Forest Research

Access to woodland in England

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The Research Agency of the
Forestry Commission

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Contents

Introduction

This publication has been produced from the Understanding and Supporting Public Access to Woodlands project, delivered by Forest Research and funded through the Government's Nature for Climate Fund.

These statistics describe the percentage of households that are within different distances of woodlands of different minimum areas in England.

The publication is complementary to Defra's 'Access to green space in England' official statistic in development (herein referred to as the 'green space statistic') which calculated the distance to publicly accessible green space for every household in England measured along a network of walkable streets and paths. In this woodland-specific statistic, the distance to publicly accessible woodland for every household is calculated along the same network using a different woodland dataset that contains information on public accessibility (defined as both areas of statutory or permissive access and corridors of 20 m width around public rights of way within woodland). As with the green space statistic, the results are summarised by Middle layer Super Output Area (MSOA) and results by Output Area are available in the published datafile (both using Census 2021 geographies).

The network model used to calculate journey distances was run six times with woodlands of different minimum areas included, and using different distance thresholds between households and woodland. We refer to these individual model runs as woodland access scenarios. The parameters for five scenarios are based on the Woodland Access Standard developed by the Woods for People project and described in the Woodland Trust's State of the UK's Woods and Trees 2021 report (not part of government policy). Parameters for scenario 3 were chosen to reflect the government's commitment to ensuring that everyone lives within a 15-minute walk (a distance of approximately 1 km at average walking pace) of a green or blue space (Environment Improvement Plan (2023) published under previous government and currently under review). This scenario also allows direct

comparison between public access to woodland and green space more broadly, as estimated in Defra's 'Access to green space in England' official statistic. The six woodland access scenarios are:

1. Woodland ≥ 0.5 ha within 500 m – considered publicly accessible woodland 0.5 hectares (ha) or larger, and a distance threshold of 500 m.
2. Woodland ≥ 2 ha within 500 m – considered publicly accessible woodland 2 ha or larger, and a distance threshold of 500 m.
3. Woodland ≥ 2 ha within 1 km - considered publicly accessible woodland 2 ha or larger, and a distance threshold of 1 km.
4. Woodland ≥ 20 ha within 4 km – considered publicly accessible woodland 20 ha or larger, and a distance threshold of 4 km.
5. Combined Scenarios 1 and 4 – where a household is considered to have woodland access if they meet the criteria of scenario 1 and scenario 4 concurrently.
6. Combined Scenarios 2 and 4 – where a household is considered to have woodland access if they meet the criteria of scenario 2 and scenario 4 concurrently.

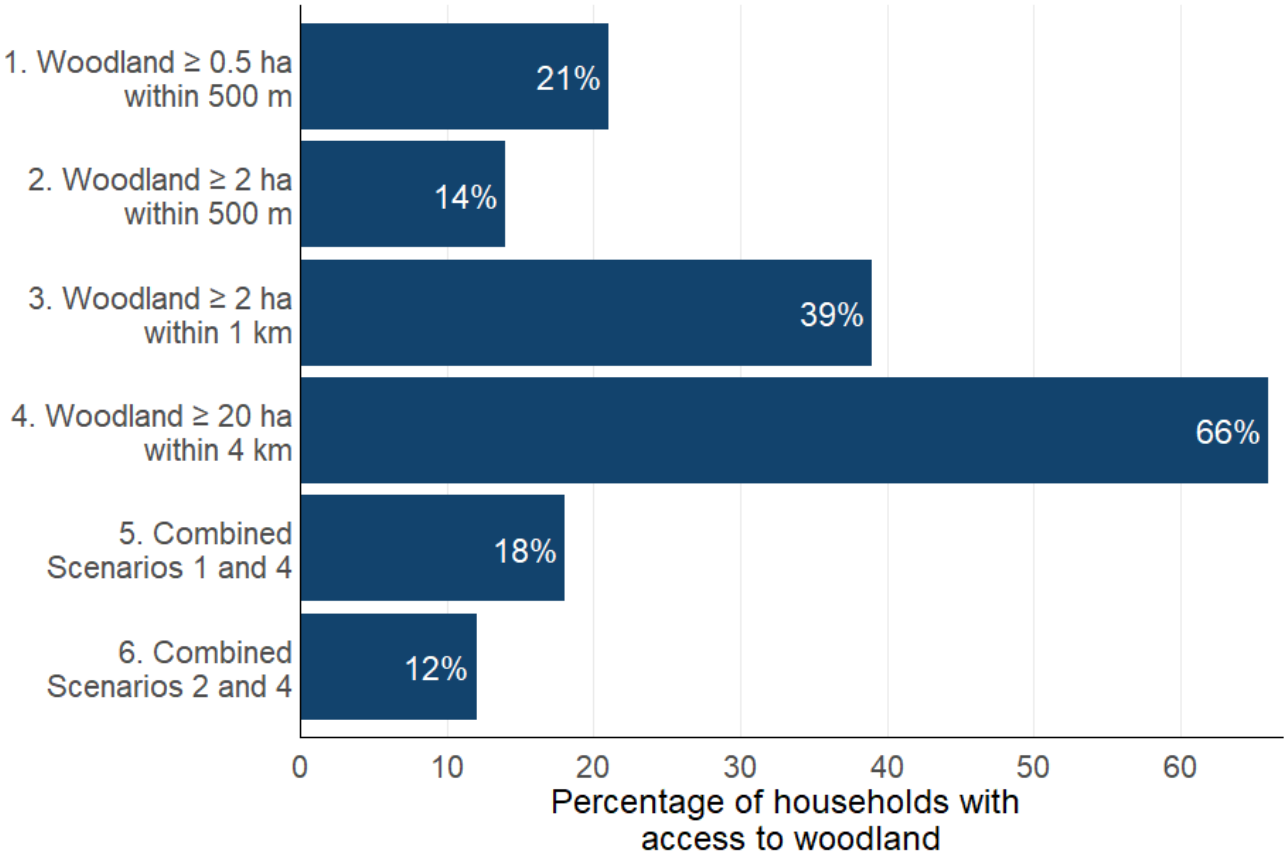
Key findings

- The provision of public access to woodlands is dependent on both the minimum woodland area and the maximum journey distance considered.
- 66% of households have access to a woodland larger than 20 ha within 4 km, while only 14% have access to a woodland larger than 2 ha within 500 m.
- 39% of households have access to a woodland larger than 2 ha within 1 km, contributing to the government's 15-minute walk to a green or blue space.
- Most households that have access to a woodland larger than 20 ha within 4 km also have access to a woodland larger than 2 ha within 500 m.
- Rural areas have a higher provision of woodland access than urban areas.

Access to woodland in England

The percentage of households in England with access to woodland varied between 12% and 66% depending on the applied woodland access scenario (Figure 1). This range reflects how differences in minimum woodland area and distance threshold impact the proportion of households deemed to have woodland access.

Figure 1 Percentage of households with access to woodland, England, 2022



Note:

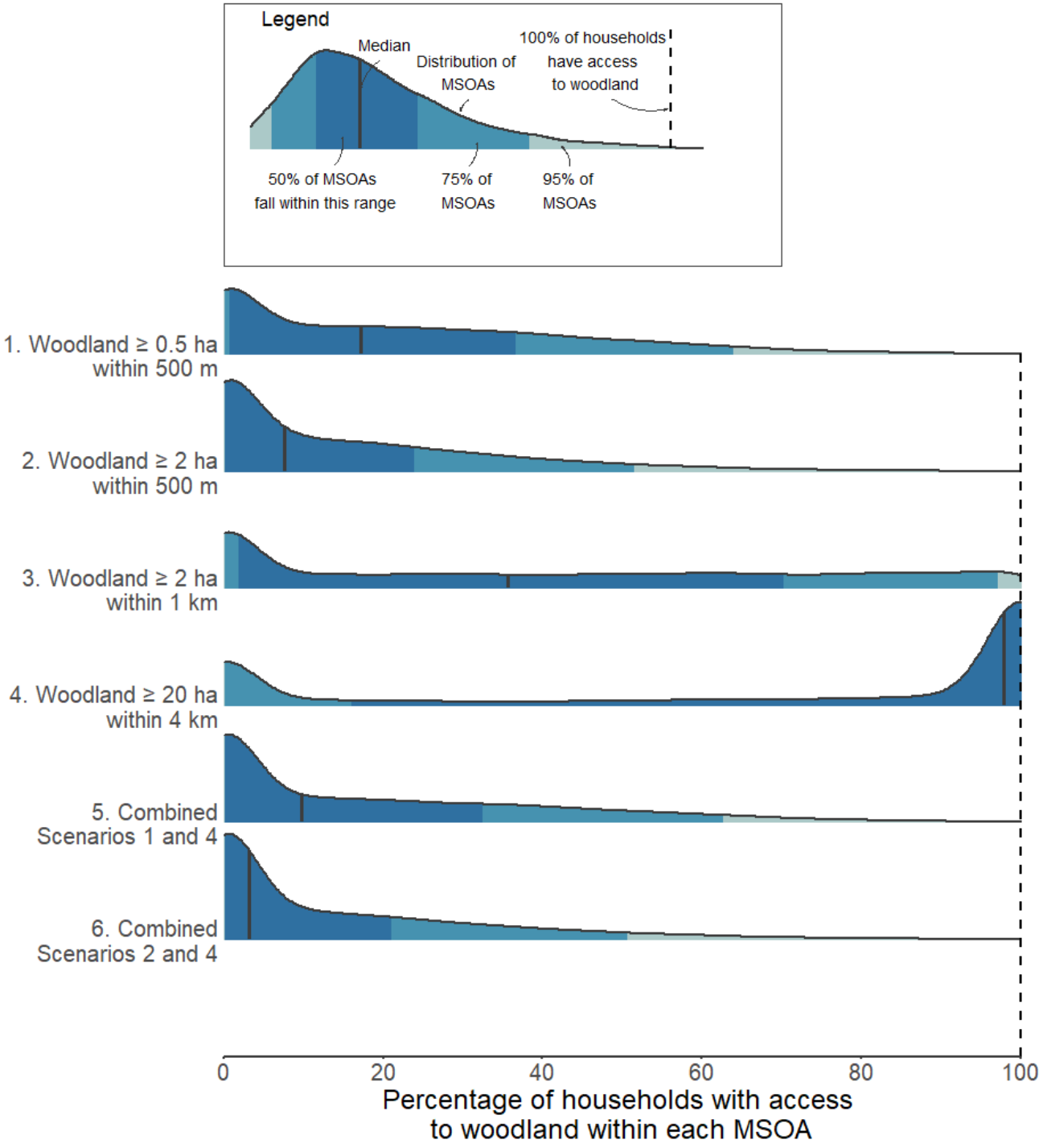
1. Bar chart displaying the percentage of households with access to woodland and calculated using six woodland access scenarios given various woodland size and distance combinations.
2. Covers roughly 25 800 000 households in England.

Scenario 1 estimates that 21% of households have access to a woodland of at least 0.5 ha within a 500 m journey along the network. When the minimum woodland area is increased to 2 ha in scenario 2, the proportion of households decreases to 14%. In scenario 3 the distance threshold to woodlands larger than 2 ha is doubled to 1 km (compared to scenario 2) and the proportion of households with woodland access increases to 39%. Despite the largest woodland area requirement (20 ha), scenario 4 reports the largest percentage of households with woodland access (66%) due to the greater distance threshold (4 km).

The combined scenarios, which require multiple woodland access scenarios to be met concurrently, estimate a lower proportion of households with woodland access compared to the respective single scenarios. Scenario 5 is a combination of scenarios 1 and 4 and reports 18% of households having woodland access, compared to 21% for scenario 1 alone. Similarly, scenario 6, a combination of scenarios 2 and 4, estimates woodland access for 12% of households compared to 14% for scenario 2 alone.

There is a high level of variation in woodland access, even at the very local level. On average a Middle layer Super Output Area (MSOA) has between 3% and 98% of households with publicly accessible woodland (Figure 2). The distribution of households with access to woodland across the country is different depending on the woodland access scenario applied. The majority of MSOAs under scenarios 1 and 2 (those with the 500 m distance threshold) contain a low percentage of households with access to woodland. Under scenario 3, a moderate number of MSOAs still contain a low percentage of households with woodland access, but the distribution of access across the remaining MSOAs is approximately even. Scenario 4 reports a bimodal distribution with a majority of MSOAs having a very high percentage of households with woodland access and a minority of MSOAs in which very few households have woodland access. The combined scenarios (5 and 6) show a similar distribution to their respective single scenarios (1 and 2) but with a generally lower proportion of households having woodland access.

Figure 2 Distribution of percentage of households within MSOAs with access to woodland, England, 2022



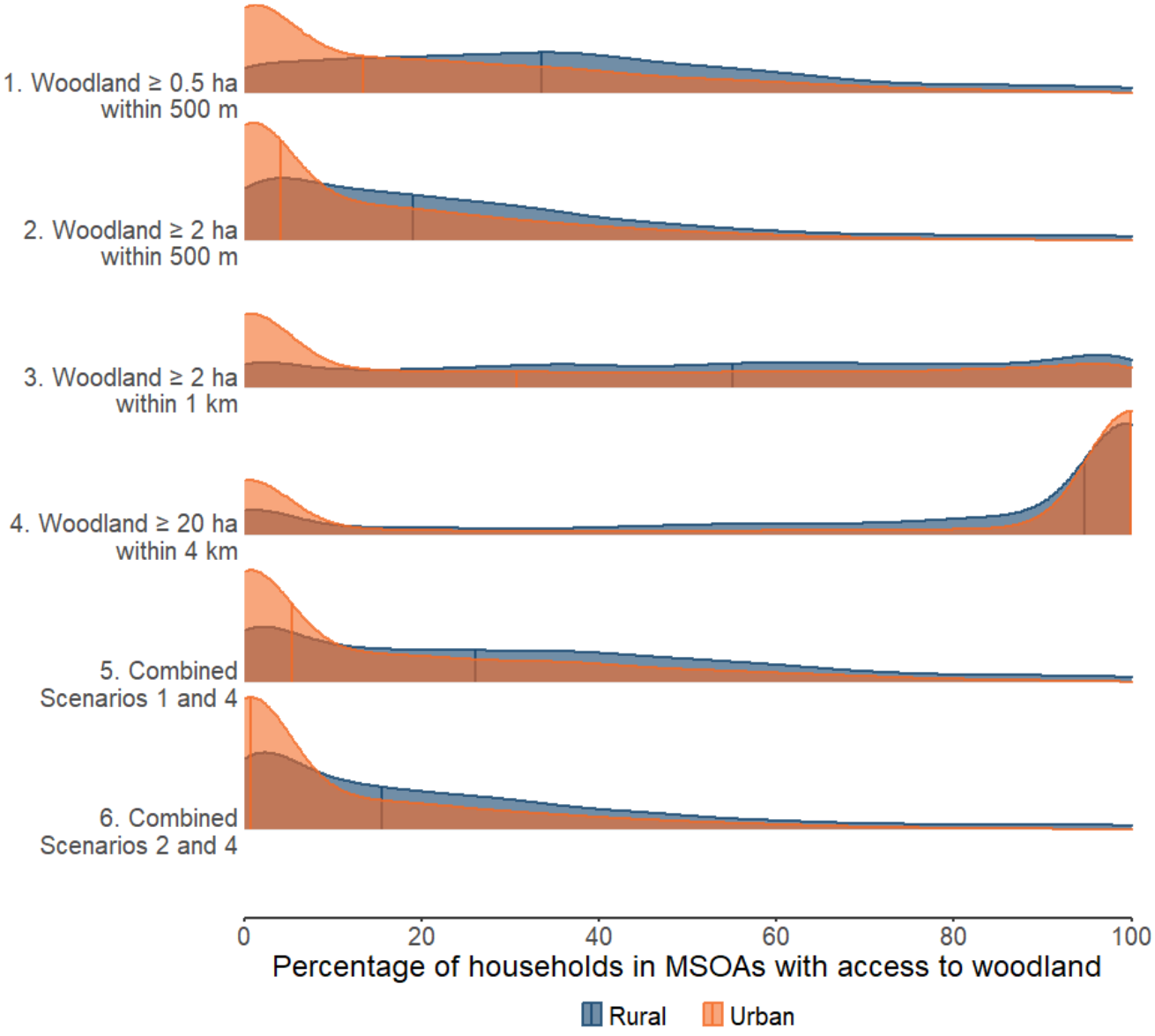
Note:

1. Ridgeline chart displaying the percentage of households with access to woodland within each MSOA and calculated using six woodland access scenarios given various woodland size and distance combinations.
2. Covers roughly 25 800 000 households in England.
3. The area under the curve represents the distribution of MSOAs across the gradient of percentage of households with access to woodland. The area under the curve is coloured to highlight the distribution, with the darkest area representing the central 50% of the data, medium blue 75% of the data, and the lightest blue 95% of the data distribution.
4. The median of each distribution is marked by a vertical black line.

For all scenarios, there is a marked difference in woodland access between urban and rural areas (Figure 3). The percentage of households with access to woodland is higher in rural areas, with urban areas comprising considerably more MSOAs in which very few households have woodland access.

The percentage of households with no access to woodland varied considerably between the different scenarios (Table 1). Scenario 4 (minimum area of 20 ha and distance threshold of 4 km) estimated a moderate number of households with no access in both rural and urban areas (29% and 35%, respectively), while scenario 6 (a combination of scenarios 2 and 4) estimated that 89% of households in urban areas and 81% in rural areas lack access to both sizes of woodland. Across all scenarios, the percentage of households with no access to woodland was higher in urban areas.

Figure 3 Distribution of percentage of households within MSOAs with access to woodland grouped by urban or rural classification, England, 2022



Note:

1. Ridgeline chart displaying the percentage of households with access to woodland within each MSOA by rural/urban classification and calculated using six woodland access scenarios given various woodland size and distance combinations.
2. Covers roughly 25 800 000 households in England.

3. 21 Output Areas could not be assigned a rural/urban classification and so were excluded from the analysis.
4. The median of each distribution is marked by a vertical line.

Table 1 Percentage of households with no access to woodland by rural/urban classification, England, 2022

Scenario	Rural	Urban
1. Woodland ≥ 0.5 ha within 500 m	68	81
2. Woodland ≥ 2 ha within 500 m	79	88
3. Woodland ≥ 2 ha within 1 km	50	64
4. Woodland ≥ 20 ha within 4 km	29	35
5. Combined Scenarios 1 and 4	73	84
6. Combined Scenarios 2 and 4	81	89

Notes:

1. Table displaying the percentage of households with no access to woodland by rural/urban classification and calculated using six woodland access scenarios given various woodland size and distance combinations.
2. Covers roughly 25 800 000 households in England.

Discussion

The results from the various scenarios highlight how differences in minimum woodland area and distance threshold greatly impact the level of public accessibility to woodland. Large differences were observed between the scenarios that included a smaller minimum woodland area and a low distance threshold (1 and 2), compared to scenario 4 which considered a larger minimum woodland area and a greater distance threshold.

The increase in minimum woodland area between scenarios 1 and 2 reduced the proportion of households with woodland access and increased the number of MSOAs that had no households with access. These data show the importance of 0.5–2 ha woodlands in providing local woodland access. Doubling the distance threshold to woodlands 2 ha or larger between scenarios 2 and 3 greatly increased the proportion of households with access and highlights how journey distance is a key factor of woodland access.

Under the combined scenarios (5 and 6), the proportion of households with woodland access was reduced compared to the respective single scenarios (1 and 2). However, the proportions were not reduced drastically. These data suggest that the majority of households within 500 m of woodlands larger than 0.5 ha or 2 ha are also within 4 km of woodlands larger than 20 ha.

All scenarios highlight the divide in woodland access between rural and urban areas. In particular, local access to woodlands is reduced in urban areas, as shown by higher number of MSOAs with a lower proportion of woodland access within 500 m (scenarios 1, 2, 5, and 6). For scenario 4, where a greater distance threshold is applied to a larger minimum woodland area, the difference between rural and urban areas is less substantial, but more MSOAs have very few households with woodland access in urban areas.

Comparing the results from these scenarios with the findings from the green space statistic allows comparison between public access to different outdoor spaces. The

green space statistic estimated that 78% of households are within 1 km of green space larger than 2 ha (which includes woodlands), while this statistic estimated that 39% of households are within the same distance of publicly accessible woodland larger than 2 ha. Although there are some differences in methodology, these figures shows that woodlands form an important component of wider green space access.

In both analyses, the distance to green space or woodland has a large impact on public accessibility. The green space statistic found that reducing the distance to green space had a greater impact on the number of households with access than the size of the green space. Similarly in these data, decreasing the distance threshold from 1 km to 500 m substantially reduced the proportion of households with access to woodlands larger than 2 ha.

The analysis in this statistic is designed to complement and build upon the Woods for People project run by the Woodland Trust and the Forestry Commission. In the State of the UK's Woods and Trees 2021 report, the Woodland Trust published statistics on public access to woodland in England under the Woodland Access Standard. By using a straight-line (Euclidean) approach to determine the area of woodland accessibility and an estimation of the population within this area using population density, they calculated that 16% of the population are within 500 m of a wood of at least 2 ha in size, and 66% of the population are within 4 km of a wood of at least 20 ha in size. These two components of the Woodland Access Standard are equivalent to scenarios 2 and 4, respectively, in this statistic. Despite the significant methodological differences, the proportion of households or population with woodland access is remarkably similar between the two approaches. Here we also present the combined statistic which represents the full Woodland Access Standard and estimates that 12% of households have access to both a wood of at least 2 ha in size within 500 m, and a wood of at least 20 ha in size within 4 km (scenario 6).

Background and methodology

A shortest path algorithm was used to find the closest woodland access point to each household, given the walkable routes available. The model was produced for the 'Access to green space in England' official statistic in development and has undergone several developments for this woodland-specific analysis. This type of model has three major components:

Source locations – the places where the shortest path calculation begins. For this statistic, source locations are households.

Destination locations – the places where the model aims to find the shortest path to. For this statistic, destination locations are woodland access points.

Network – consisting of links and nodes. Links represent transport infrastructure in line form (e.g. roads and paths) and nodes show the locations at which they interconnect. Together they form a traversable network, where each link has a length and two associated nodes. The path with the smallest sum of lengths between source and destination locations forms the shortest path.

Source locations, the network, and the method for creating the statistics are unmodified from the original model. For further detail on these elements please refer to the green space statistic. The woodland-specific model described in this statistic uses a different set of destination locations to calculate access to woodlands. More detail on this component of the model is provided below.

Destination locations – access points

Access points are point locations that show where a person is likely to access a woodland. We acknowledge that the data we have compiled is not exhaustive and that, for some woodlands, we have not acquired or created data. A combination of pre-existing data and data created specifically for these statistics was used to represent access points to woodlands. Below, the different types of access points are listed and more detail about their creation can be found in the Technical Annex.

See 'Green space access points and node relationships' in the green space statistic for more information on integrating access points into the network.

As these analyses are focussed on woodland, non-woodland green space access points have not been considered. Furthermore, changes to the representation of woodlands when compared to the green space statistic are as follows. Firstly, the Woods for All dataset was used as the woodland dataset and for the generation and/or filtering of other access point datasets. The Woods for All dataset comprises woodland polygons from the National Forest Inventory 2022 of woodland area over 0.5 ha in area, with a minimum width of 20 m and a minimum of 20% canopy cover, or the potential to achieve it. The dataset contains robust information on public accessibility across the woodland polygons determined from a range of spatial datasets including the Public Forest Estate (a collection of government-owned forests and woodlands that are managed by Forestry England) and publicly accessible land under the Countryside and Rights of Way Act 2000. Public accessibility to woodlands is described in binary terms as either 'public access' or 'no known public access'. Secondly, additional woodland-specific datasets have been used to provide or generate access points to better represent woodland accessibility. These include data from Forestry England and the Woodland Trust.

Ordnance Survey Open Greenspace access points

Green space access points were acquired from the Ordnance Survey Open Greenspace data product. This data product contains entry points to green spaces which are likely to be accessible to the public. These access points were filtered from those in close proximity to publicly accessible woodlands.

Public right of way intersections

The public right of way network provides people with the opportunity to access woodlands by defined linear routes. Access points were generated where the compiled public rights of way data from Natural England's Green Infrastructure map intersects the Woods for All dataset.

Woodland Trust access points and car parks

The Woodland Trust own and manage an extensive network of publicly accessible woodlands across England. These datasets detail access points and car parks at woodland sites owned and managed by the Woodland Trust.

Forestry England car parks, forest roads, linear assets, and gates

Forestry England are responsible for managing the publicly accessible Public Forest Estate. The Car Parks dataset details areas managed as places for vehicles to park and are therefore potential access points to woodland. The Forest Roads and Linear Assets datasets detail roads and linear routes through the Public Forest Estate and where they meet public roads and paths may act as access points to woodland. The Gates data details where gates are present and may act as access points from public roads and paths.

Scenarios

The woodland access scenarios used in this statistic are primarily derived from the Woodland Access Standard, which was produced by the Woodland Trust and the Forestry Commission during the Woods for People project (described in the State of the UK's Woods and Trees 2021 report and not part of government policy). The Woodland Access Standard stated that everyone should have access to a wood of at least 2 ha in size within 500 m of their home (scenario 2), and a wood of at least 20 ha in size within 4 km of their home (scenario 4). Since the publication of the Woodland Access Standard, spatial data on woodlands with a minimum area of 0.5 ha is now available and has allowed the calculation of the proportion of households within 500 m of these woodlands (scenario 1). Scenario 3 estimates the proportion of households within 1 km of woodlands larger than 2 ha to directly investigate the effect of increasing journey distance (by comparison to scenario 2) and allow comparison to scenario 1 of the green space statistic. Woodland access scenarios 5 and 6 are combinations of two of the previous scenarios designed to represent the full Woodland Access Standard. Scenario 5 combines scenarios 1 and 4 where a

household is considered to have access if they are within 500 m of a woodland of 0.5 ha or larger, and within 4 km of a woodland of 20 ha or larger concurrently. Scenario 6 combines scenarios 2 and 4 where a household is considered to have access if they are within 500 m of a woodland of 2 ha or larger, and within 4 km of a woodland of 20 ha or larger concurrently.

Caveats, limitations, and uncertainties

The model used to produce these statistics is the same model used to produce the green space statistic. Therefore, the caveats, limitations, and uncertainties detailed in the green space statistic remain valid in this statistic. Additional areas of consideration are described below.

Access points

Access points are compiled from pre-created datasets and generated within this statistic (see Technical Annex). The Woods for All dataset provides data on whether woodlands are publicly accessible. However, an access point is necessary for a woodland to be considered accessible within the model. There are instances where woodlands deemed publicly accessible in the Woods for All dataset are not captured by the model because they do not have an associated access point.

A large number of access points are generated where a public right of way intersects with a woodland. The public rights of way data used in the analysis are known to be incomplete; a small number (48) of highways and local authorities across England did not provide data to the compilation process undertaken by Natural England. Therefore, in some parts of England, there will be fewer woodland access points available as destinations in the shortest path calculations.

Walkability

The network used by the model to calculate the shortest distance to woodland assumes walkability and contains both roads and paths. A potential drawback of the 4 km distance threshold used in these scenarios is that some people may choose to

drive or take public transport for a journey of this distance. In this instance, the shortest distance would be more accurately estimate if paths were excluded from the network.

Acknowledgements

Thank you to the many people and organisations who have contributed by providing data and useful insights which contributed to developing the method behind these statistics.

Thank you to James Duffy, Jasmine Elliott, and Claire Harris at Defra, Gary Nobles at the Forestry Commission, and Sally Bavin and the GIS team at the Woodland Trust.

Technical Annex

Datasets

Many of the datasets used to produce these statistics are integral to the shortest path model and have been fully described in the green space statistic. The versions/dates associated with each dataset are the same as in the green space statistic and, as such, they are not described in detail but are listed for reference:

- Ordnance Survey AddressBase Plus
- Ordnance Survey MasterMap Highways Network – roads
- Ordnance Survey MasterMap Highways Network – paths
- Natural England Green Infrastructure - public rights of way
- Office for National Statistics Output Areas
- Office for National Statistics Rural/Urban classification
- Office for National Statistics Countries

Datasets that have been included in this analysis but were not part of the green space statistic are described below.

Forestry Commission Woods for All

Forestry Commission published version 1.0

These data consist of polygon geometries representing woodlands based on the National Forest Inventory 2022. Public accessibility is classified as 'public access' or 'no known public access', where public access is defined as any site that is designated for statutory public access or with permissive access to the general public for recreational purposes. The following source data were used to develop the Woods for All dataset:

- Forestry Commission: National Forest Inventory 2022

- Forestry Commission: National Forest Estate Ownership England 2019
- The Woodland Trust: Estate
- The Woodland Trust: Small Landowners
- RSPB: Public Reserve Boundaries (filtered on public access)
- Natural England: National Nature Reserves
- Natural England: Millennium Greens
- Natural England: Countryside Rights of Way (CRoW) Access
- Natural England: Countryside Rights of Way (CRoW) Section 15
- Natural England: Countryside Rights of Way (CRoW) Section 16
- Natural England: Public Rights of Way (PRoW)
- Natural England: King Charles III England Coast Path Route
- Natural England: National Trail (10 metre buffer)
- National Trust: Open Access
- National Trust: Limited Access
- Royal Parks: Boundaries
- Rural Payments Agency: Woodland Supplement 4 (Access for people)
- Westacre Estate: Permissible Routes (Cycle, 10 metre buffer)
- Westacre Estate: Permissible Routes (Footpaths, 10 metre buffer)
- Forestry England: Access
- Forestry England: Unrestricted Access
- Forestry England: No access
- Forestry England: Access Permitted
- Forestry England: Access Constrained

- Forestry England: De Facto Access

The dataset contains 20-metre-wide woodland linear corridors along Public Rights of Way (PRoW). These corridors indicate parts of woodlands that people can experience while using public paths and are categorised as being publicly accessible (i.e. 'public access'). A width of 20 m was selected to align with the Natural England Green Infrastructure Framework.

This dataset is provided under the Open Government Licence.

Forestry England Car Parks

Forestry England live version accessed 25/09/2024

These data consist of polygon geometries for areas on the Public Forest Estate managed as places for cars and other vehicles to park.

This dataset is for Forestry England internal use and not publicly available.

Forestry England Forest Roads

Forestry England live version accessed 25/09/2024

These data consist of line geometries for the forest road network providing access within the Public Forest Estate.

This dataset is for Forestry England internal use and not publicly available.

Forestry England Gates/Cattle Grids/Barriers

Forestry England live version accessed 24/09/2024

These data consist of point geometries for gates, cattle grids, and barriers on the Public Forest Estate.

This dataset is for Forestry England internal use and not publicly available.

Forestry England Linear Assets

Forestry England live version accessed 25/09/2024

These data consist of line geometries for linear routes not on forest roads within the Public Forest Estate.

This dataset is for Forestry England internal use and not publicly available.

Woodland Trust Access Points

Woodland Trust version accessed 09/07/2024

These data consist of point geometries for access points to Woodland Trust sites that are not managed by third parties.

This dataset is for Woodland Trust internal use and not publicly available.

Woodland Trust Car Parks

Woodland Trust version accessed 09/07/2024

These data consist of point geometries for car parks owned and managed by the Woodland Trust within site boundaries. Car parks at sites managed by third parties are excluded.

This dataset is for Woodland Trust internal use and not publicly available.

Access points

Access points used in this analysis were a combination of both pre-created (already published) and those created specifically for these analyses. Much of the

methodology has been previously described in the green space statistic but, where appropriate, is repeated here for clarity.

Prior to access point generation and/or filtering, the polygons in the Woods for All dataset were filtered to retain only woodland features and produce a dataset called 'Woods for All: woodlands'. Specifically, polygons of the following Interpreted Forest Types (assigned in the original National Forest Inventory data) were selected:

- Broadleaved
- Conifer
- Mixed mainly broadleaved
- Mixed mainly conifer
- Young trees
- Coppice
- Coppice with standards
- Shrub
- Low density
- Assumed woodland

Many access points were filtered or created based on proximity to publicly accessible woodland in the Woods for All dataset. To perform this spatial operation, a polygon dataset entitled 'Woods for All: publicly accessible woodlands' was created from the Woods for All: woodlands dataset by the following methodology:

1. Polygons representing woodland features in the Woods for All: woodlands dataset were filtered for those classified as 'public access' in the 'access' column.

2. Filtered woodland polygons from step 1 were dissolved and internal boundaries removed to ensure entire woodlands were considered as a single polygon.
3. For each polygon created in step 2, the area was calculated.
4. The dissolved polygons were then buffered by 10 m. This was to account for spatial inaccuracies and the poor topological representation of some linear features. For each buffered polygon, the area of the dissolved polygon calculated in step 3 was retained.

Figure 4 shows how the Woods for All dataset has been used to generate or filter access points from other input datasets.

Pre-created access points

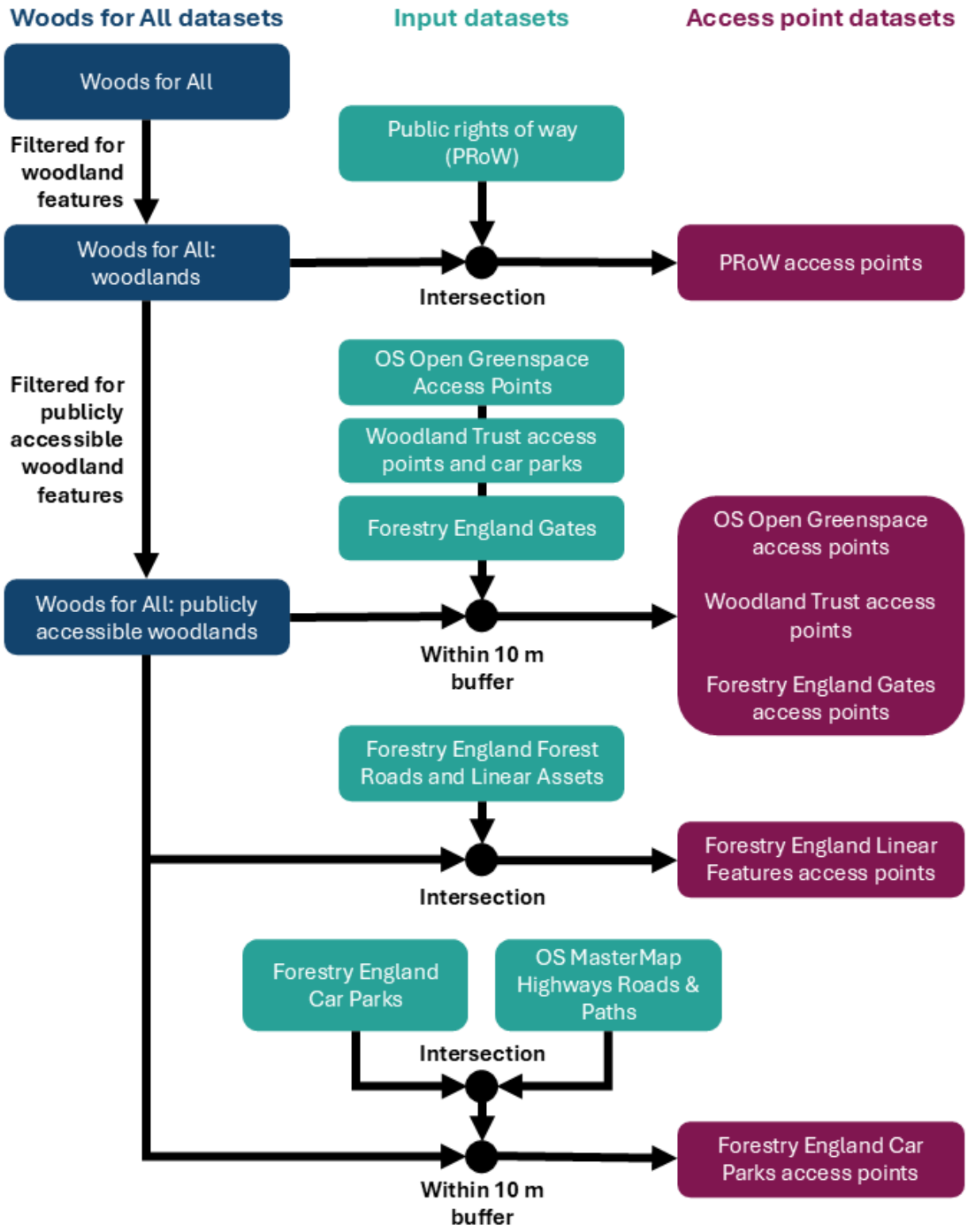
Ordnance Survey Open Greenspace Access Points

Green space access points were acquired from the Ordnance Survey Open Greenspace data product. The point dataset was filtered to retain only those access points within a 10 m buffer of woodland features in the Woods for All: publicly accessible woodlands dataset. For each access point, the area of the spatially associated dissolved woodland polygon was retained.

Woodland Trust Access Points and Car Parks

Access point and car park datasets were acquired directly from the Woodland Trust. These point datasets were combined and filtered to retain only those access points within a 10 m buffer of woodland features in the Woods for All: publicly accessible woodlands dataset. For each access point, the area of the dissolved woodland polygon was retained.

Figure 4 The geospatial processing of input datasets using the Woods for All dataset to produce access points.



Note:

1. A flowchart outlining the geospatial processing of datasets to produce woodland access points.
2. The 'Woods for All' dataset is filtered for woodland features to produce the 'Woods for All: woodlands' dataset, which is then filtered for publicly accessible woodlands to produce the 'Woods for All: publicly accessible woodlands' dataset.
3. Input datasets are processed using Woods for All datasets to produce access point datasets.
4. Intersections are found between public rights of way (PRoW) and Woods for All: woodlands datasets.
5. Ordnance Survey (OS) Open Greenspace Access Points, Woodland Trust access points and car parks, and Forestry England Gates datasets are filtered for those features within a 10 m buffer of the Woods for All: publicly accessible woodlands dataset.
6. Intersections are found between Forestry England Forest Roads and Linear Assets and Woods for All: publicly accessible woodlands datasets.
7. Intersections between the Forestry England Car Parks and OS MasterMap Highways Roads and Paths datasets that are within a 10 m buffer of the Woods for All: publicly accessible woodlands dataset.

Access points created for these analyses

Public right of way intersections

Where a public right of way enters and passes through a woodland, this offers a publicly accessible method of experiencing a woodland, whether the land is considered generally publicly accessible or not. Therefore, access points were generated where public rights of way intersect features in the Woods for All: woodlands dataset. Public rights of way data from Natural England's Green Infrastructure dataset were used. The following methodology was followed to create access points for public right of way intersections:

1. Polygons representing woodland features in the Woods for All: woodlands dataset were dissolved, and internal boundaries removed to ensure entire woodlands were considered as a single polygon.

2. For each polygon created in step 1, the area was calculated.
3. The dissolved polygons were then buffered by 10 m. This was to account for the poor topological representation of some rights of way.
4. Public rights of way data were processed so that multi-part geometries were separated into multiple, single-part geometries.
5. A subset of the processed public rights of way from step 4 was created by intersecting them with the buffered polygons created in step 3.
6. The buffered woodland polygons from step 3 were subset, selecting those that intersected with the processed public rights of way data from step 4.
7. The subset of buffered woodland polygons from the previous step was altered, erasing the original woodland polygons from them. This resulted in polygons representing the buffer zone (area between the original woodland boundary and the buffered woodland boundary). For each buffer zone, the area of the dissolved polygon calculated in step 2 was retained.
8. Sections of the processed and subset public rights of way data from step 5 falling within the woodland buffer zones were extracted.
9. Access points were generated from the start and end points of the extracted public right of way sections from the previous step. For each access point, the area of the dissolved polygon assigned to the woodland buffer zone in step 7 was retained.

The rationale for the buffer zone approach was to make sure that public rights of way that fell within the buffer zone (i.e. within 10 m of the original woodland polygon boundaries), but did not cross the buffered woodland polygon boundary (usually because they met a path or road within the buffer zone) were captured as likely access points. This does result in the production of a greater number of access points, but this does not impact the shortest path calculations, as the destination is only ever one location per household.

Forestry England Car Parks

The Forestry England Car Parks dataset contains polygon geometries of areas of vehicle parking. Access points were created from these data with the following methodology:

1. Car Park geometries were buffered by 10 m to account for spatial inaccuracies and the poor topological representation of some rights of way.
2. Point intersections of the buffered polygon with OS MasterMap Highways Roads and Paths datasets (i.e. the network) were calculated.
3. Point intersections were filtered to retain only those points within a 10 m buffer of woodland features in the Woods for All: publicly accessible woodlands dataset. For each access point, the area of the dissolved woodland polygon was retained.

Forestry England Forest Roads and Linear Assets

The Forestry England Forest Roads and Forestry England Linear Assets datasets contain line geometries of routes through the Public Forest Estate. Access points to publicly accessible woodlands were created from these data with the following methodology:

1. Linear features were extended in both directions by 10 m to account for spatial inaccuracies and the poor topological representation of some linear features.
2. A subset of the extended linear features from step 1 was created by intersecting them polygons in Woods for All: publicly accessible woodlands dataset.
3. Polygons in the Woods for All: publicly accessible woodlands dataset were subset, selecting those that intersected with the extended linear features from step 1.

4. The subset of publicly accessible woodland polygons from the previous step was buffered by 10 m to account for spatial inaccuracies and the poor topological representation of some linear features.
5. The buffered woodland polygons from the previous step was altered, erasing the original woodland polygons from them. This resulted in polygons representing the buffer zone (area between the original woodland boundary and the buffered woodland boundary). For each buffer zone, the area of the dissolved polygon was retained.
6. Sections of the extended and subset linear features from step 2 falling within the woodland buffer zones were extracted.
7. Access points were generated from the start and end points of the extracted right of way sections from the previous. For each access point, the area of the dissolved polygon assigned to the woodland buffer zone in step 5 was retained.

Forestry England Gates

The Forestry England Gates/Cattle Grids/Barriers contain point geometries of gates, cattle grids, and barriers on the Public Forest Estate. Access points were created from these data with the following methodology:

1. Point dataset was filtered to retain only those access points designated as 'Gate'.
2. Gate features were filtered to retain only those points within a 10 m buffer of woodland features in the Woods for All: publicly accessible woodlands dataset. For each access point, the area of the dissolved woodland polygon was retained.

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