



Accurate forest cover assessment of the National Forest

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Background

The National Forest is a 200 square mile area of the Midlands that has seen a huge amount of transformation since its inception in 1991. Over 8,500ha of habitat has been transformed since then, with the National Forest Company (NFC) driving much of this change. A key figure in reporting this change is the overall percentage of the National Forest that is forest cover. To facilitate this, a map of existing woodlands was created in 1991, and the NFC has kept records of all supported forest creation activity since then. For 30 years, these datasets formed the basis of the reporting on progress towards our target of 33% forest cover. In April 2023, forest cover was reported as 22.6% of the total Forest area.

However, early mapping of woodlands was not as accurate as it would be today due to the limitations of available mapping information and software at the time. Geographic Information Systems (GIS) barely existed in the early 1990s and have improved significantly over the last 30 years, allowing much more accurate identification and mapping of habitats. Combined with access to more accurate and comprehensive data sources such as satellite imagery, it has become apparent that the forest cover reporting was not fully reflecting habitats on the ground. Therefore, in the 2023/24 financial year, the NFC research team undertook a thorough re-assessment of forest cover across the National Forest.

Defining forest cover

The habitat creation work of the NFC spans beyond just woodlands, and therefore reporting has always used the term “forest” to encompass woodlands and woodland-associated habitats. For clarity in future reporting, forest cover includes:

- **Woodlands** – land parcels over 0.5ha area and 20m that have a canopy cover of greater than 20%.
- **Small woods and groups of trees** – densely planted areas of trees smaller than 0.5ha funded under NFC forest creation grants.
- **Parkland** – land parcels that are predominantly grassland but contain a minimum of 6 scattered trees per hectare, excluding hedgerow trees.
- **Other associated habitats** – other habitats, e.g. grasslands, that are contained within a forest creation scheme.

At the current time, trees outside of woodland have not been included in this analysis. However, we recognise they are an important element of the landscape and future work is planned to integrate them into this reporting (see Related Datasets and Future Analyses section for more detail).

Data Analysis

Due to the complexity of this mapping task, no single dataset could provide everything needed to accurately reflect the forest cover in the National Forest. Table 1 describes the main datasets used for this assessment and how they were analysed. Land parcel areas from each dataset were combined into a single mapping layer with any duplicates or overlaps removed. This mapping layer will then become the definitive dataset showing forest cover in the National Forest and used as a baseline for future reporting.



Table 1. Descriptions of the datasets used to assess the forest cover in the National Forest.

Name	Source	Description	Challenges	Solution
Pre-NFC Woodlands	Internal	Internal dataset created at the inception of the National Forest and detailing woodlands identified in 1991.	Inaccurate boundaries due to lack of accurate mapping systems at the time or changes in size/shape of woodlands over time.	Boundaries corrected against OS MasterMap and satellite imagery.
NFC Forest Creation	Internal	Shows boundaries of all creation schemes supported by or known to the NFC since its inception.	Inaccurate boundaries (particularly on older records) due to restrictions of available mapping systems at time of entry. Boundary overlaps where sections of sites have been reported under different schemes.	Boundaries corrected against OS MasterMap and satellite imagery. Overlaps removed.
National Forest Inventory (NFI)	Forest Research	Created by Forest Research and released annually. Shows boundaries of woodlands and some associated habitats. Defines woodlands as being over 0.5ha area and 20m wide, with greater than 20% canopy cover.	Does not include young woodlands.	Used to identify forest sites that were not included in other layers.
National Tree Map™	BlueSky	Maps crown/canopy size for all trees above 3m. Last updated summer 2023.	Not linked to specific land parcels.	Canopy cover compared to OS MasterMap to identify land parcels matching the definition of woodland or parkland.
Satellite Imagery	Google	Aerial imagery derived from multiple sources, including historic imagery in certain areas.	Not linked to specific land parcels.	Used for a visual sense check of accuracy of all other layers, combined with local knowledge of the sites.
OS MasterMap topography	Ordnance Survey	National dataset giving accurate land parcel boundaries for the entire landscape.	Broad habitat categorisations.	Used to improve accuracy of boundaries of other layers.



Methodology

Boundaries of the existing internal datasets (Pre-NFC woodlands and forest creation layers) were checked against OS MasterMap boundaries and satellite imagery to improve accuracy. Land parcels that were not already identified as woodland in either of these layers or the NFI were then extracted from OS MasterMap. These were cross-referenced with the National Tree Map™ to identify any parcels that had a canopy cover of over 20% (the threshold for inclusion in the NFI). These areas were then visually checked against aerial imagery to ensure that the computer analysis was correct and included as woodland in the forest cover layer as appropriate. Land parcels outside of all these layers were then checked for the presence of parkland habitats. Grassland areas with scattered trees were identified through priority habitat mapping and a visual check of satellite imagery. Any of the land parcels that were over 0.5ha with at least 6 trees per hectare were included as parkland within the forest cover layer.

Results

Using the datasets described above, we identified an additional 1,430ha of forest cover within the National Forest boundary. These are sites that have been missed from reporting but do not represent sites that the NFC has contributed to or can take credit for. Potential reasons for this could be that they were missed from the initial baseline, have grown through natural processes or were planted independently from the NFC and not reported. The forest creation sites from the 2023/24 planting season also provided an additional 99ha of forest cover. The total area of forest cover in the National Forest has been calculated at 12,907ha, representing 25.6% of the total Forest area. This is a marked increase from previous reporting but reflects an accurate reflection of habitats on the ground. This figure will be used as the basis for future reporting on percentage forest cover.

Related Datasets and Future Analyses

The analysis described here was used to refresh figures for forest cover. However, there are other, related internal datasets that measure different aspects of land use across the National Forest. For clarity and future consistency of use, here are the four main datasets and their purposes:

- 1) **Forest cover** – The combination of the pre-Forest woodland baseline, the Forest creation layer and the uncounted woodlands identified in the recent review. This is used to demonstrate progress towards the ultimate target of 33% forest cover and is the figure that has been updated using the above method. As of 1st April 2024, this figure is 25.6%.
- 2) **Forest creation activity** – This layer shows the boundaries of all forest creation delivered through NFC funding, planning gain and activity of partner organisations under National Forest umbrella. This is used to track our delivery on a year-by-year basis for reporting to Defra, our partners, and funders.
- 3) **Woodland cover** – This layer will show only land parcels that can clearly be defined as woodland using the standard definition and will include new woodlands that have the potential to reach 20% canopy cover. This analysis is pending, but the result will demonstrate the National Forest's contribution towards the national target of reaching 16.5% tree canopy and woodland cover. Using the National Forest Inventory dataset, our current woodland cover sits at 18%.
- 4) **Priority habitats** – This layer will show all non-woodland habitats across the Forest that are listed as UK Priority Habitats. This includes habitats such as marsh, grasslands and water bodies that are not directly associated with woodlands and so not included in the forest cover layer. This layer will display habitats that are





making a contribution to biodiversity and other environmental outcomes, including Biodiversity 30x30.

- 5) **Trees outside of woodlands** – This layer will use the National Tree Map™ data to show all trees above 3m across the Forest that fall outside of woodland parcels. Using this dataset, our current canopy cover is 22.2%, however further work is needed to align this with the forest cover analysis described here.

