Nature in Cities

By earthwatch EUROPE

Tiny Forest Monitoring Report 2025

Contents

Key findings

In 2025, Earthwatch Europe ran 40 monitoring events at 44 Tiny Forests, training 2,271 citizen scientists across the UK. Thanks to these volunteers we have found:

Biodiversity support

As Tiny Forests age, the **diversity of different ground-dwelling invertebrates increases**.

Flood mitigation

Infiltration rates inside Tiny Forests are on average **28% faster compared to the surrounding area**; thanks, in part to the 38% lower soil compaction inside a Tiny Forest compared to outside.

Carbon storage

Tiny Forests **store exponentially more carbon as they grow.** We estimate that, all together, Earthwatch's Tiny Forests are currently storing about 35,000 kg of above ground Carbon, not counting the roots! This equates to 128 metric tonnes of CO_2.

Thermal comfort

Forty-four percent of visitors reported feeling very or moderately comfortable inside the forest compared to 33% of people in the surrounding open area.

Social benefits

Participation in Discovery Days increases attendees' environmental and social connectedness—feeling 8% more connected to nature, 5% more connected to their local community, and 3% more responsible for their local environment.

An introduction to Tiny Forest

The Tiny Forest project uses the Miyawaki method of tree planting to bring the benefits of nature into the heart of our urban spaces. Through community engagement and citizen science monitoring we aim to understand how these pockets of urban woodland provide benefits to people and nature.

The Problem

Around 1 in 3 people in England don't have access to natural spaces near their homes, and some of the most deprived areas have no natural space at all [1].

Access to natural space is associated with better health and well-being outcomes[2-3] and urban natural spaces can help bind communities together, reduce loneliness, and mitigate negative effects of air pollution, heat and flooding. Alarmingly, UK residents ranked lowest for their connection to nature in a study of fourteen European nations[4] and the UK ranks worst out of these nations for biodiversity[5]. Less biodiverse ecosystems are less resilient to challenges such as climate change, pests and diseases[6].

Land use change is the biggest direct driver of biodiversity loss[7,8], often leading to the destruction and fragmentation of natural forests and grasslands.
The loss of trees has further environmental impacts. Trees play a critical role in carbon absorbing and storing carbon dioxide, flood control, and creating comfortable microclimates. With 85% of the UK live in towns and cities[9] - where nature connection is often lacking, biodiversity is depleted, and climate adaptation is paramount – planting trees in urban environments has never been more important.

A Solution: Tiny Forests

Urban trees provide several ecosystem services – benefits that humans derive from natural ecosystems - that enhance environmental, social and economic well-being. They **moderate urban temperatures** through shade and evapotranspiration, **manage stormwater** by intercepting rainfall, reducing runoff, and preventing soil erosion, and **improve air quality** by filtering pollutants and producing oxygen. They **support biodiversity** by providing habitats for birds, insects, and other wildlife, even in densely populated areas. They **improve human health** by reducing stress, enhancing mental well-being, and encouraging physical activity in green spaces.

That's where Tiny Forest comes in. Tiny Forest is a large-scale, long-term ecological experiment. It uses the **Miyawaki method of afforestation** to rapidly create small pockets of diverse, native woodland and to understand what impacts the benefits these forests provide to people and nature. Local communities lead the monitoring of four ecosystem services: **biodiversity, carbon storage, flood mitigation, and thermal comfort.** The results of this monitoring are used to guide the design and implementation of the Tiny Forests to maximise the benefits for people and nature.

What is the Miyawaki Method?

Tiny Forest is an application of the Miyawaki tree-planting method. This differs significantly from traditional tree planting in its focus on creating dense, biodiverse, and self-sustaining forests quickly. Developed by Japanese botanist Miyawaki Akira[10], the method emphasises dense planting of native species - mimicking natural forest ecosystems - with appropriate soil preparation.

Unlike traditional planting, which often involves canopy-level species planted 1m to 2m apart in regular, neat, evenly spaced rows, the Miyawaki method uses a mix of species, from all four canopy layers, to promote layered vegetation.

The methodology has gained global popularity, and evidence is accruing that trees planted using the Miyawaki method grow faster and have higher survival rates than those planted following traditional methods[11]. Supported by Earthwatch engagement activities, Miyawaki forests can also inspire local communities, facilitating their involvement and fostering environmental awareness and ownership of local green spaces. Importantly, the method is known to be effective for rapidly creating forest cover on land that has previously been used for other purposes, as urban land so often is. As such, it presents an ideal opportunity to improve tree cover in urban areas.

Tiny Forests, Big Impact

Together with local communities, Earthwatch has planted one of the largest networks of Miyawaki forests outside of Japan. At the time of writing this report, the network consists of 291 forests, or about 174,600 trees planted in urban areas across the UK - from the Channel Islands to Aberdeen.

Earthwatch believes in the power of data for change. Across the network of Tiny Forests, citizen scientists collect data to examine the extent Miyawaki-style forests are delivering ecological and social benefits, generating a breadth of information that would be impossible for researchers alone to produce. Their contributions provide essential insights into how these forests function, how quickly they develop, and what benefits they offer to people and wildlife.

Earthwatch acts as a hub for this growing body of knowledge, sharing results with researchers, communities, and urban professionals around the world. Through this collaborative, data-driven approach, we aim to support the creation of more resilient, biodiverse, and welcome urban environments for generations to come.

The Benefits of Tiny Forest

Ecosystem service 1 - Biodiversity support

Our research questions:

- How do Tiny Forests contribute to supporting urban biodiversity?
- How do forest features (such as age, tree species, and soil) affect invertebrate communities over time?
- Does the surrounding greenspace affect species recorded in the Tiny Forest?

Biodiversity is essential for many ecological processes, including pollination, soil enrichment, and nutrient cycling. All of these contribute to the resilience and productivity of the forest ecosystem. Insects are the predominant providers of these ecosystem services in the UK, and act as excellent indicators of ecosystem health.

Monitoring invertebrates isn't easy. There are over 40,000 invertebrate species in the UK (about 64% of all UK wildlife)[12], and many are so similar that distinguishing them at species level often needs specialist equipment and expertise. So our surveys are accessible to everyone, the ground dweller and pollinator-timed-count surveys record morphotypes instead of species. A morphotype is a group of organisms that look similar to us. This approach makes large-scale monitoring possible: it's quick, reliable, and lets us capture the broad structure of invertebrate communities, allowing us to see how they respond to environmental changes.

Butterflies are one of the few invertebrate groups that people can usually identify by sight, so our butterfly surveys track species-level change more precisely. Together, these approaches give thousands of people the ability to contribute meaningful, high-quality data on Tiny Forest biodiversity — without needing to be expert taxonomists.

In 2025, citizen scientists carried out:

- 212 ground dweller surveys across 64 forests;
- 97 pollinator timed counts across 55 forests;
- 56 butterfly timed counts across 43 forests;
- 29 butterfly species list survey across 25 forests;
- An incredible 6,439 minutes of mindful minutes spent watching wildlife - the equivalent of watching around 55 feature films!

Ground Dwellers

Ground dwellers, such as ants, beetles, and woodlice, play an important part in maintaining soil health. They break down dead plant material, accelerate the decomposition process, and release nutrients that are absorbed by tree roots. This nutrient recycling not only nourishes the trees but also enhances soil fertility and reduces the compaction in the soil, improving the soil's water infiltration potential.

Ground-dwelling creatures often like to take shelter under rocks or large pieces of wood. To standardize the measurements, 40x40cm stone biodiversity tiles are laid when the forest is planted, allowing recording of the forest's soil community.

This season, 212 ground dweller surveys were undertaken at 64 Tiny Forests.

Ground dweller surveys can be conducted at any time of year, though you're likely to see more critters in the spring, summer and early autumn months because species are more active. When conditions are harsher, e.g. colder or drier, many species move deeper underground or retreat into leaf litter.

Combining this year's data with all previous years, we find that as Tiny Forests age, the number of different ground-dwelling morphotypes increases (Figure 1).

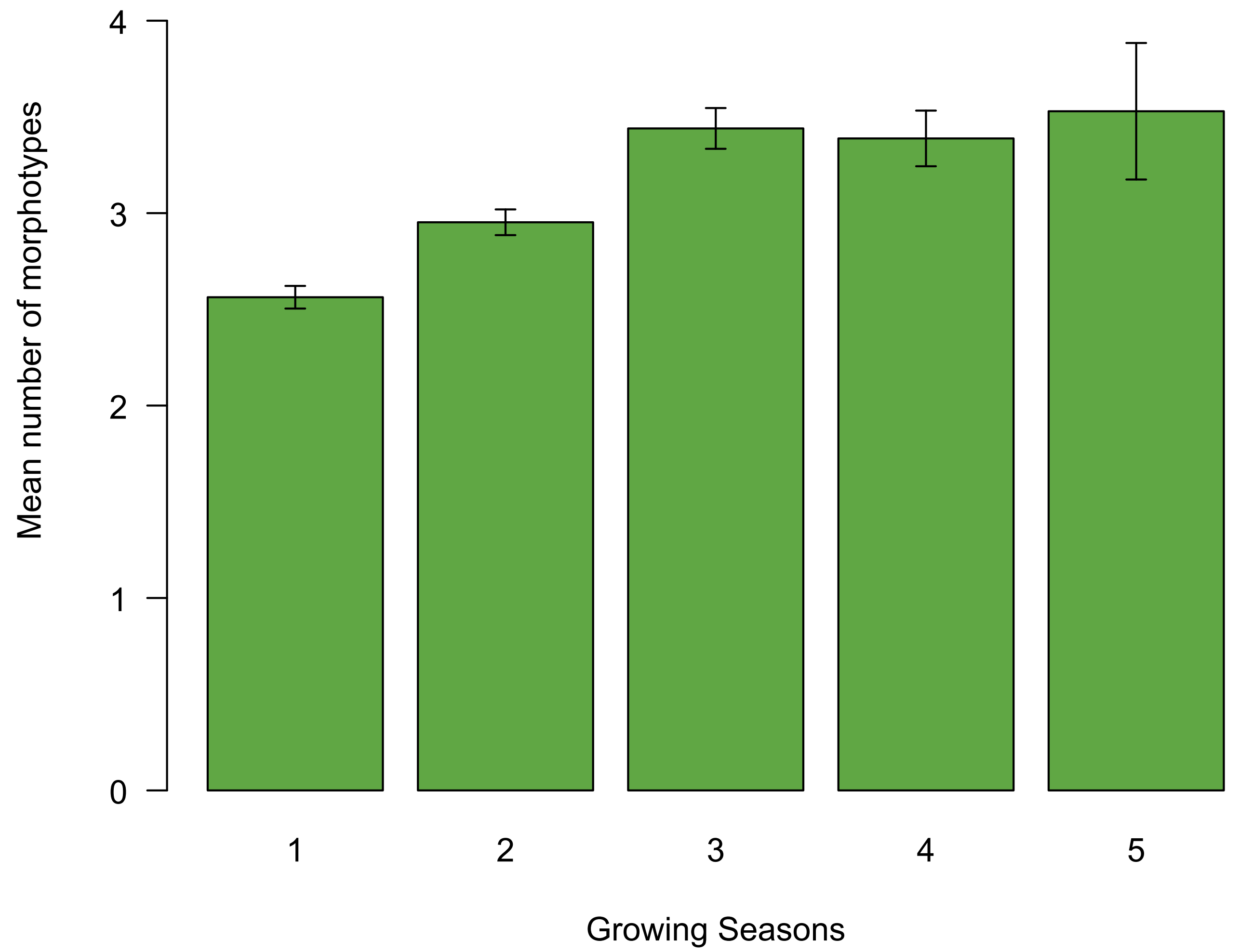


Figure 1. The average number of ground dweller morphotypes seen in Tiny Forests as they age.

As Tiny Forests age, the number of different morphotypes is expected to plateau as species occupy the available habitat making it difficult for new species to move in. We can't yet determine when this plateau occurs as we need more data. What is clear is that the diversity of ground dwellers does not regress below the initial levels recorded at the start of forest establishment.

Our data also show that as Tiny Forests age, the relative abundance of ground dwellers change. The most abundant morphotype observed in Tiny Forests of all ages are ants (Figure 2a). This is because ants live in societies where thousands of female workers look after the queen and her offspring, and work collectively to ensure the colony thrives.

With ants removed, differences in other ground dweller communities become clearer (Figure 2b). The relative abundance of ground dweller morphotypes is more even in forests in their first growing season. As forests age, snails and slugs and woodlice become the most common morphotypes suggesting their activity may be linked to moisture and plant growth.

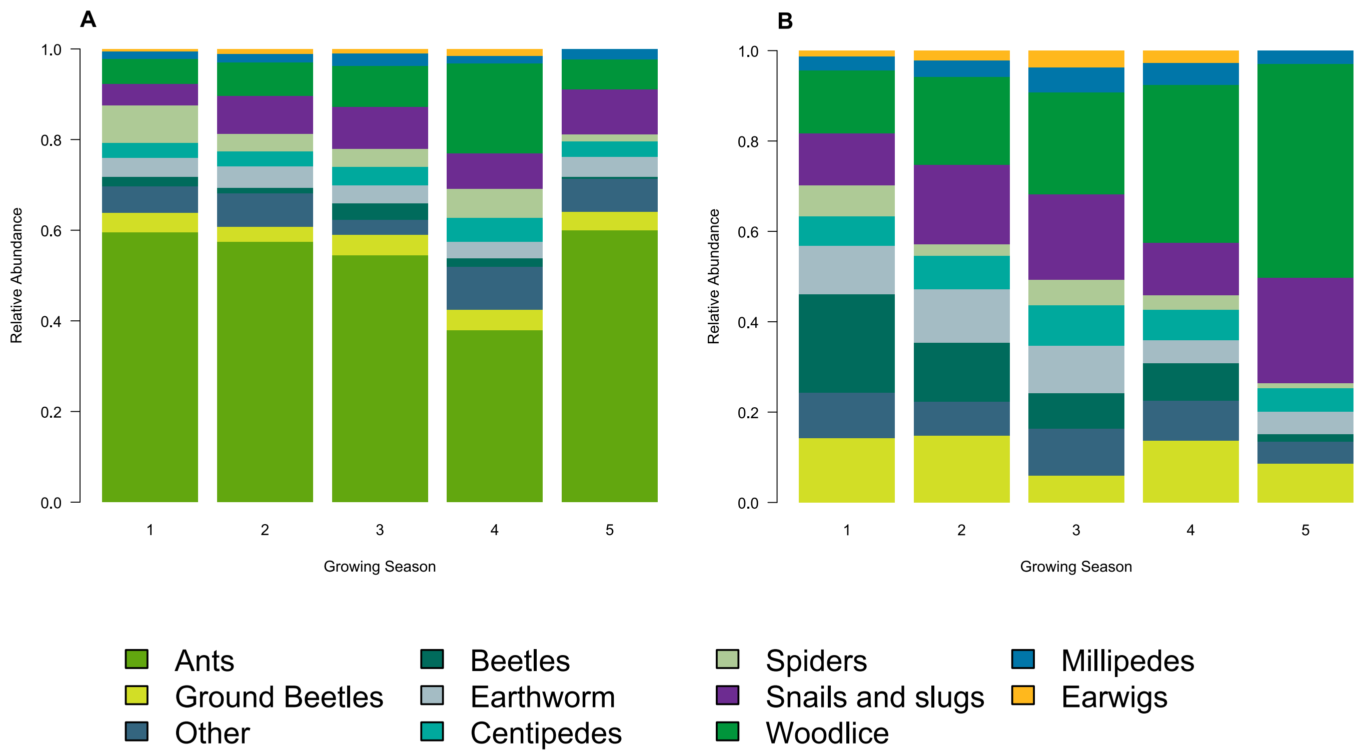


Figure 2. Relative abundance of ground dweller morphotypes as forests age a) including ants, b) with ants removed.

Pollinators

In the UK, approximately 80% of all plants are pollinated by around 1,500 insect species[13]. Climate change is affecting where and when pollinators are found. Spring and summer species have started to emerge earlier, autumn species emerge later, and many stay active in the environment longer[14]. This extends the period over which pollinators require resources: food, nesting sites, and water.

Diverse forest habitats, such as Miyawaki forests, play an important role in supporting pollinators. Flowering trees and shrubs often produce large numbers of blossoms and can supply substantial quantities of pollen and nectar at times when other resources are limited[15]. Early-flowering species such as hazel (Corylus avellana) and blackthorn (Prunus spinosa) provide pollen and nectar just as pollinators emerge from winter dormancy, a period when ground-level flowers are often scarce[16-17]. Because Miyawaki forests are planted with a dense and diverse mixture of native species, they naturally include plants that flower at different times of year, creating a successional sequence of floral resources that can support pollinators across their full activity season.

To ensure our citizen-science data has the biggest possible impact, we've adapted the Pollinator Monitoring Scheme's Flower Insect-Timed count and Butterfly Conservation's Big Butterfly Count to understand how Tiny Forests are used by pollinators. Adapting surveys used by other organisations increases the usefulness of the data, allowing researchers to combine datasets and improve conservation strategies.

This year, 97 pollinator timed counts were conducted at 55 forests, identifying 1,071 pollinators. The surveys were conducted from the end of April to early November, covering the most active period for pollinators. As expected, most pollinators are seen in Tiny Forests between mid-May and early September, the most active foraging period for pollinators.

Our data show that as Tiny Forests age, the average number of pollinator morphotypes observed stays constant (Figure 3), with an average of 4 morphotypes being spotted in a Tiny Forest.

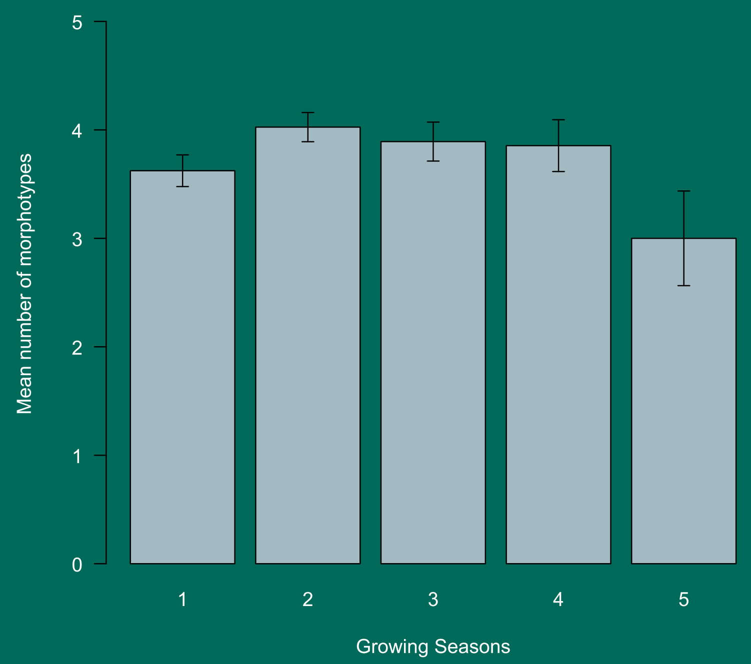


Figure 3. Average number of pollinator morphotypes observed interacting with flower heads in Tiny Forests as they age.

This might seem strange as immature trees do not produce nectar or pollen, however, the reason lies in the soil preparation of a Tiny Forest. Soil preparation can support a proliferation of herbaceous plants whose seeds are already present in the soil. As the canopy closes, generally in years 3 and 4, the floor of the forest becomes shaded and the number of herbaceous plants decreases. The floral resources provided by the forest will then primarily be provided by the trees, way up in the forest canopy. This could explain the small reduction in pollinators seen in Tiny Forest in year 5, as floral resources become scarcer at human height, the number of flowers we can observe, and therefore the number of pollinators we're likely to see, will decrease. However, we don't have many 5-year-old forests yet and need more data to be sure.

Our data also show the relative abundance of pollinator morphotypes is similar across Tiny Forests of all ages (Figure 4).

This might be because pollinator communities are being sampled at similar flower species at Tiny Forests of all ages, or because factors other than forest age – such as the surrounding landscape - are the primary drivers of pollinator community composition.

The most abundant morphotype, irrespective of forest age, is "Other flies". Although often overlooked, flies are important pollinators in the UK. With more than 7,000 species, they form one of the most diverse and abundant pollinator groups. And it isn't just hoverflies that matter for pollination as many other fly species also collect and transport pollen. For example, one study found that non-hoverfly flies carry the majority, approximately 84%, of fly pollen loads[18], highlighting just how beneficial groups we tend to overlook are.

In year 5, beetles larger than 3mm appear to become dominant, although the sample size is small (4 forests).

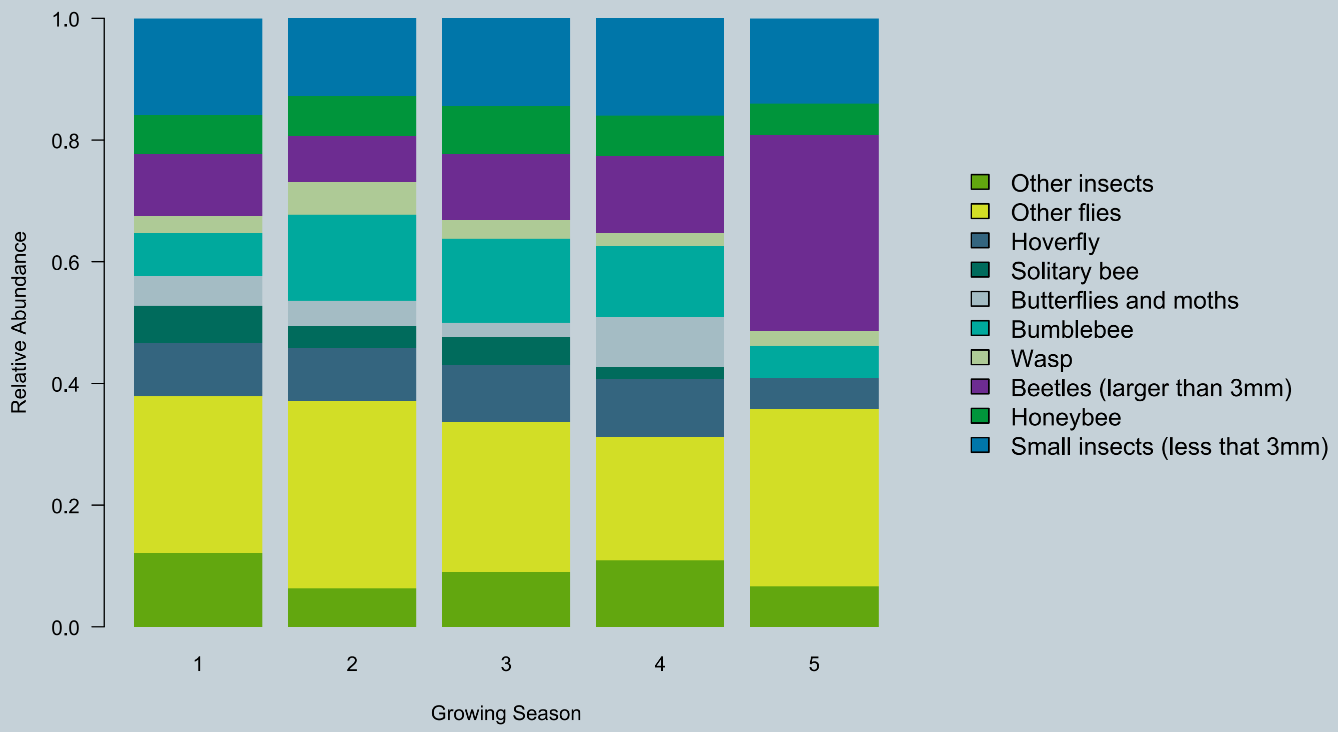


Figure 4. Relative pollinator morphotype abundance as forests age.

Butterflies

Whilst looking at morphotypes provides a high-level overview of animal communities, the breadth of those groups hides a wealth of information that can only be answered at the species level. For example, do species using Tiny Forest change over time?

Butterflies are excellent for examining such changes. However, butterfly species emerge at different times of year, and their abundances vary year-on-year. This means that comparing butterfly numbers between years is tricky, especially where sampling happens at different times in the season.

We use two kinds of surveys to monitor butterflies in Tiny Forests: the Butterfly Timed Count and the Butterfly Species List. The Butterfly Timed Count involves recording the abundance of butterflies seen at a Tiny Forest during a 15-minute-period and is consistent with butterfly monitoring schemes in Europe and increasingly in the UK. The Butterfly Species List replicates Butterfly Conservations' Butterflies' for the New Millennium project. Adapting surveys used by other organizations increases the usefulness of the data, providing standardised data for researchers and policymakers to inform conservation strategies.

Local volunteers spent 4,542 mindful minutes looking for butterflies across 54 Tiny Forests. Pollinator timed counts were conducted from the end of March to December. Most butterflies are seen in Tiny Forests between mid-May and September.

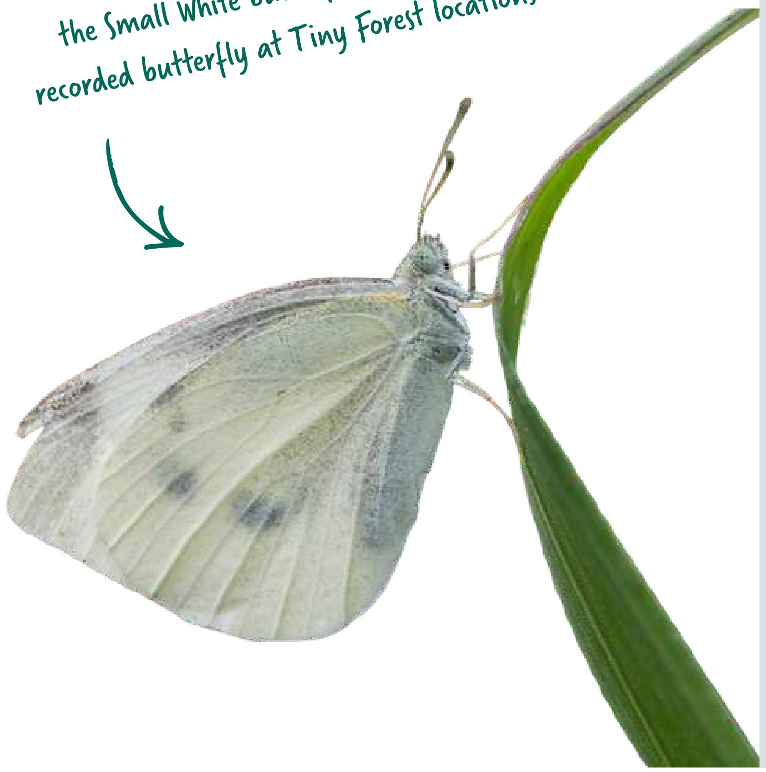
The majority of this data comes from forests in their first few growing seasons. At this early stage, butterfly communities are largely determined by the surrounding landscape rather than by the forests themselves, meaning the diversity we record mainly reflects species already present in the wider area[19].

As Miyawaki forests develop, they may offer increasing structural complexity and flowering resources that supports forest specialist species. However, many woodland butterflies require larger, older, and less fragmented woodland patches than these small forests typically provide. It is therefore not guaranteed that true woodland specialists will use these sites, making this a key ecological question for the project that requires long term and regular data collection

Compiling data from multiple years, we find no significant difference in the number of butterfly species observed in Tiny Forests over time (Figure 5) – consistently averaging 2 butterfly species per survey. Growing season five is likely to be an outlier as only four Tiny Forests have been monitored for butterfly diversity in their 5th growing season.

Across both survey methods, the Small Whites and Large Whites dominated sightings, both spotted in over 50% of Tiny Forests. Gatekeepers, Red Admirals, and Speckled Woods were also regulars, giving us a classic mix of sunny-edge and shade-loving generalists typical of young, developing woodlands.

the Small White butterfly is the most recorded butterfly at Tiny Forest locations.



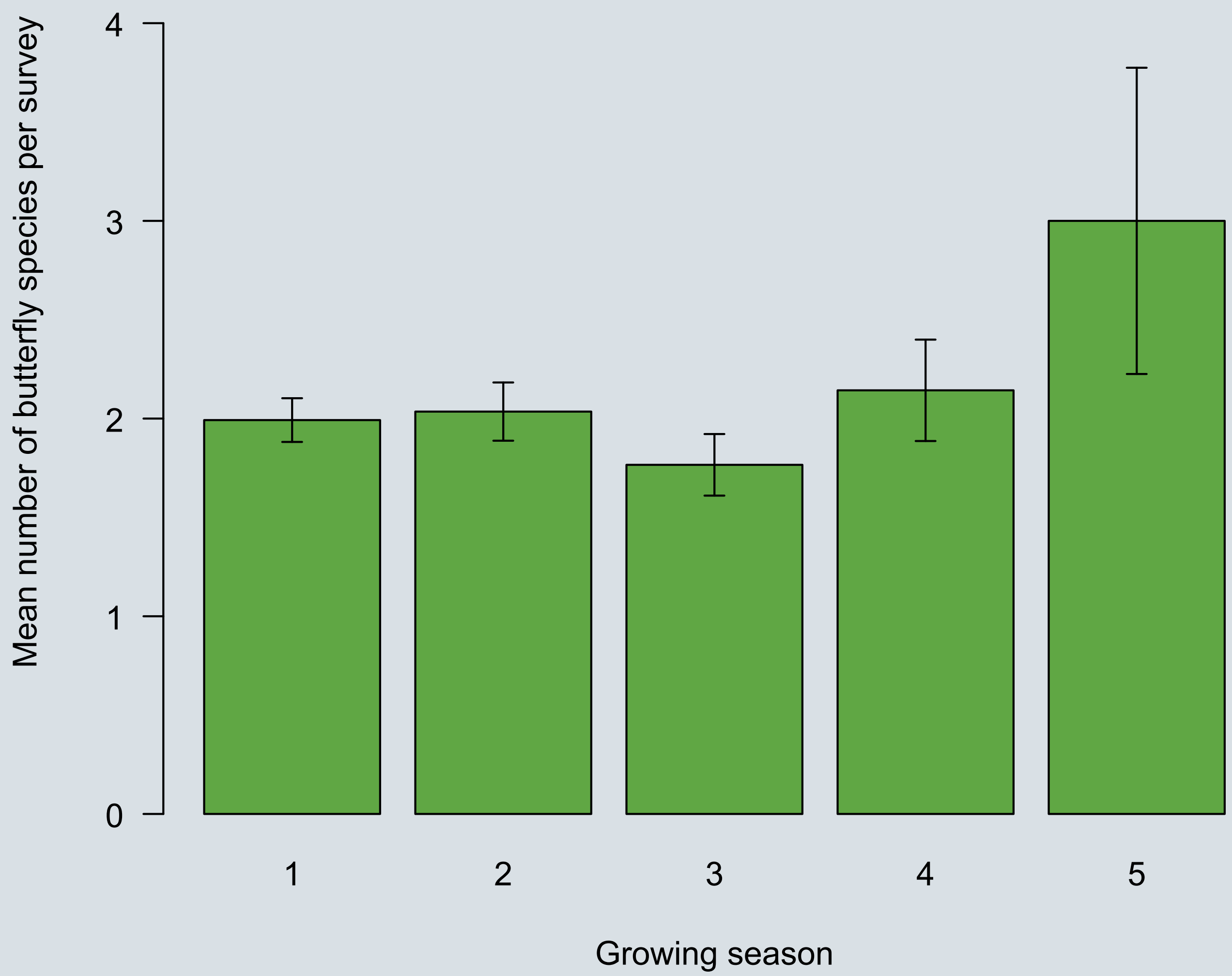


Figure 5. Average number of butterfly species per Tiny Forest as forests age

Citizen scientists also logged plenty of "No Butterflies Observed" records — and that's genuinely valuable. Absences help us understand whether distribution patterns are real or the result of gaps in survey effort. In butterfly monitoring, silence can be just as informative as sightings.

Among the more exciting or charismatic species were Common Blue, Small Copper, Brimstone, Marbled White, and Small Tortoiseshell — all welcome signs that Tiny Forests are already intersecting with a variety of local habitats.

Ecosystem service 2 – Flood mitigation

Our research questions:

- How do Tiny Forests affect flood management compared to the surrounding area?
- How does the development of Tiny Forests influence their capacity to store water and improve soil quality?

Water Infiltration

Urban flooding is an escalating global challenge driven by rapid urbanisation, climate change, and inadequate drainage systems. Urban trees play a critical role in mitigating flooding by improving soil health and absorbing and intercepting water. Over time, tree roots improve soil structure, fertility, and aeration, reducing surface runoff, lowering the risk of flash floods, and supporting groundwater replenishment.

Across the UK, dedicated citizen scientists got their hands dirty assessing whether Tiny Forests can provide flood mitigation benefits by measuring the colour, compaction, texture, and infiltration rate of the soil in the middle, edge, and outside Tiny Forests - 131 times across 48 Tiny Forests.

Across forests of all ages, infiltration rates inside Tiny Forests are 28% faster compared to the surrounding area (Figure 6), confirming the strong effect Tiny Forests can have on improving infiltration rates.

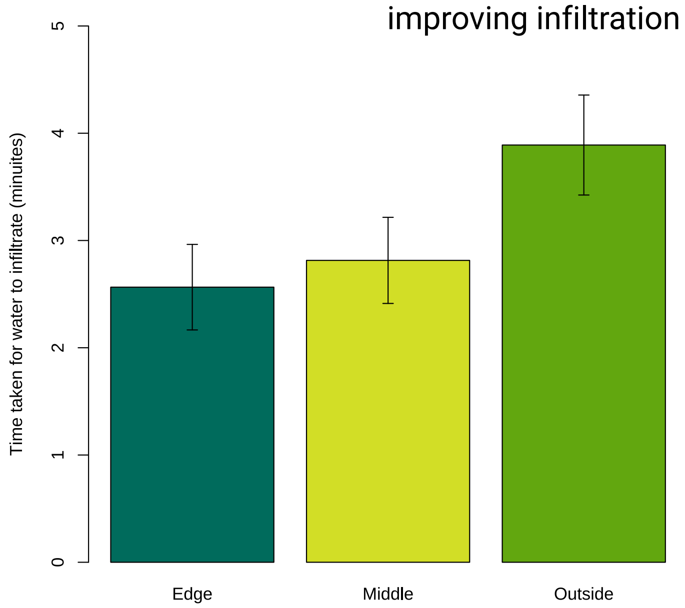


Figure 6. Infiltration rate at Tiny Forests are 28% faster inside the forest than outside.

In 2025, citizen scientists carried out:

- 131 infiltration rate surveys across 48 Tiny Forests
- 111 soil health (colour, compaction and texture surveys) across 43 Tiny Forests
- That's almost 60 hours spent surveying soil!

Infiltration rates may also be improving as Tiny Forests age (Figure 7), although the sample size is too small to be sure.

This is fantastic, as it means the soil is able to absorb and store water. Healthy levels of water infiltration help prevent flooding and help the forests resist drought as the soil acts like a sponge, soaking up the water when it's wet, and slowly releasing it as the plants need it.

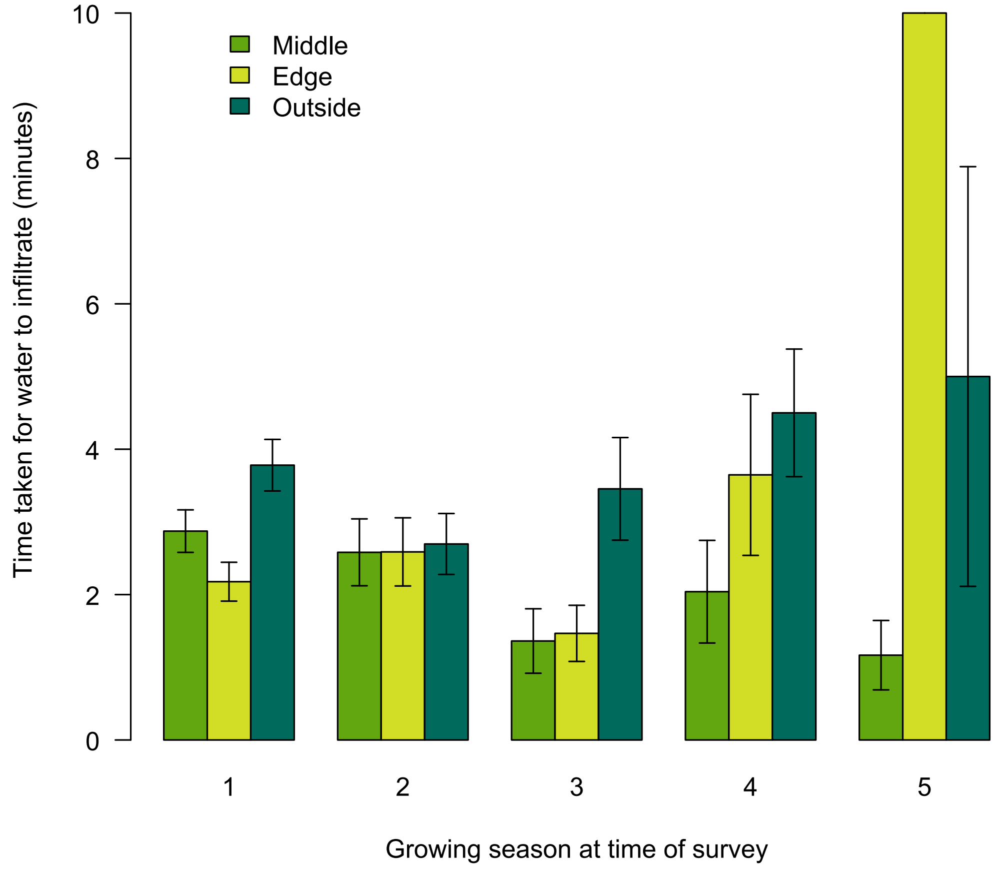


Figure 7. Average infiltration rate as forests age.

Soil Health

Soil colour, texture and compaction are assessed in Tiny Forests as they give an indication of changing soil health. Healthy soil not only supports healthy trees, it also tends to be softer, allowing for faster infiltration. In 2025 citizen scientists carried out 111 colour compaction and texture surveys across 43 Tiny Forests.

Soil Compaction

Soil compaction is on average 38% lower inside a Tiny Forest than outside (Figure 8). This compaction appears to remain consistent regardless of forest age.

Compact soils have had the air stamped out of them, which limits water infiltration, and when compaction reaches more than 30 kg/cm^2 or 3 MPa, restricts root penetration and slows tree growth.

Providing healthy, decompacted soil for planting is a core element of the Miyawaki method, and is likely a major driver of the forests' rapid early growth. Decompaction improves oxygen availability, root penetration, and water infiltration, giving young trees the conditions they need to establish quickly.

Soil texture

Soil texture describes the proportion of sand, silt and clay-sized particles, which can influence how water is absorbed, retained, and drained.

The most common soil textures sampled inside Tiny Forests in 2025 were Sandy Clay Loam (18%), Clay Loam (17%), Sandy Loam (12%), and Loam (10%).

Outside the forest, Silty Clay Loam dominated (18%), Sandy Clay Loam (15%), Sandy Loam (15%), and Loam (15%). As such, Tiny Forest sites sampled in 2025 were dominated by moderately fine to medium classes. The proportions of each texture are broadly similar across zones, with only small differences.

Soil colour shows a similarly consistent pattern. Most samples fall within brown to dark-brown Munsell groups such as H-5, H-6, and related mid-brown tones, with grey–brown and yellow–brown colours appearing less frequently. Again, differences between inside and outside areas are modest, and both zones are characterised by the same general range of mineral topsoil colours.

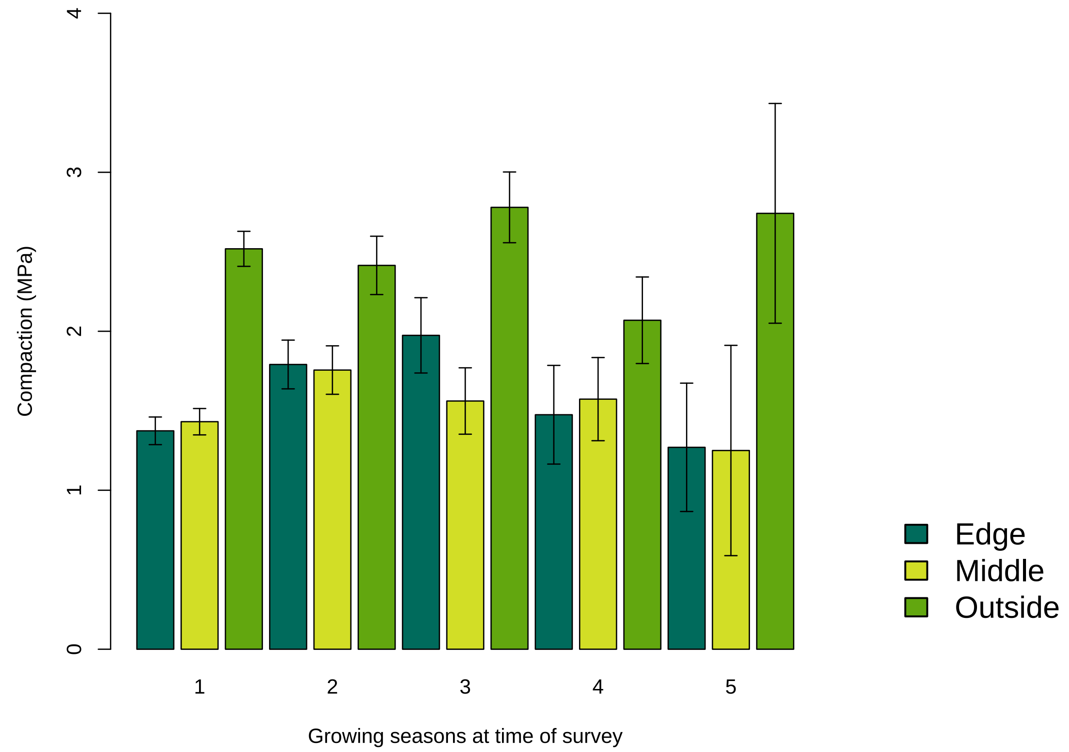


Figure 8. Average soil compaction in and outside of Tiny Forests by growing season.

Taken together, the texture and colour data suggest that Tiny Forest soils largely reflect the surrounding baseline site conditions, with minor differences likely driven by soil preparation techniques aimed at reducing compaction and adding soil amendments.

These soil health measurements describe the surface horizon of the soil. This layer is central to the biological functioning of young Tiny Forests. The upper soil typically contains the highest concentrations of organic matter, nutrients, fine roots and microbial activity, and it is where processes such as decomposition, nutrient cycling and seedling establishment are most active. These conditions strongly influence early tree development and the establishment of below-ground communities.

As the forests mature, continued monitoring of the surface horizon will help us understand how these processes gradually change over time. In developing forests, increases in leaf litter, root turnover and microbial activity can slowly alter the surface soil—potentially increasing organic matter, improving structure and supporting a more active soil community. Tracking these changes across many years will help us identify whether the Tiny Forests are contributing to the development of healthier, more biologically active, and flood mitigating soils at their sites.

Plot Twist: First-Year Findings from Mutton Brook's Three Experimental Plots

One question we are often asked during Tiny Forest plantings is ***'Do we really need to dig the soil to 1m deep?'*** It's a fair concern — deep digging is expensive, invasive, and can disturb soil carbon and microbial life. At Mutton Brook in Barnet, London, we had the opportunity to trial three different soil preparation methods next to each other:

- **Excavation (control):** the standard Miyawaki soil preparation: 1m excavation and addition of site-specific soil amendments.
- **Excavation with biochar:** the standard Miyawaki preparation, including site-specific soil amendments, plus handfuls of charged biochar, a stable, carbon-rich material produced by heating organic biomass (such as wood, crop residues, or green waste) in a low-oxygen environment
- **Sheet mulch:** a no-dig method where organic matter is layered on top of wet cardboard and left to break down for 6 months before planting.

Tree species, planting timing, and tree density were all kept the same, ensuring that the only variable differing between sites was the soil preparation method. This allows us to confidently compare how the different soil interventions influenced early tree growth and establishment.

This trial was made possible through collaboration with A Healthier Earth, who supplied the biochar and half the trees — grown from seed in their *ForestFactory™* vertical farm.

To date, **trees in both excavated plots are outpacing those in the sheet-mulched plot.** Trees in the standard excavation plot show 50% faster height growth and three-times-faster diameter growth, while trees in the biochar plot have twice the height growth and three-times-the diameter growth compared with those in the sheet-mulched plot (Figure 9).

The findings highlight just how much soil preparation shapes early forest development, offering valuable evidence to guide future Tiny Forest design and investment.

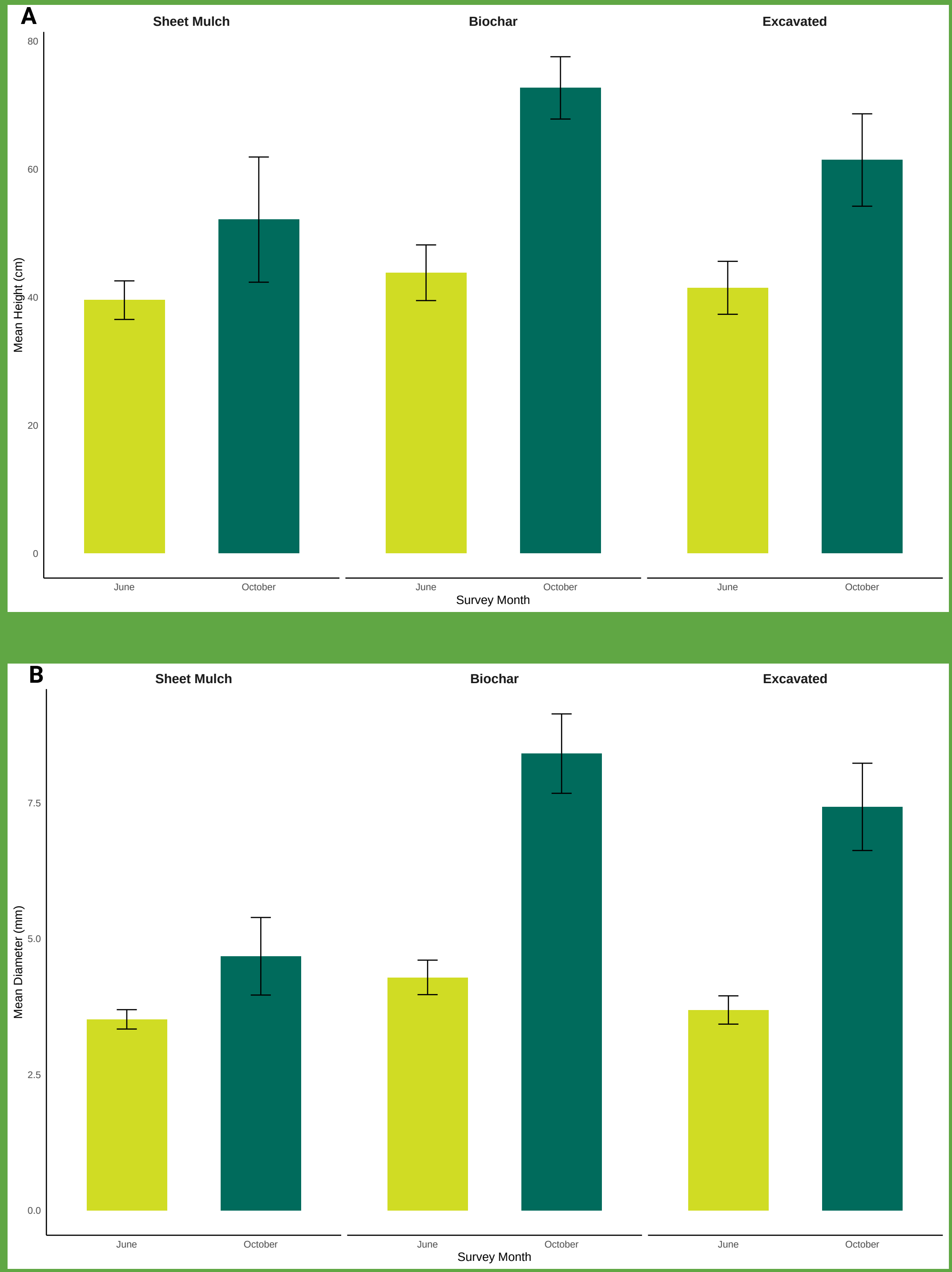


Figure 9. Mean a) tree height and b) diameter growth across three Tiny Forests

Ecosystem service 3 - Tree growth and carbon storage

Our research questions:

- How fast do the trees grow?
- How do Tiny Forests store Carbon?
- How does tree growth and Carbon storage vary from one forest to another?

Carbon moves naturally through ecosystems. During photosynthesis, plants absorb carbon dioxide (CO_2) to store as carbon in leaves, stems and roots. As plants shed material, some of this carbon enters the soil, where microbes break it down; some of this carbon is released back to the atmosphere, while some of it becomes stabilised as soil organic matter. Root growth and root-derived compounds also contribute to building soil carbon over time. Human activities disrupt this balance by releasing CO_2 from long-term geological stores through the combustion of coal, oil and gas, increasing atmospheric concentrations and driving climate change.

Planting trees uses natural cycles to draw carbon out of the atmosphere and store it in living biomass. To estimate how much carbon our trees hold, we use an allometric equation (Box 1), a well-established and trusted method. However, it does have limitations. Trees in Miyawaki forests may grow differently - investing more in growing tall than wide - and the equation was not developed specifically for the species mixes we plant. It also accounts only for carbon stored above ground in trunks, branches, and leaves, and does not include carbon held in roots or soil. This means we might be underestimating the total carbon stored in our Tiny Forests.

$$C = 0.0577 \times D^2 \times H \times 0.25$$

In this equation, C is the carbon in the stem of the tree; 0.0577 is a constant in the allometric equation; D is the diameter of the trunk of the tree, in cm, squared; H is the height of the tree in meters; and 0.25 is to account for the conversion from green weight to dry weight. One limitation of this you might already notice; we have the same equation for Silver Birch and Oak, and all other species. As we collect more data, hopefully we can build better models, tailored to particular species in Miyawaki forests!

Box 1. The Allometric Equation to estimate tree mass and Carbon content.

Of the almost 3,000 trees measured in 2025 (Figure 10), the tallest is a 4-year-old Wild Cherry, in Hammersmith Park at 540cm! Wild Cherry trees normally grow 30-60cm per year; in comparison, this tree has been growing over 100cm per year, showing the benefits of Miyawaki soil preparation for supporting tree growth[19]. Wild cherry trees at the same forest also had the largest diameter at 8cm, indicating that trees in Miyawaki forests are investing both in vertical growth and structural support.

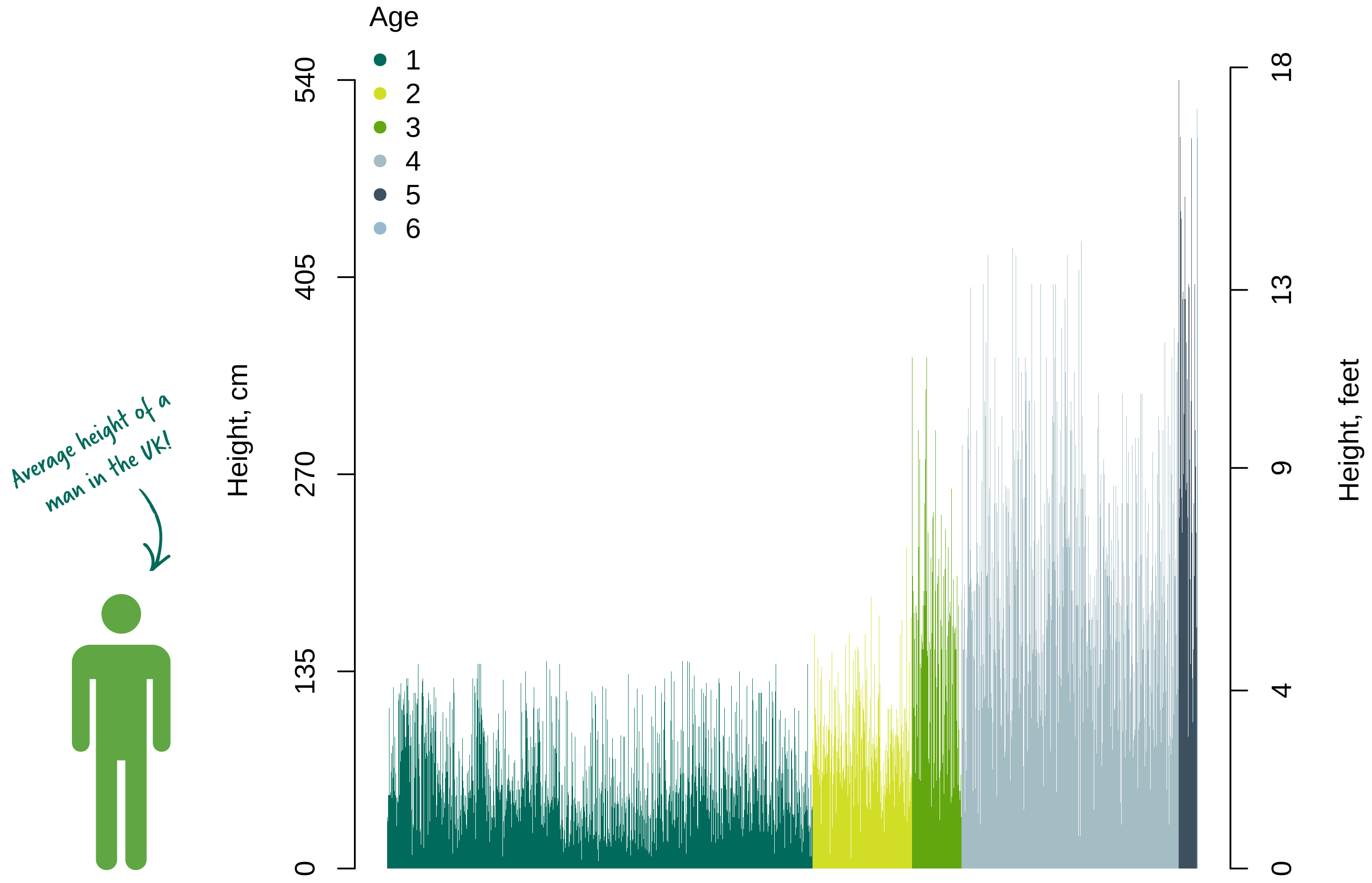


Figure 10. The height of Tiny Forest trees (cm and feet) measured in 2025 arranged by forest age.

We can use the height and thickness of trees to estimate the carbon stored in each Tiny Forest, based on its age, as shown in Box 1 and Figure 11. From years 1-5, Tiny Forests store exponentially more carbon each year, with 5-year-old forests storing 570kg, compared to 4-year-old forests storing 147kg, and 3-year-old Tiny Forests storing 63kg.

By adding the Carbon stored across all our Tiny Forests of a given age, we can estimate that the entire Tiny Forest network is storing 35,500 kg of above ground carbon, or about 130 tonnes of CO_2e - the equivalent of driving around the equator 12 times in a typical petrol car!

In 2025, citizen scientists measured the height and diameter of 2928 trees at 75 Tiny Forests! That's almost 20,500 minutes spent surveying trees (or a return trip across Russia on the Trans-Siberian Railway).

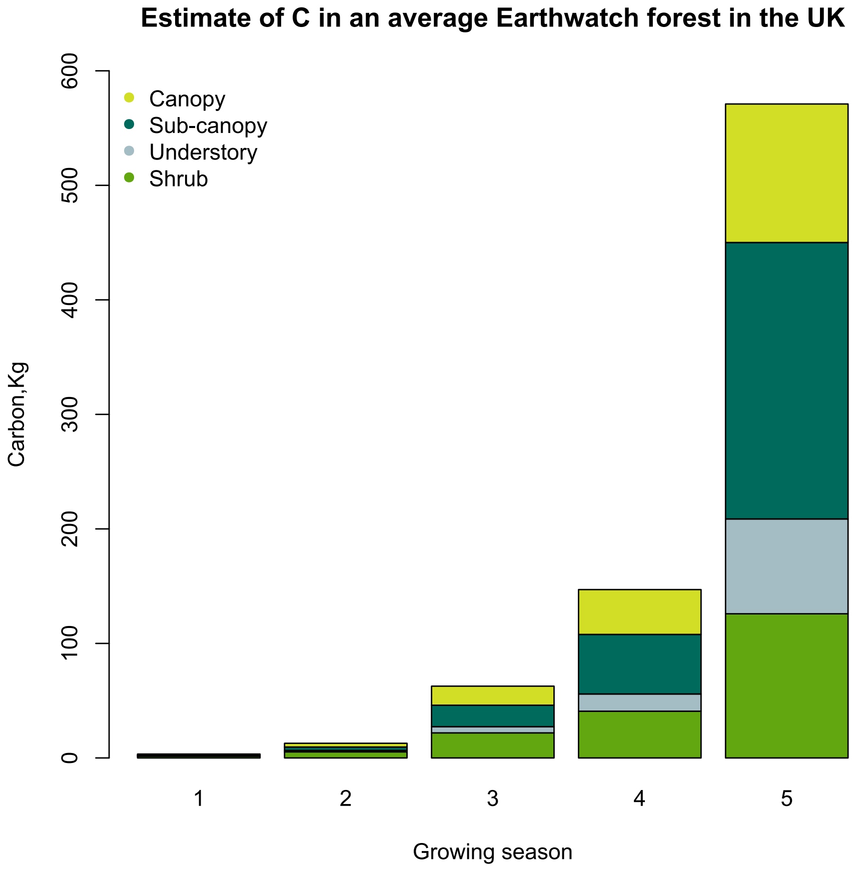


Figure 11. Carbon stored in Tiny Forest layers as they age.

Every measurement plays a vital part in helping us understand how Tiny Forests develop over time. Some types of data are especially valuable because we have fewer samples from them. As Table 1 shows, we already have a strong foundation of samples from younger forests, thanks to your huge collective effort. Older forests are still less common in the network, so each new sample from these sites is particularly informative.

This year's citizen-science data accounts for 75% of all the information we now hold on four-year-old forests. As these sites continue to mature, long-term monitoring will help us understand when growth begins to slow, what 'maturity' really looks like, and whether Tiny Forests follow different development pathways compared with other planting approaches.

Forest age	Total number of data points	Data points in 2025	% of data collected this year
1	8302	1396	17%
2	4875	261	5%
3	2537	239	9%
4	1305	974	75%
5	149	52	35%
6	6	6	100%

Table 1. Sample size and relative contribution of new values to dataset.

Tiny Forests vs Traditional Tree Planting: How Do They Compare?

One of the questions we often hear is: *"Do trees survive better in Tiny Forests than with traditional planting?"*

To explore this, we worked with Coventry City Council to plant a Tiny Forest and a traditional tree planting area side by side. The Tiny Forest consisted of 600 native trees in a 200 m^2 area, with soil mounded to 30cm (rather than excavated) and a 5cm mulch layer. The traditional planting consisted of 400 trees at 1–2m spacing, with no soil preparation and minimal mulching. **After 6 months we returned to measure survival. In the Tiny Forest, 95% of trees were still alive; whereas in the traditional planting, 0% survived.**

This pattern reflects wider trends. **The Trees Outside Woodland programme found trees in Miyawaki Forests were over 1.5 times as likely to survive the first two years than if planted using traditional planting methods.** These early results suggest that Tiny Forests can offer a more resilient way to establish trees in urban areas, though long-term monitoring will tell us more.

Ecosystem service 4 - Thermal comfort

Our research questions:

- Do Tiny Forests have a cooling effect?
- Do local microclimate conditions differ within the Tiny Forest compared to urban surroundings, and how do people perceive these differences in terms of thermal comfort?
- What kind of effect does thermal comfort have on human health and wellbeing?

Urban areas in the UK often experience higher temperatures than in the countryside, a phenomenon known as the urban heat island effect. This happens because materials like concrete and asphalt absorb and retain heat, while the lack of green spaces reduces natural cooling. Trees and urban forests are nature's air conditioners and can significantly help to cool our towns and cities.

As Tiny Forests mature, their ability to influence local temperatures increases because taller trees and denser canopies provide more shade, greater transpiration, and stronger sheltering effects. Seasonal patterns then shape how this influence is expressed. In summer, cooling is likely to be strongest, driven by shade and higher rates of transpiration. In spring and early autumn, the effect may be smaller, especially before full leaf-out or as leaves begin to senesce. In winter, although trees do not cool the air in the same way, they can still help to moderate conditions by reducing wind speeds and limiting heat loss from the ground and nearby buildings. As such, measuring thermal comfort throughout the year provides valuable insight into how these forests shape local conditions as they mature. Our expanding dataset now includes measurements taken across all seasons.

How does the location within a Tiny Forest affect temperature, humidity and windspeed? For temperature and humidity, location and age together explain only a small fraction of the overall variation, and no simple pattern emerges up to growing season five (Figure 12a and b). Measurement location within Tiny Forest has a clear effect on wind speed as conditions at the edge and in the middle of the forest are consistently less windy than outside (Figure 12c), with some evidence that this sheltering effect strengthens as forests age.

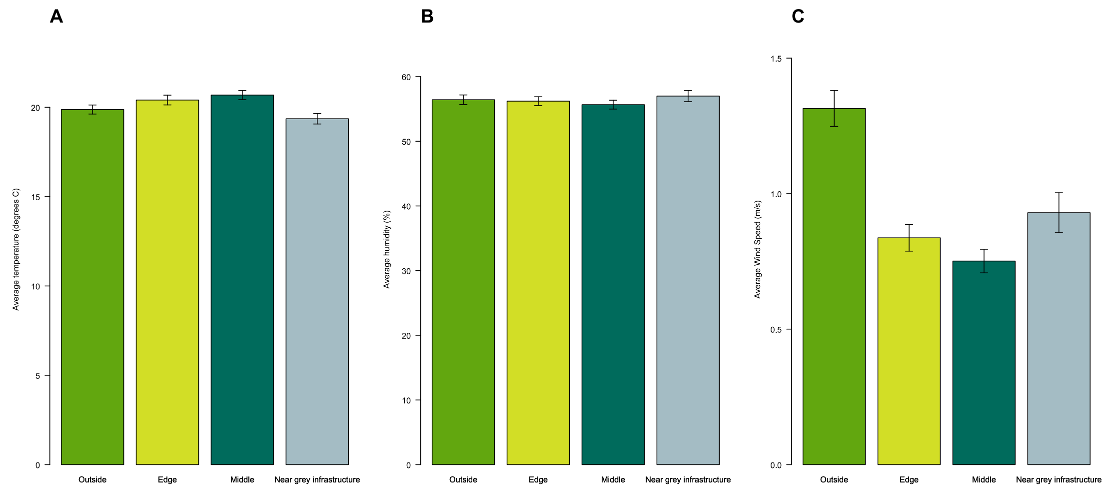


Figure 12. Average a) temperature, b) humidity, c) wind speed inside and outside Tiny Forests.

Thermal comfort is less about the absolute temperature and more about how people feel in the environment. Figure 13 illustrates how people rate their thermal comfort depending on whether measurements were taken within the forest (a: middle or edge) or outside (b open ground or near grey infrastructure).

Across all growing seasons, responses inside the forest were generally more positive. Neutral and comfortable ratings consistently made up 70% or more of all inside/edge responses in Seasons 1–3, rising to over 80% in Season 4 and 50% very or moderately comfortable in Season 5. Discomfort levels remained very low throughout (typically 10–20% of responses).

In contrast, responses outside the forest show a slightly different pattern. Although the general trend is still toward comfort, the comfortable categories form a smaller share of responses overall, and the uncomfortable categories occupy a larger proportion compared with inside the forest. This indicates that people tend to feel less thermally comfortable in open or grey-infrastructure surroundings than when standing within the forest canopy or at its edge.

Taken together, these results suggest that Tiny Forests offer a meaningful thermal comfort benefit, with visitors consistently reporting that they feel more comfortable inside the forest than in the surrounding open environment. This aligns with the expected microclimatic buffering provided by vegetation—shade, moderated temperatures, and reduced wind exposure.

There were 227 thermal comfort studies conducted in 2025, across 50 Tiny Forests. The most intensely studied forest was Meadow Lane in Oxford, with 25 reported surveys of their Miyawaki forest.

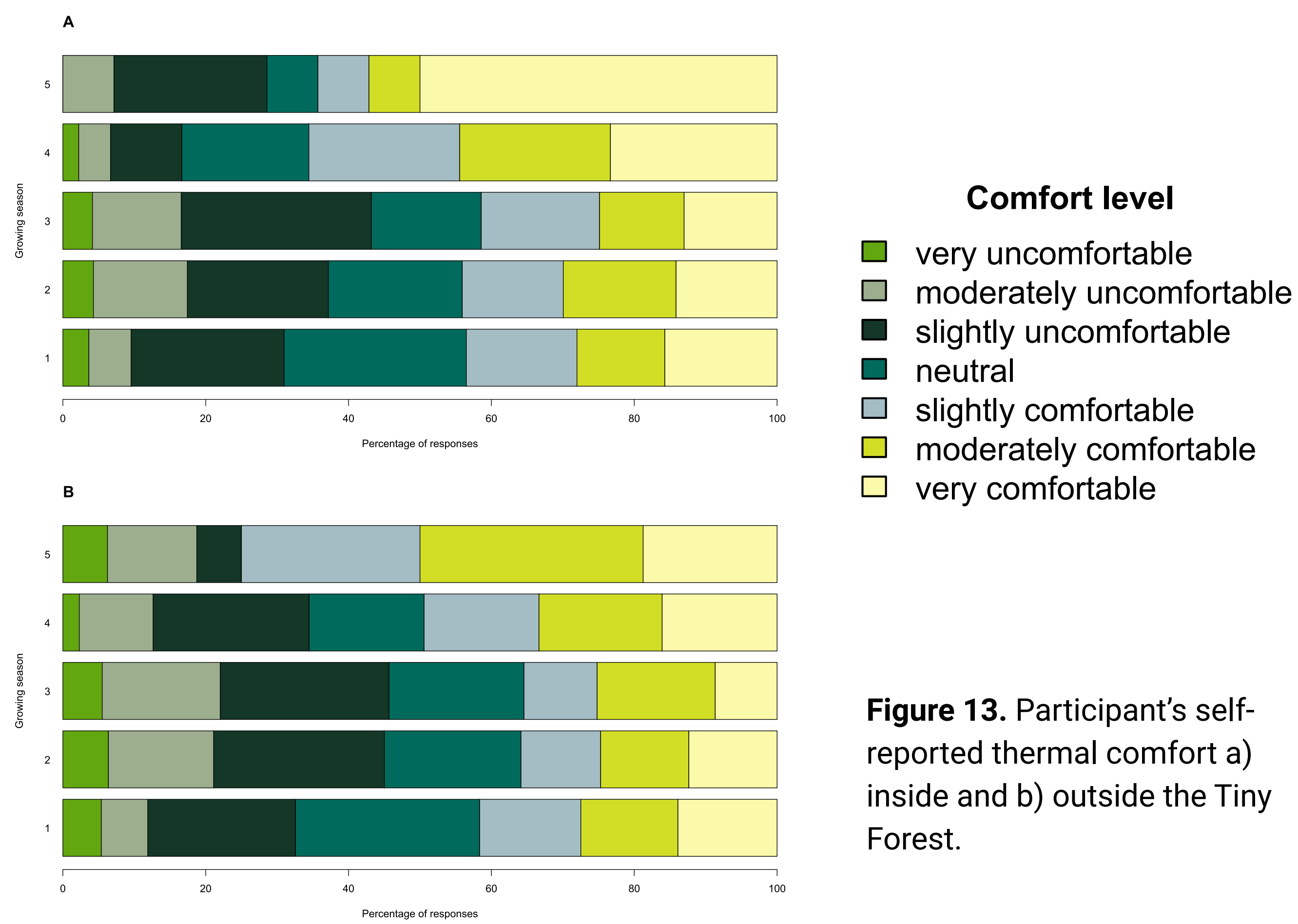


Figure 13. Participant's self-reported thermal comfort a) inside and b) outside the Tiny Forest.

Ecosystem service 5 - Social Benefits

Our research questions:

- What is the social reach of Tiny Forest?
- How can planting, monitoring and engagement activities be designed to foster nature connectedness?
- Does improvements in nature connectedness lead to more pro-environmental behavior?

Lack of access to greenspace in the UK predominately affects people living in deprived areas, minority ethnic groups, and younger people[20] . Earthwatch Europe is helping to address this inequality by planting high quality green space in urban areas across the UK, and engaging people in connecting with those spaces through implementation, environmental monitoring and community events.

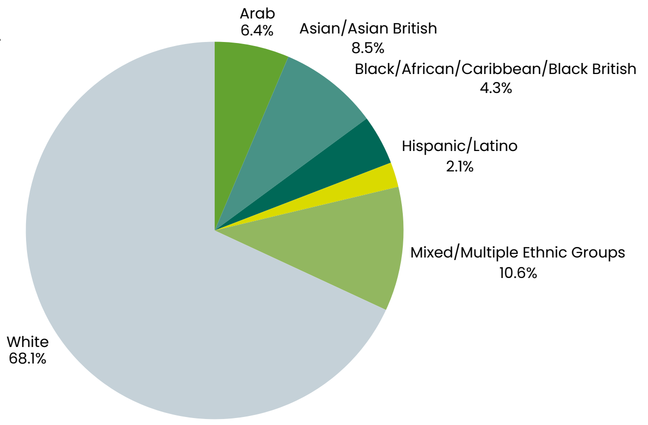
Across the UK, the Index of Multiple Deprivation can be used as an indicator of areas experiencing inequality in greenspace provisioning and access. The IMD ranks every small area in England 1 (most deprived) to 32,844 (least deprived). Scotland, Wales and Northern Ireland have their own IMD rankings. To date, over 54% of UK Tiny Forests are planted in areas that score 4 or below on the IMD.

Being in and interacting with nature improves our mental and physical well-being, as well as how we relate to and feel about nature - our nature connectedness – and, therefore our attitudes and behaviours towards it[21-22].

In 2025, Earthwatch Europe ran 40 monitoring events at 44 Tiny Forests, training 2271 citizen scientists across the UK. This builds upon the already active group of Tree Keepers who care for and monitor their local Tiny Forests.

At a subset of these events, PhD student Babette van Gerwen carried out surveys to explore the nature-connection benefits of participation. She found that it was normally participants' first visit to a Tiny Forest, and that their motivations were primarily value-driven: 81% wanted to contribute to conservation, and 74% sought to spend more time outdoors. Participants were predominantly University educated (89% held a degree or higher), slightly less ethnically diverse than the London population (68% White; 32% from minoritised ethnic groups), had a median age of 35–44, and were mostly female (60%) (Figure 14).

A



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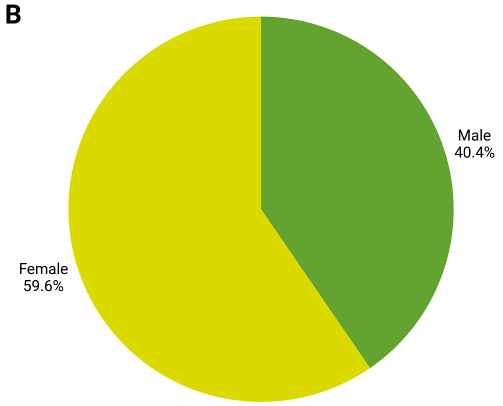
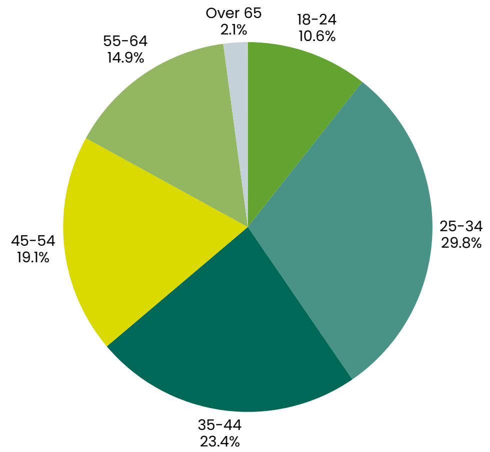


Figure 14. Participant demographics at London Tiny Forest monitoring events a) gender, b) age

C



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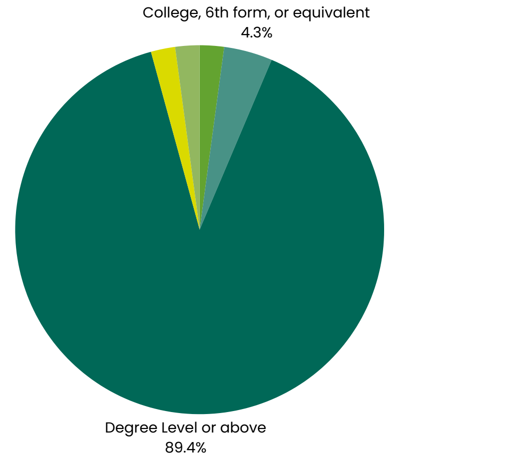


Figure 14 cont. Participant demographics at London Tiny Forest monitoring events c) ethnicity, d) education level

Studies of UK citizen science projects have found that participants are typically White, middle-aged to older men from higher socio-economic and educational backgrounds, with over 90 % identifying as White, the vast majority educated to at least degree level, and participation increasing with age[23-24]. As such, Tiny Forest events attracted a broader and younger group of volunteers than is usually seen in environmental citizen science.

Following participation, attendees reported an increase in environmental and social connectedness—feeling 8% more connected to nature (Figure 15), 5% more connected to their local community, and 3% more responsible for their local environment.

Qualitative responses show that all participants (100%) agreed that they felt close to nature through their senses, found the experience calming or joyful, noticed the beauty of nature, and considered their participation meaningful and helpful in caring for nature.

Overall, the findings show that Tiny Forest is helping to make citizen science more inclusive and to demonstrate its potential as a tool for social connection and environmental awareness. Participants not only reported feeling more connected to nature, their community, and local place after taking part, but did so through activities delivered in diverse, urban settings. This provides encouraging evidence that accessible, community-focused approaches can extend the reach of citizen science and amplify its positive impacts for both people and nature.

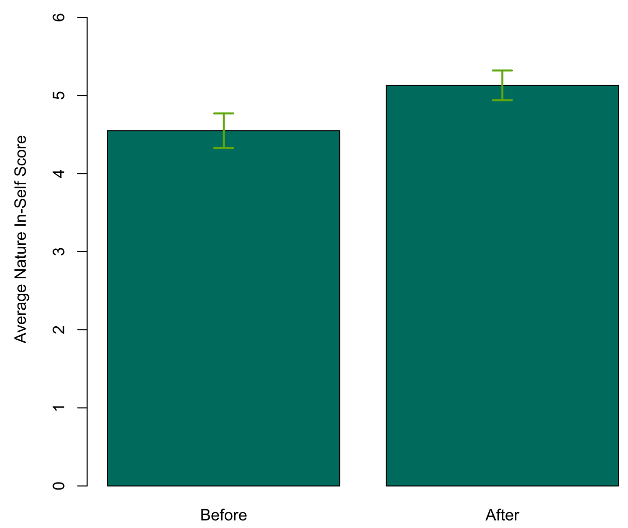


Figure 15. Average participant nature-connectedness, before and after citizen science activities, as reported using the Nature in Self scale.

Tree Keeper Motivations

One of the central challenges in citizen science is understanding not only why volunteers join, but why they stay; especially in place-based conservation projects where long-term care matters.

Milly Wang, an MSc student at Imperial College London, explored exactly that by speaking with twelve Tree Keepers she met at Tiny Forest Tree Keeper parties, asking them about their original motivations, what keeps them involved, and how their sense of nature connectedness or community belonging shapes their commitment.

Their stories reveal a clear pattern: people initially join for simple, personal reasons—loving nature, enjoying being outdoors, or wanting to look after young trees—yet their motivations deepen over time into a richer blend of stewardship, emotional connection, pride, and the quiet strength of relationships formed through shared tasks (Figure 16).

This framing shows that Tiny Forests thrive not because volunteers arrive with complex motivations, but because the project environment gently nurtures motivation as people return, notice more, and come to care more deeply.

How does this compare to your experience of volunteering with Tiny Forest?

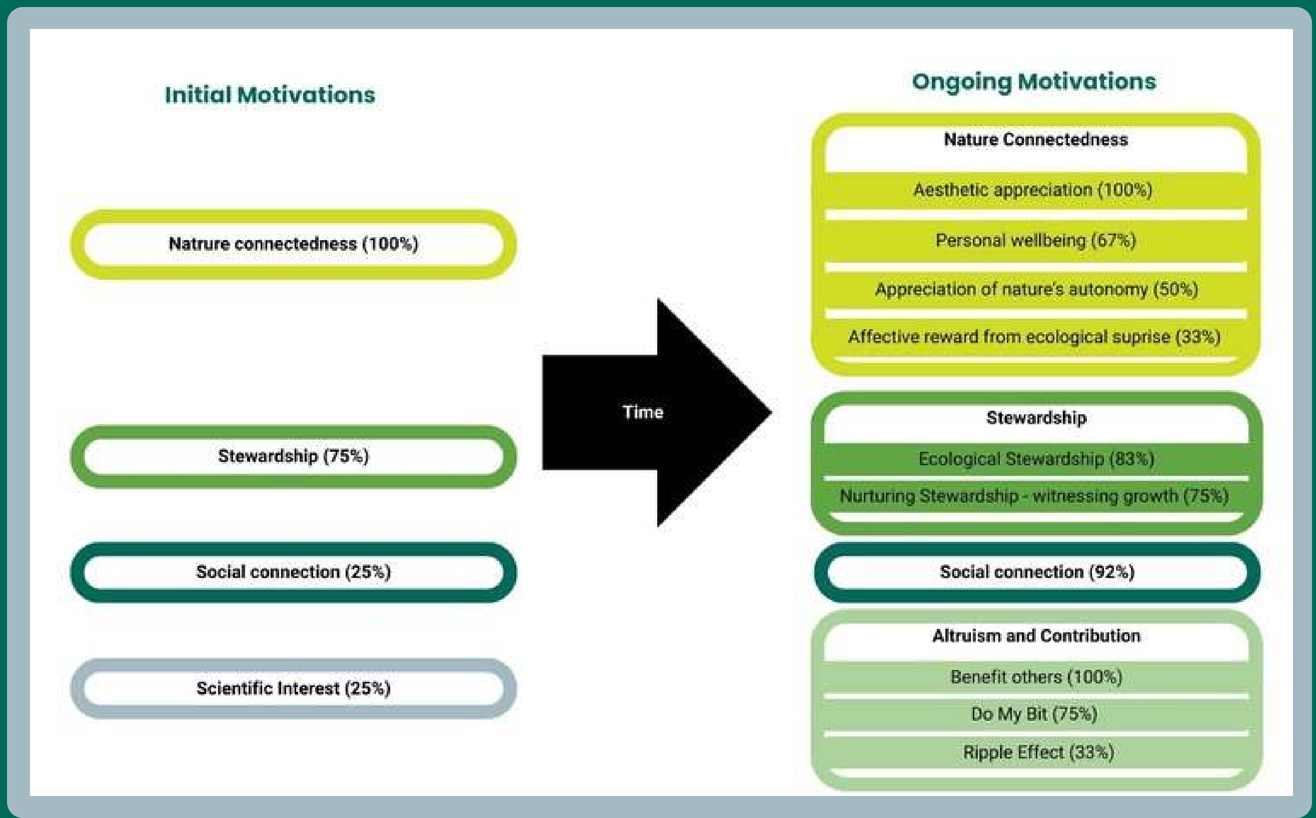


Figure 16. Initial and ongoing motivations of Tiny Forest volunteers

The people behind the data

This report wouldn't be possible without the hard work of Tiny Forest Tree Keepers and citizen scientists. To date, around 48,000 people have participated in planting, monitoring and caring for Tiny Forests across the UK. Tree Keepers lead the charge, organising data collection events and looking after their local Tiny Forest. Here are a few of their stories.

New Road Park Tiny Forest was planted in March 2025 in what had once been a small, underused patch of grass enclosed by houses. For years, Mina—chair of the Friends of New Road Park—had worked to protect the space from development and to strengthen its role as a community asset. But without clear council support, progress stalled and the park remained vulnerable. When Haringey Council selected the site for a Tiny Forest, it transformed everything. The commitment to long-term stewardship provided the security local residents had been fighting for. As Mina said, the project didn't just plant trees—"it saved the park."

From the outset, the forest took shape through community collaboration. During soil sampling and design workshops, residents chose a layout with a small pathway that encourages people to step into the growing woodland. The energy carried into planting day, when forty pupils from nearby Lordship Lane Primary—joined by neighbours, families, and volunteers—helped plant hundreds of native trees in a joyful, muddy afternoon of teamwork.

Since then, the Tiny Forest has helped shift the atmosphere of the park. Residents report that what was once a space associated with antisocial behaviour now feels welcoming and cared for. Regular weeding sessions, wildflower sowing and informal meet-ups have created a steady rhythm of activity. Mina remains a driving force—organising watering during heatwaves, rolling in her wheelie bin for litter-picks, and rallying neighbours for events that bring life to the space. Her reflections capture the depth of connection felt across the community:

> *"Because the space has a lot of history, a lot of senior residents around the park feel very connected with it. We also have a lot of young families here like my family. We felt that it's a great space for the local children to come and play. Living in London can be a challenge because of the traffic and pollution, but we felt like we do have an opportunity here to create a space where they can learn from nature that can contribute to the environment, and they have a nice time with the friends. For me, it's a great space for my wellbeing, to relax after a stressful day at work and do some weeding."*
>
> **Mina, Tiny Forest Tree Keeper at New Road Park**

The forest has also become a vital resource for local education. Almost 40% of Tiny Forests across the UK sit on school grounds, and New Road Park shows the same potential even as a neighbourhood site. Lordship Lane Primary—just minutes away—has begun using the forest for hands-on learning. With Earthwatch Europe's curriculum-linked resources, teachers can bring science, geography and maths outdoors. Pupils investigate soil, biodiversity, weather and tree growth through real data collection, building curiosity and confidence as young scientists.

As Year 4 teacher and Forest School Leader Keisha King explains:

> *"It's just so important that any space that we can find in London can be turned into something like this with Tiny Forest, making it accessible to the children and access the curriculum through that. Getting them outside, use their hands, involved in science and asking questions is so important."*
>
> **Keisha King, Year 4 teacher & Forest School Leader, Lordship Lane Primary**

The impact is tangible. The school is located in one of the most polluted parts of London, and pupils speak with clarity about why urban nature matters. When asked why forests are important, every pupil answered in a similar way: "because it gives us oxygen."

Together, these moments tell the story of what New Road Park Tiny Forest has become: a place of safety, learning, wellbeing and community pride—rooted in the dedication of its residents, and flourishing in the hands of the next generation.

Where do we go from here?

Restoring urban biodiversity and nature connection has never been more important. We believe that there are four key areas that Government and stakeholders need to address to create a national strategy for biodiverse cities of the future.

Embrace natural spaces and nature-based solutions

Nature-based Solutions address societal challenges through actions to protect, sustainably manage, and restore natural and modified ecosystems, benefiting people and nature at the same time. Earthwatch believes that urban developers need to plan for natural spaces and implement nature-based solutions across our cities – including tree-planting, wildflower meadows, wetlands and rain gardens, green roofs and living walls – and that these solutions should be at the forefront of urban policy towards climate mitigation and adaptation.

Improve equal access to natural spaces

Around 1 in 3 people in the UK don't have access to nature-rich spaces near their homes, with fundamental disparities disproportionately affecting people from Black, Asian and minority ethnic backgrounds and those living on a lower income. Earthwatch believes that all people, regardless of background, should have equal access to natural spaces. We want to see the barriers to access addressed, in part through the engagement of communities.

Empower and engage communities

Access to nature is associated with better health and wellbeing outcomes, with green spaces helping to bind communities together and reduce loneliness. We believe communities should be empowered to assist in the planning, creation, maintenance and – where applicable - monitoring of natural spaces. We want to see communities supported to care for and enjoy their existing local green spaces. By engaging communities in the design and development of natural spaces in urban areas, we can better appreciate the cultural variation in how people want to spend time in these environments and foster a greater sense of nature connection.

Facilitate outdoor learning

Fewer than 1 in 10 children regularly play in wild places, compared to 5 in 10 a generation ago. Earthwatch believes teachers and educators should be equipped with the tools they need to take learning outside, inspiring their children and young people to build curiosity of the natural world, create solutions-focused thinking and build a foundation of strong scientific knowledge of the environment. We want to see education policy support the creation of quality green spaces in school grounds that educators and students can access and enjoy on a daily basis and support for teachers and pupils to embed nature-positive learning into the curriculum.

Acknowledgements

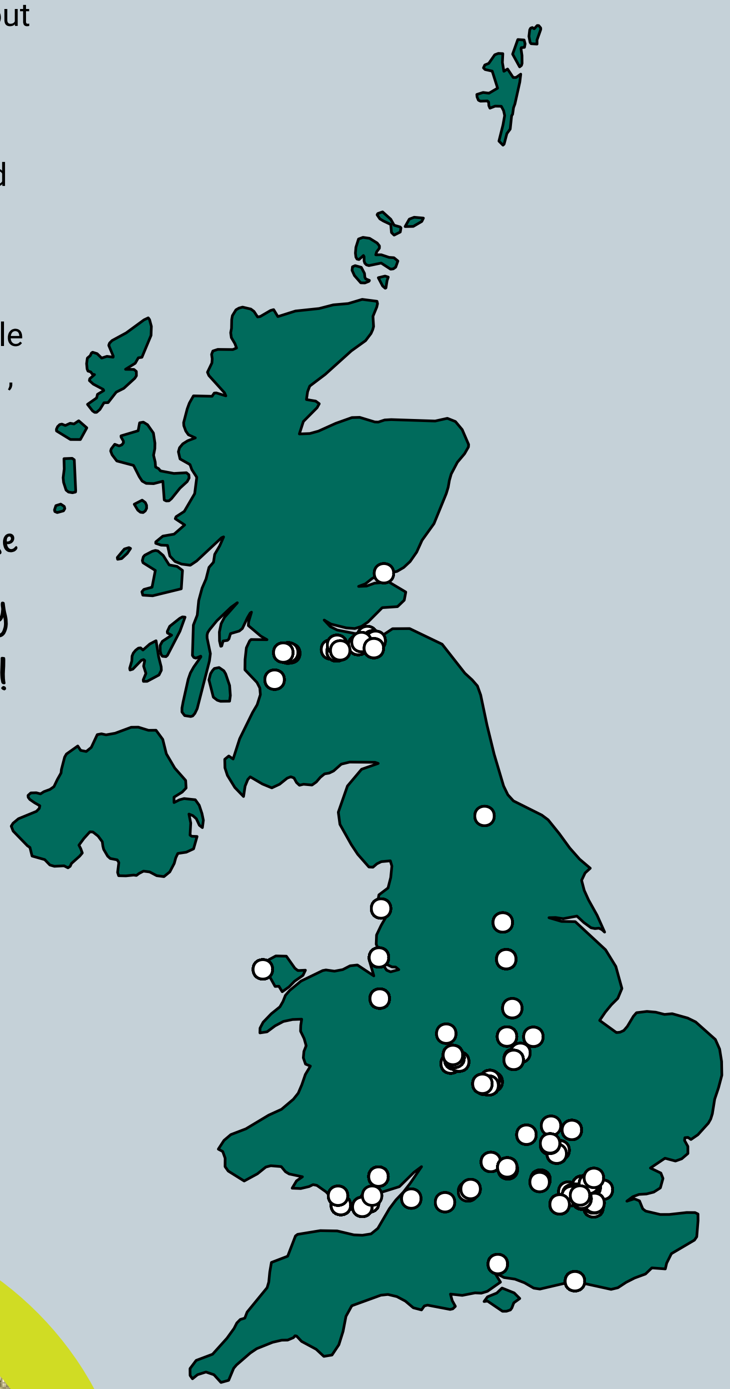
We couldn't do any of this without you. Thank you to all of the amazing citizen scientists, volunteers, and Tree Keepers who have contributed to this research over the last four years.

Some of our forests might seem tall, but they're still young and we have much more to learn from them. So please, do keep going out there and collecting data … the more the better.

For more information on how to get involved visit the Tiny Forest website: tinyforest.earthwatch.org.uk/get-involved.

The Tiny Forest project would not be possible without the support of our funders, partners , schools and volunteers. **Thank you all.**

The data in this report come from right across the Tiny Forest network in the UK!



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