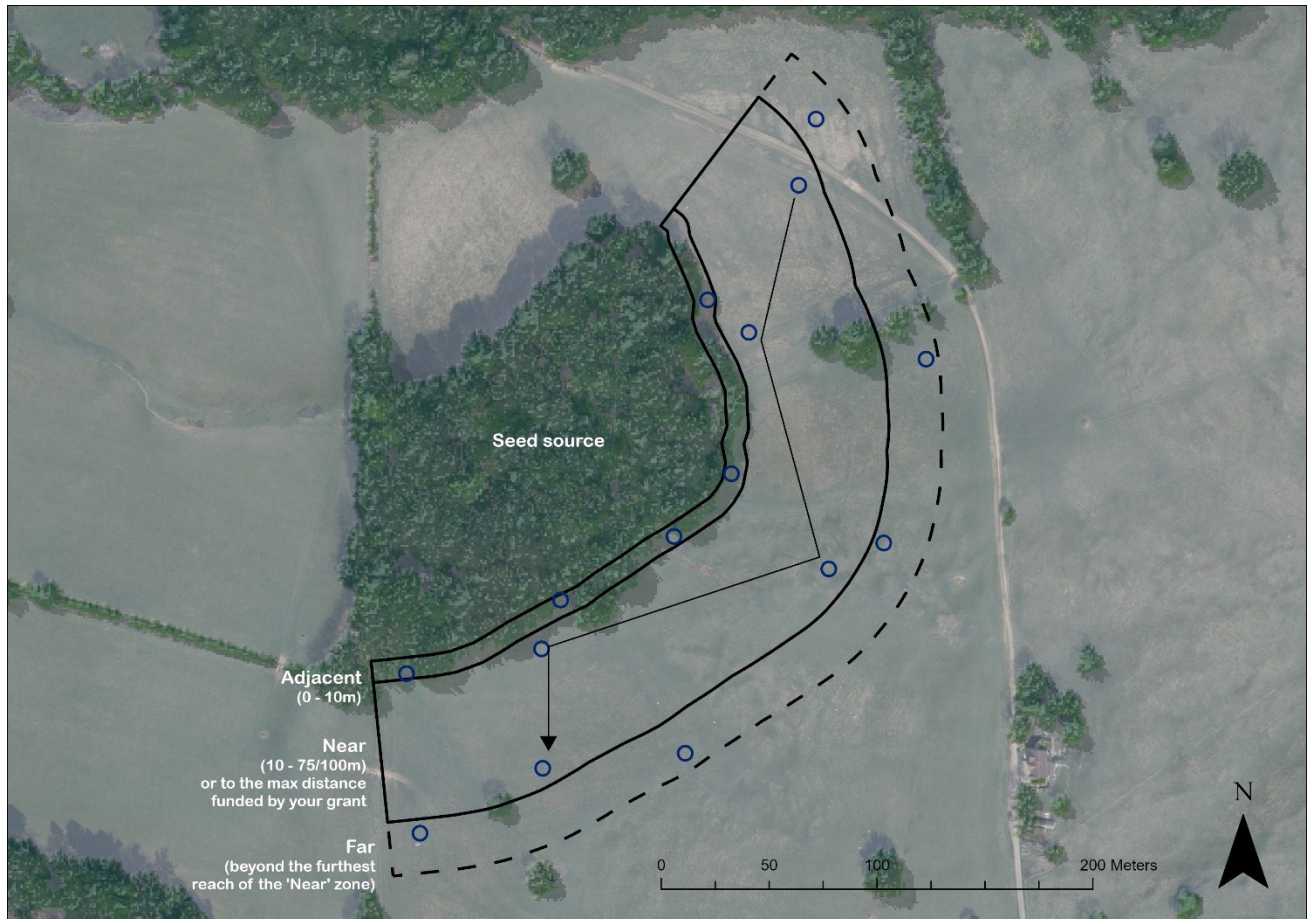


Figure 1. An example of how to set up the three zones from the main seed source. The arrow in the 'near' zone illustrates a W-walk – how you might move through each zone to randomly locate your plots.

Equipment

- GPS to record plot locations (or what3words)
- Tablet to access the data collection sheet (or printed versions of this)
- Tape measure and/or string or rope
- Stake(s)/bamboo stick(s), to mark the zones and the centre of plots. Coloured flags or tape at the top of these can help with location, especially when vegetation growth is vigorous.
- Camera or phone for photos




Completing the survey

At each plot location, measure out the plot size, and then record the indicators which are most relevant to you. What you measure should vary depending on the age of your site.

There are a few things we think are essential measurements to understand whether or not your site is developing towards being a woodland. Depending on your objectives, there are also optional things you could measure if you have the time and resources. Links to methodologies for measuring these are provided in the next section

Take a photo of each zone from the same location each time you survey. Photos of each plot can also be useful.

Table 1. Suggestions for indicators to measure at each stage of woodland development.

Year	Essential	Optional
0-5 	Tree/shrub <ul style="list-style-type: none"> ▪ ID – species ▪ Count - by species ▪ Stage – seedling (<50cm tall), sapling (>50cm, <150cm tall) Herbivory presence - % of seedlings/saplings in the plot with evidence of browsing	UK Habitat Classification *
10-20 	All measures above, + any optional indicators (see right hand column) Tree/shrub age distribution – by species, count within the following categories: seedling, sapling, mature, veteran, ancient *^&	Horizontal complexity * (see Appendix) Diameter at breast height (DBH) \$& Disease presence - % of the plot with trees/shrubs affected ^
20+ 	Decaying wood presence - % of the plot with decaying wood *	Herbivore damage via Herbivore Impact Assessment (HIA) or alternative ^

Objectives key

* Nature recovery

§ Wood products

& Carbon sequestration

^ Resilience

Links to methodologies for optional indicators:

UK Hab Classification - <https://www.ukhab.org/>

Tree & shrub age distribution - <https://www.woodlandtrust.org.uk/blog/2019/06/tree-lifecycle/> & <https://www.woodlandtrust.org.uk/publications/2025/03/recognising-ancient-veteran-trees/>

Horizontal complexity – see Appendix

Diameter at Breast Height (DBH) - <https://ati.woodlandtrust.org.uk/how-to-record/recording-guide/how-to-record-the-girth-of-a-tree/>

Pest or disease presence – Observatree <https://www.observatree.org.uk/> will help you to ID common pests and diseases. We recommend adding a ‘disease severity’ and/or ‘pest severity’ indicator to the ‘Data input’ tab on the spreadsheet and recording how much each tree/shrub is effected by the issue of interest e.g. (no effect, 1 - <25% tree affected, 2 – 25-75% of tree affected, 3 – over 75% of the tree affected).

Herbivore damage – Deer HIA: <https://bestpracticeguides.org.uk/impacts/training-whia-lite/>

Recording form

The survey results can be collected on the recording sheet found in the accompanying Excel document [**Natural_processes_data_collection_spreadsheet.xlsx**]. The first tab of this document explains in detail how to use this accurately to record your data and view your results.

Interpreting the results

Here we outline how you might interpret just a few of the indicators you could be measuring (the early stage 'essential' indicators). Please refer to the external guidance links for instructions on how to measure and interpret other optional indicators.

Species and age diversity

Research to date has suggested that generally there are four possible trajectories that sites might go on when relying mainly on natural processes:

- 1) Very few trees & shrubs
- 2) Unpalatable vegetation (e.g. bramble, bracken) dominates
- 3) A single tree or shrub species (e.g. blackthorn, hawthorn or willow) dominates
- 4) Woodland community similar to the seed source woodland established

The fourth trajectory is obviously generally what you will be hoping and aiming for, but bear in mind that natural processes just take a bit longer to develop and go through several stages of succession. Early pioneer (willow, birch) or more hardy thorny species (blackthorn, hawthorn) may dominate early on, but given time other species are likely to establish.

However, if you are seeing very few trees and shrubs in all zones after 5-10 years, or a single or limited number of species are still dominating, then your survey results can inform supplementary planting of species that are struggling to establish but that you think should be there. You could even consider seed collection from seed source and scattering this around your creation area (be a jay!).

In terms of the age diversity (the range of ages of trees and shrubs) in the colonising woodland you're ideally looking for a varied mix. In the summary sheet in the spreadsheet this will look like a good balance of percentages across all categories. Lots of seedlings show good evidence for colonisation and regeneration but try and work out if these are maturing to become saplings, young trees, mature trees and so on.

We would expect fewer total counts in each category as the woodland ages but check if only one or two species are making it past the seedling stage. If this is the case, you could consider adding protection for individual saplings for tree species that are struggling to establish or are highly browsed (e.g. add tree guards around oak saplings).

Tree and shrub density

Generally speaking, aim for minimum density of 100 trees/shrubs per hectare across the site by year 5. This will equate to the minimum canopy cover requirements (to be defined as a woodland) of 20%.

Very low densities (below 100 trees or shrubs/ha) indicate poor establishment. Try and unpick the reason for this – it may be related to other things you're measuring e.g. high herbivore impact. If this is the case, consider tree protection or deer management strategies if these aren't already in place.

High densities are generally a good thing, illustrating that woodland cover is establishing. However in some cases it can be related to a single or small number of species dominating (see above). If this is

the case, you could consider selective thinning to favour rarer species, or supplementary planting of other target species.

If densities vary a lot between zones, this is generally a positive thing, especially if nature recovery is a main aim for you. Structural diversity is beneficial for biodiversity, so if your site is dense in some areas and more open than others, this is providing a number of niches for different species.

Densities will also vary by distance from the seed source, so don't worry if not many seedlings or saplings are observed beyond 75-100m (the 'Far' zone). Even within the 'Adjacent' and 'Near' zones, densities likely to be higher closer to the seed source and then reduce with increasing distance from it.

Herbivore impact

Average scores of 2 or more are likely to be an issue for woodland establishment and ongoing health of the ecosystem. If herbivore control is not already in place (e.g. tree protection, deer or stock fencing, deer management), then consider implementing this.

Variables

It is important to consider all the possible variables when analysing the data from these surveys. Results may be affected by things like different soil types or aspect (e.g. a predominantly north or south facing site). Care should be taken to ensure that data collection is as consistent as possible, but some variability is to be expected. There could also have been management differences that are causing a change in data, such as herbivore management, forestry practices, and climatic differences. If possible, focus on long-term trends rather than year-to-year differences.

Summary

1. Measure out three zones from the main seed source and measure the indicators that are important to you in a minimum of five plots per zone.
2. Record results using the spreadsheet provided. This gives a way of recording the early 'essential' indicators only. Refer to the external links for methods to survey 'optional' indicators.
3. Photographic evidence will also help you understand and review how your site is developing over time. A photo of each zone from the same point each year would be enough.
4. If possible, record the route of travel in each zone to enable annual surveys to be repeatable. It is not necessary, however following a similar route will increase the quality of the data collected.
5. Keep a record of your surveys and use your findings to intervene where needed – remember, low densities of trees and shrubs early on are normal, try to be patient and give the woodland time. That being said, you can carry out supplementary planting or seeding at any point if things aren't going the way you hoped.

Acknowledgements

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Appendix

Optional transects to measure horizontal complexity

Horizontal complexity is measured by recording the height class of the uppermost vegetation at a series of stops along a single straight line transect, or near enough straight, dependent upon on the ground features, constraints or hazards.

Aim to walk in a straight line starting at the seed source and heading directly away from it.

A total of 10 stops is required every 10m horizontal distance from the last stop. At each stop the 'Top height category number' is recorded.

For the surveyor it is useful to use a clinometer occasionally to calibrate height estimations, particularly when moving between zones with different top heights.

Canopy layer	Height range*	Top height Category number
Upper canopy	> 15m	6
Mid-canopy	10 – 15m	5
Lower canopy	5 – 10m	4
Shrub layer (inc. young trees)	2 – 5m	3
Field layer	0.5 – 2m	2
Ground layer	< 0.5m	1

Stop number	1	2	3	4	5	6	7	8	9	10
Top-height category number	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Example recording boxes on form used for field trials

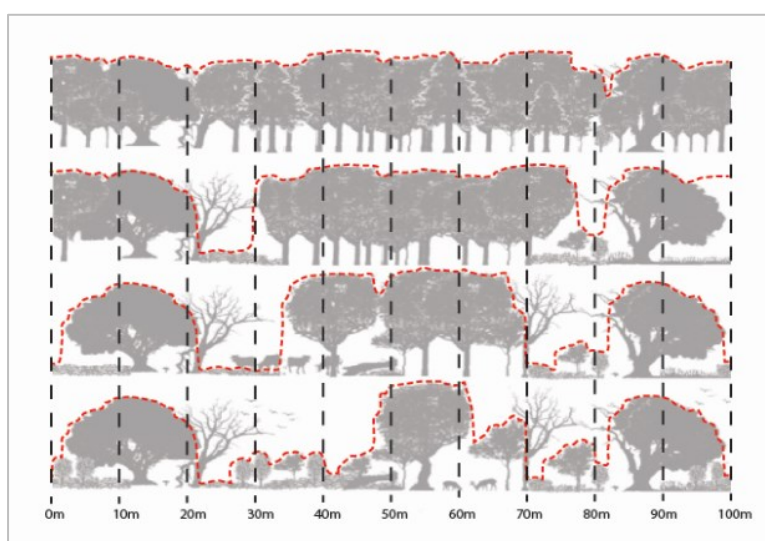


Image shows variation in vegetation top heights at different 10m stops for each woodland cross-section scenario.