FUTURE CLIMATE SUITABILITY OF LONDON'S PUBLIC REALM TREES

FINAL REPORT NOVEMBER 2025

URBAN PLANT LAB

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Dr Andrew Hirons is a Director at Urban Plant Lab and a Senior Lecturer in Arboriculture and Urban Forestry at University Centre Myerscough. As well as having a range of teaching responsibilities on modules relating to tree biology, tree establishment and urban tree management, he is also actively involved in research.

Primarily this research is motivated by the need to create resilient urban forests that meet the needs of society. He has particular interest in tree species selection for urban environments, tree water relations and abiotic stress in trees. In addition to publishing academic papers, Andrew co-authored *Applied Tree Biology* (Hirons and Thomas, 2018), a textbook focusing on the integration of science into the management of trees and the professional guidance, *Tree Selection for Green Infrastructure: A Guide for Specifiers* (Hirons and Sjöman, 2019).

KEVIN MARTIN

Kevin Martin is a Research Fellow at Urban Plant Lab. He serves as the Head of Tree Collections at the Royal Botanic Gardens Kew, where he is responsible for curating the tree collection. Charged with safeguarding the collection's future amid the dynamic landscape of climate change, Kevin's passion lies in comprehending its impact on trees and pioneering methods to pinpoint species resilient to forthcoming environmental shifts.

Kevin holds a Research Master's degree from the University of Lancaster, his research focused on species distribution modelling and future climate projections. By embracing data-driven approaches, he aims to revolutionize tree selection strategies, ensuring that Kew Gardens remains at the forefront of botanical conservation. Through his academic pursuits, Kevin aspires to integrate cutting-edge methodologies to fortify the resilience and sustainability of Kew's botanical collections in the face of increasingly complex environmental challenges.

ACKNOWLEDGEMENTS

Urban Plant Lab is a not-for-profit organisation that has been established to benefit those seeking to select and establish plants for urban environments. Resilient green infrastructure is vital to societal wellbeing and relies on informed species selection complementing other aspects of planning and management. Urban Plant Lab delivers research, guidance and training to help secure quality green spaces for future generations.

We would like to thank the following for their support through engaging in a project workshop and thoughtful discussion:

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Royal Botanic Gardens Kew

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MAYOR OF LONDON

BY WORKING TOGETHER, WE CAN ENSURE LONDON'S TREESCAPES REMAIN HEALTHY, DIVERSE, AND RESILIENT WHILST PROVIDING BENEFITS FOR GENERATIONS TO COME.

A panoramic view of London's urban forest taken from Severndroog Castle, looking towards the City of London. © Paul Wood

EXECUTIVE SUMMARY

Trees in London's public spaces – parks, streets, squares – play a vital role in making the city healthier, cooler, and more liveable for both people and wildlife. However, as the climate changes, life will become more challenging for many of these trees.

This report, commissioned by the Greater London Authority and the Forestry Commission, assesses how well London's public realm trees are likely to cope with projected climate conditions in 2090.

London is the first city in the world to commission such a comprehensive climate suitability assessment of its public trees. This puts London on the front foot, with the evidence needed to act early and strategically.

Findings from this research are specific to London, they should not be applied to other cities or regions, even within the UK, as climate projections and growing conditions vary substantially.

A native oak tree enriching the urban realm in the autumn sun. Photographed in Woodberry Wetlands. © Paul Wood

EXECUTIVE SUMMARY CONTINUED

KEY FINDINGS

If no changes are made, in total, 73% of London's public trees may struggle to thrive or survive as the climate changes.

– Only 0.38% of London's current trees are considered highly suitable for future climate conditions.

– 22% of London's current trees have moderate suitability to future climate.

– 62% of London's current trees are rated as having low suitability to future climate.

– 10.6% of London's current trees are considered vulnerable to future climate.

The impact of this analysis will only be borne if nothing is done to adapt and address the composition of London's urban forest. Therefore, huge opportunities exist to improve the suitability of London's trees to future climate through positive shifts in policy and practice.

HOW THE ASSESSMENT WAS DONE

The study analysed data from over 1.1 million public trees across London. Each species was assessed for its suitability to London's projected climate in 2090 using a composite scoring system that combined global species distribution data and plant trait analysis.

Species were grouped into four climate suitability categories:
– High suitability: Likely to thrive under future conditions.
– Moderate suitability: May perform well, especially if sourced from regions with compatible climates.
– Low suitability: Expected to struggle, though some improvement may be possible through careful sourcing.
– Vulnerable: Unlikely to survive or thrive, with no presence in analogues of London's future climate.

WHY THIS MATTERS

Trees that are poorly suited to future conditions may grow slowly, be more vulnerable to pests and pathogens, and die prematurely – reducing the many benefits they provide.

Publicly owned trees deliver around 60% of the ecosystem services London's urban forest provides, this includes cooling, air purification, and stormwater management. The resilience of London's overall public tree population is critical to sustaining the environmental and cultural benefits Londoners rely on.

RECOMMENDATIONS

To protect London's urban forest, we make the following recommendations:

1. Enhance the health of existing trees.
2. Strategically diversify London's urban forest.
3. Fund tree establishment, not tree planting.
4. Adopt a London tree data standard.
5. Collaborate with tree nurseries.
6. Develop a strategic mechanism to get novel plant material into horticultural production.
7. Address gaps in plant trait data.
8. Evaluate potential canopy cover impacts of species climate suitability.
9. Develop London-wide strategies and structures to manage the whole of London's urban forest.
10. Apply this analytical framework to other cities and regions.

CONCLUSION

Ensuring the resilience of London's urban forest requires collective action from strategic authorities, tree managers, nurseries, researchers, funders and Government. Each has role to play in enacting the recommendations of this report; by working together, we can ensure London's treescapes remain healthy, diverse, and resilient whilst providing benefits for generations to come.

THE REPORT

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INTRODUCTION

London's urban forest contributes to the wellbeing of residents and visitors in manifold ways. Put simply: London's trees make London more liveable, not just for its human inhabitants, but also for a diverse range of other organisms that use trees for shelter and food.

Retaining and promoting a healthy urban forest for London is the primary motivation for the *London Urban Forest Plan* that acts as a unifying strategic plan to help ensure such a critical resource is resilient to future threats and capable of meeting the needs of future generations living in, or visiting, the UK's capital city.

To support key stakeholders tasked with delivering a resilient and healthy urban forest, it is critical to evaluate the suitability of London's current tree stock to projected climate scenarios. Therefore, the Greater London Authority and the Forestry Commission, on behalf of the London Urban Forest Partnership[1], commissioned an analysis of the likely suitability of London's trees to the SSP3[2] climate scenario in 2090 (Box 1). This directly supports the implementation of actions 1C and 1D of the *London Urban Forest Plan* and its Goal 1: *Resilience*.

Box 1: The SSP3 scenario

This scenario is part of the Shared Socioeconomic Pathways (SSPs) used in climate modelling – it describes a future where the world experiences high challenges to both mitigation and adaptation. SSP3 assumes:

- Fragmented international cooperation, with countries prioritising domestic concerns over global climate action.
- Slow economic development and limited technological progress, especially in low-income regions.
- High population growth in some areas, increasing pressure on resources.
- Continued reliance on fossil fuels, leading to high greenhouse gas emissions.

In the context of this report, SSP3 represents a high-risk climate scenario, helping to model how London's tree species might fare under more extreme future conditions.

GOAL 1: RESILIENCE

– Enhance the resilience of London's urban forest to the threats posed by climate change, pests and diseases.

Using collated tree inventory data from local authorities and other public realm tree managers within the Greater London Authority area, species comprising of 95% of London's public realm trees have been evaluated for their likely suitability to London's climate in 2090.

THE PROJECT OBJECTIVES WERE TO:

I. Determine the suitability of London's most important urban tree species to a future climate scenario.
II. Recommend strategic tree management objectives to mitigate climate-related risks to London's urban forest.

FIGURE 1: This project directly supports the implementation of Goal 1 from the *London Urban Forest Plan 2025 Actions Update*[3].

REFERENCES AND NOTES

[1] London Urban Forest Partnership.
[2] Shared Socioeconomic Pathway 3 (Masson-Delmotte, V., Zhai, P., Pirani, A., Connors, S.L., Péan, C., Berger, S., Caud, N., Chen, Y., Goldfarb, L., Gomis, M.I. and Huang, M., 2021. Climate change 2021: the physical science basis. *Contribution of working group I to the sixth assessment report of the intergovernmental panel on climate change*, 2(1), p.2391.
[3] London Urban Forest Plan 2025 Actions Update.

REVIEW OF THE TAXONOMIC COMPOSITION OF LONDON'S PUBLIC REALM TREES

The Greenspace Information for Greater London CIC (GiGL)[4] provided a data cache compiling tree inventory data from 31 out of London's 33 boroughs, as well as from other landowners managing public realm trees in London such as, Transport for London, the London Legacy Development Corporation, the Royal Parks and Wembley Park[5]. This dataset totalled 1,187,924 observations. These data were cleaned to remove 19,574 observations that either recorded too high a taxonomic level or were not trees (details of removed observations can be found in Appendix 1 – Supplementary Data). Accordingly, the final dataset had 1,168,350 tree observations that were subject to analysis.

Public realm trees within London are taxonomically diverse and include 44 families, 110 genera and 375 species (Figure 2). Proportionally, the most important family is the *Rosaceae* (rose family); it accounts for 29% of public realm trees and contains important genera such as, cherries (*Prunus* (14%)), rowans (*Sorbus* (4%)) and hawthorns (*Crataegus* (4%)). Other important genera are the maples (*Acer* (14%)), limes (*Tilia* (9%)), oaks (*Quercus* (7%)), planes (*Platanus* (7%)), ash (*Fraxinus* (6%)) and birch (*Betula* (5%)). Interestingly, the cypress family (*Cupressaceae*) is represented by 15 different genera, yet only makes up around 2% of the urban forest.

At a species level, the most frequently observed species was '*Prunus*' (8% | 87,837). Of course, this is a genus rather than a species, so accurate taxonomic interpretation is challenging. However, when *Prunus* is recorded, surveyors are most likely referring to some type of flowering cherry. A similar lack of species resolution is apparent within numerous important genera. As it is impossible to determine the species composition of a pooled group, these genus-level 'species' have been preserved in the analysis: this will be a minor source of error. However, it is very unlikely that a major tree species has not been recorded, rather, the relative proportions of some species may be slightly misrepresented. These errors could be removed through future surveying efforts and should motivate the introduction of a standardised data collection protocol across London.

London plane (*Platanus* x *hispanica* (7% | 77,569)), pedunculate oak (*Quercus robur* (6% | 66,892)), Norway maple (*Acer platanoides* (5% | 55,775)), European ash (*Fraxinus excelsior* (5% | 53,362)) and sycamore (*Acer pseudoplatanus* (5% | 52,510)) are the most important species within London's public realm trees (Figure 3, 4, 5). A detailed breakdown of the taxonomic analysis is found in table A1 of Appendix 1.

PUBLIC REALM TREES WITHIN LONDON ARE TAXONOMICALLY DIVERSE AND INCLUDE 44 FAMILIES, 110 GENERA AND 375 SPECIES.

Magnificent, large trees, such as these London plane trees (*Platanus* x *hispanica*) in Green Park offer an array of benefits to residents and visitors. This hybrid tree makes up 7% of the public realm trees in London. © Andrew Hirons

REFERENCES AND NOTES

[4] Greenspace Information for Greater London (GiGL).
[5] This dataset forms the backbone of the London Public Realm Tree Map available on the London Datastore.

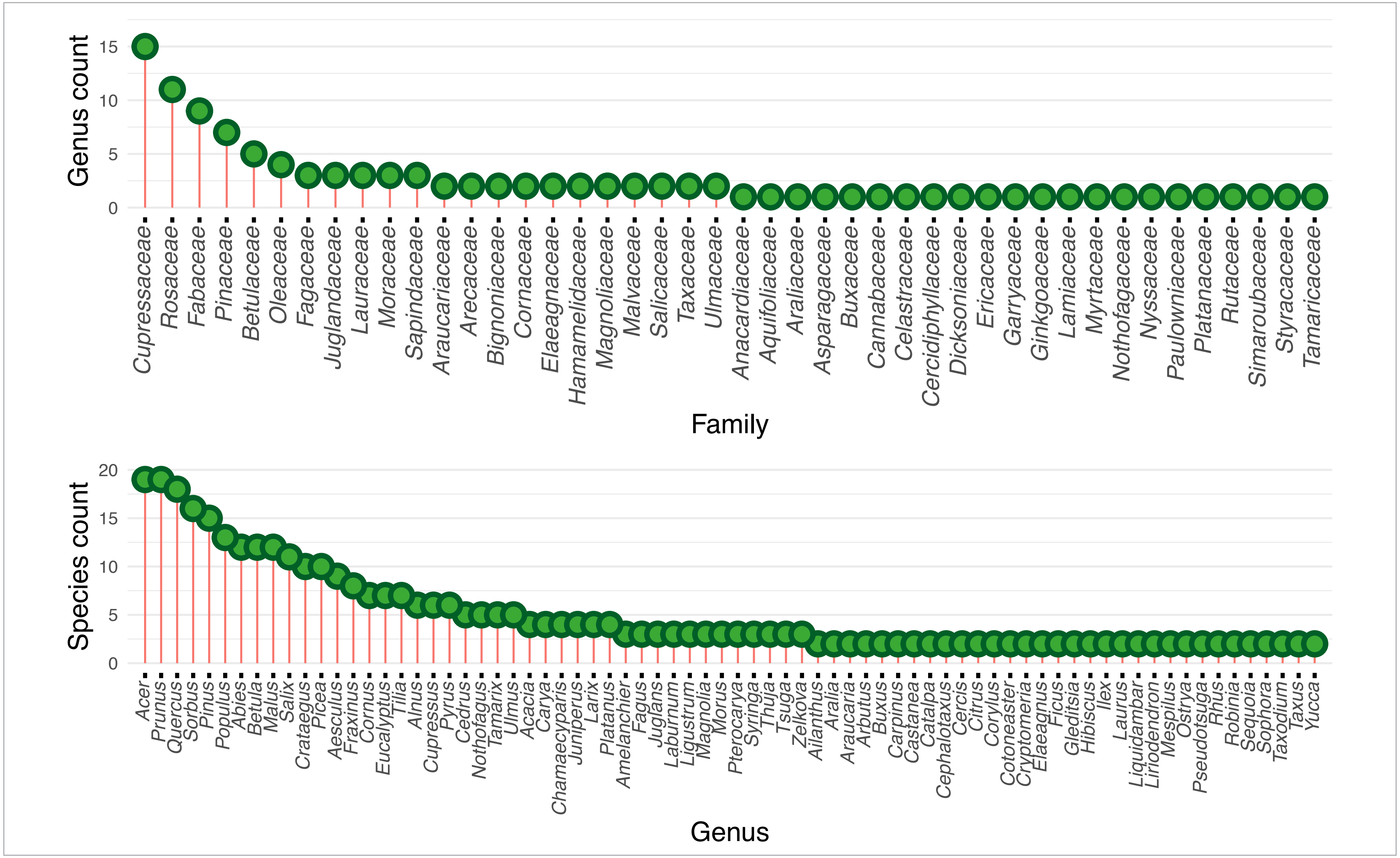

FIGURE 2: Taxonomic make up of London's public realm trees. Upper panel: number of genera represented by the 44 botanical families. Lower panel: number of species in each genera. Those genera with only one species represented have been omitted from the plot to aid clarity for the more important genera. A full taxonomic breakdown can be found in table A1 in Appendix 1.

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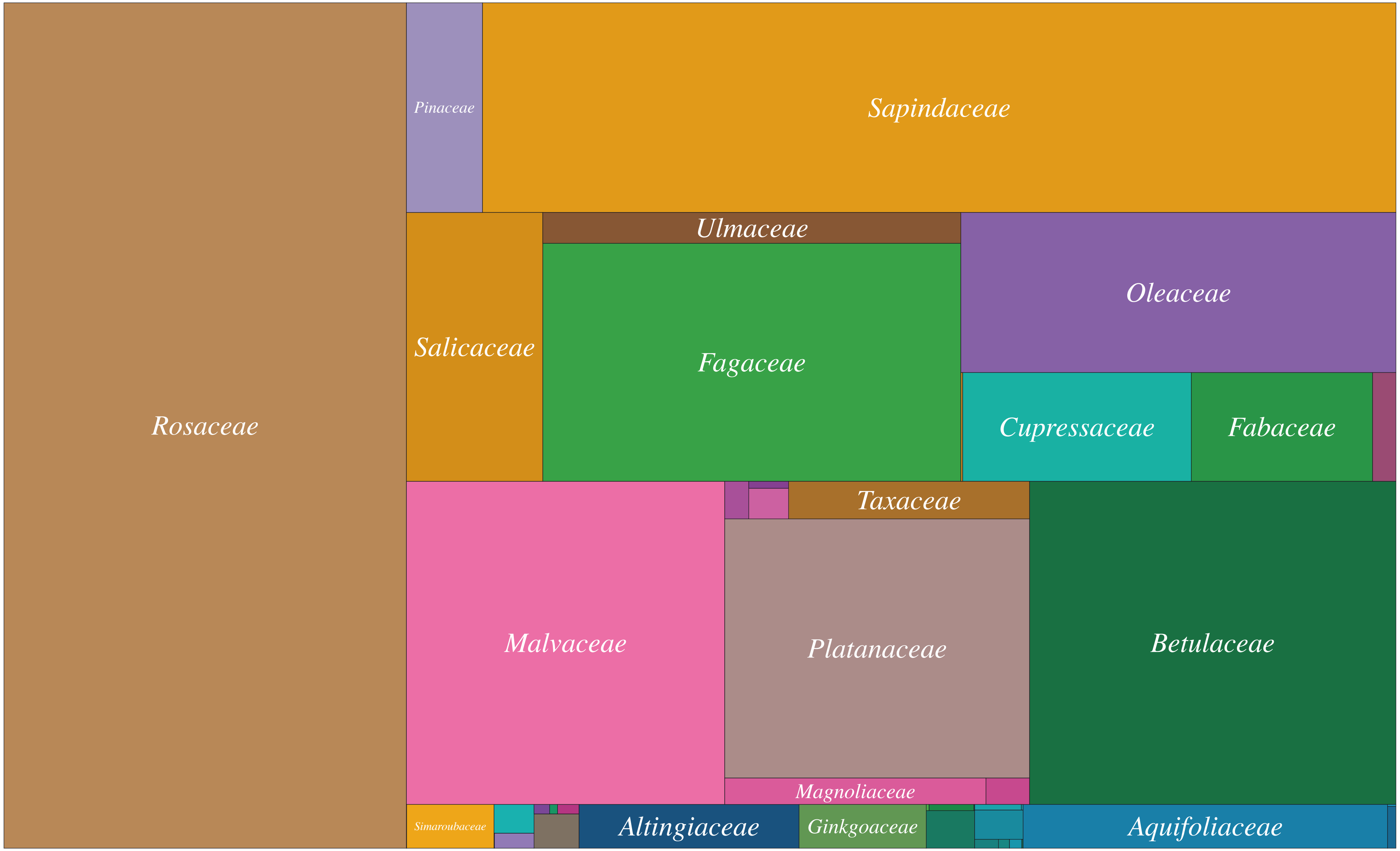

FIGURE 3: Representation of the taxonomic diversity of London's public realm trees. The size of the rectangles represents the tree population; colour represents the botanical family. Labels are included for the 18 most represented families, labels for the less significant families are omitted for clarity. The largest family represented is the *Rosaceae* family, it comprises of 28.9% or 337,837 trees.

REVIEW OF THE TAXONOMIC COMPOSITION OF LONDON'S PUBLIC REALM TREES CONTINUED

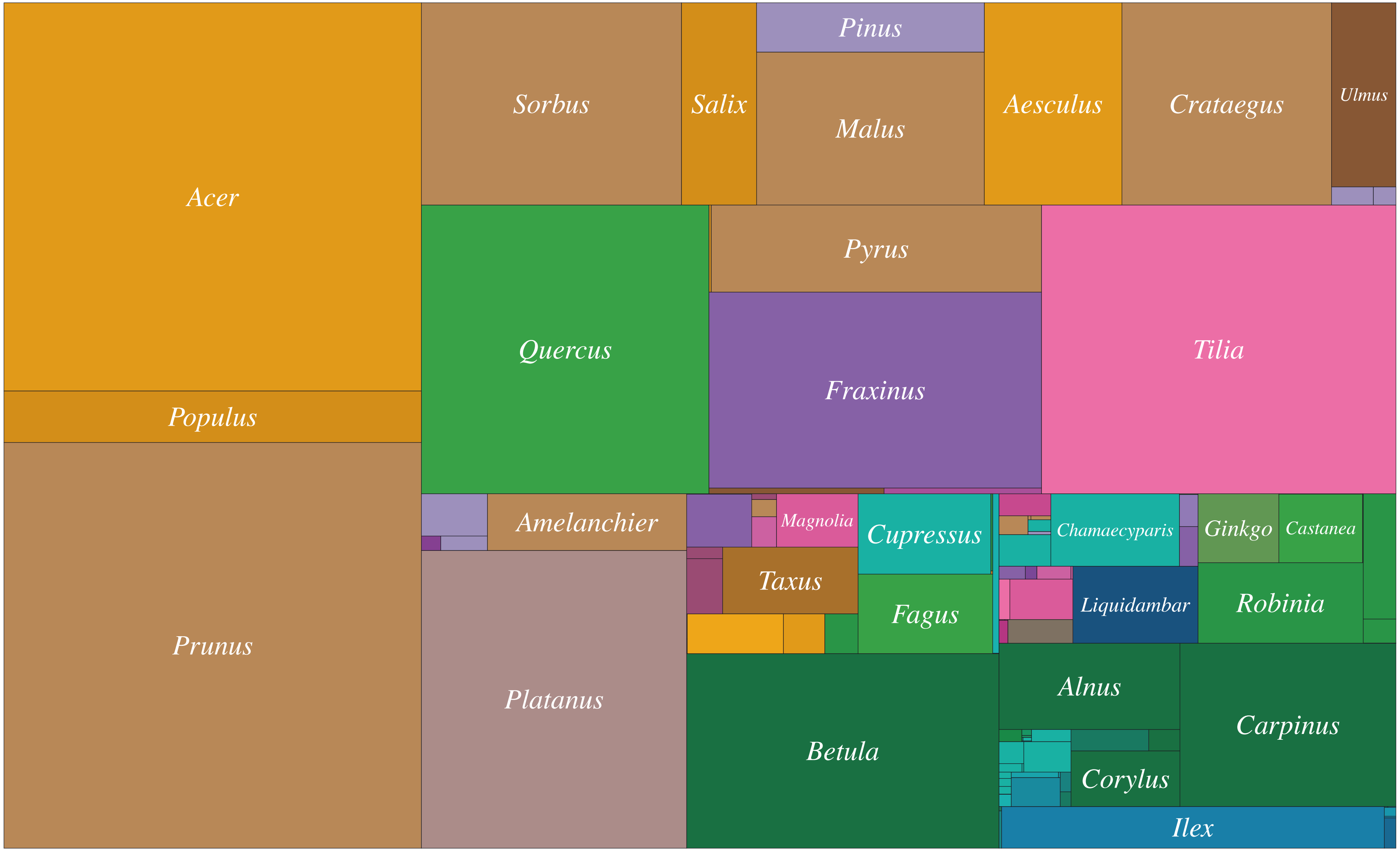

FIGURE 4: Representation of the taxonomic diversity of London's public realm trees. The size of the rectangles represents the tree population; colour represents the botanical family. Labels are included for the 30 most represented genera, labels for the less significant genera are omitted for clarity. The largest genus is *Prunus*, consisting of 14.4% or 168,147 trees.

REVIEW OF THE TAXONOMIC COMPOSITION OF LONDON'S PUBLIC REALM TREES CONTINUED

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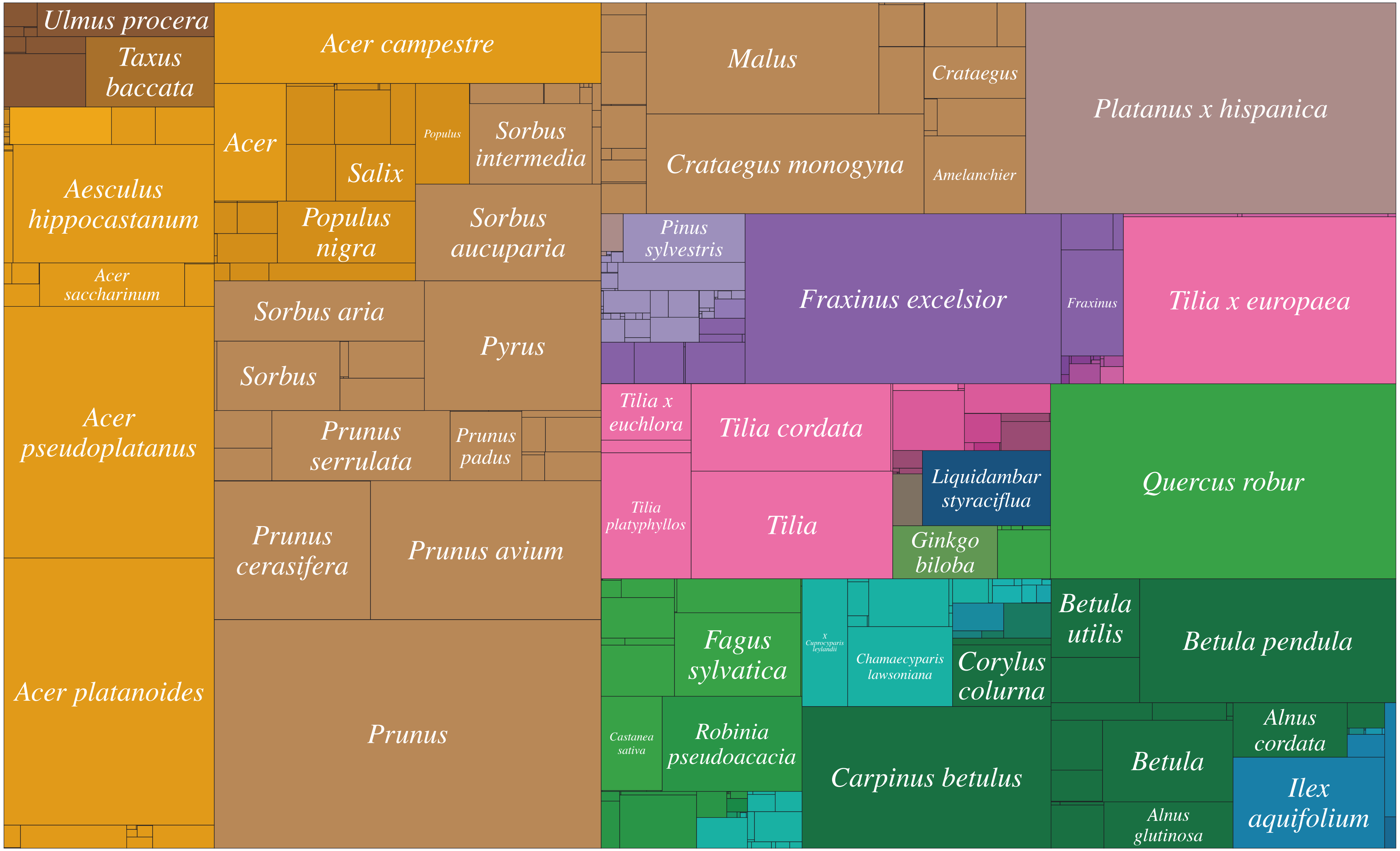

FIGURE 5: Representation of the taxonomic diversity of London's public realm trees. The size of the rectangles represents the population of the species; colour represents the botanical family. Labels are included for the 50 most represented species, labels for the less significant species are omitted for clarity. The largest 'species' is *Prunus* which comprises of 7.5% or 87,837 trees.

EVALUATING CLIMATE SUITABILITY FOR LONDON'S PUBLIC REALM TREES

London already experiences a significant urban heat island effect (Figure 6), which makes growing conditions challenging for many tree species – especially when combined with poor soil quality and limited rooting space. These pressures are expected to intensify under future climate scenarios (Figure 7).

From the perspective of establishing, growing and maintaining trees, the climate in London is set to become more challenging for many species. Even though the annual precipitation of London is likely to be stable, the increase in temperature will increase the amount of water being drawn into the atmosphere from surfaces, soils and plants (potential evapotranspiration (PET)). Therefore, water is likely to be less available in London's future climate and trees will experience acute water deficits more frequently.

Access to sufficient water and nutrient resources is further compromised by highly constrained rooting volumes with impoverished soils. Trees growing in small tree pits experience soil drying cycles more intensely and generally have less access to nutrients. Intentionally designing high-quality rooting environments for new plantings and ameliorating poor-quality rooting environments for existing trees will be important to alleviate climate related stress.

FROM THE PERSPECTIVE OF ESTABLISHING, GROWING AND MAINTAINING TREES, THE CLIMATE IN LONDON IS SET TO BECOME MORE CHALLENGING FOR MANY SPECIES.

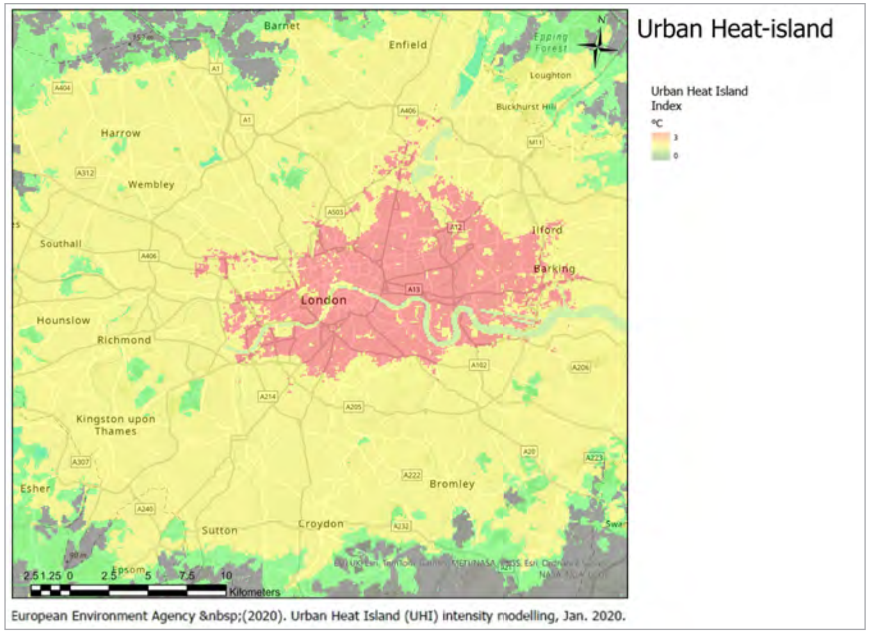

FIGURE 6: London already experiences a substantial urban heat island with the central areas being around 3°C warmer than surrounding rural areas.

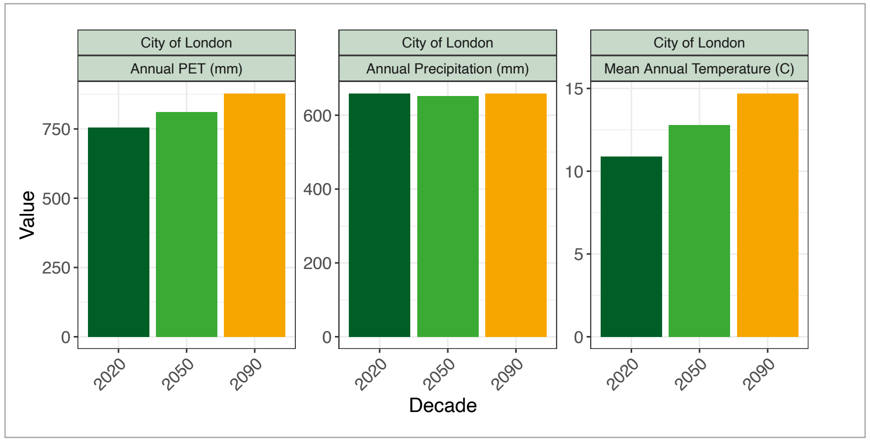

FIGURE 7: Key climate metrics for the City of London in response to climate scenario SSP3 for current (2020), medium-term (2050) and long-term (2090) timescales.

OUR METHODOLOGICAL APPROACH TO SPECIES EVALUATION

Understanding the climate suitability of a tree species is complex. It depends not only on the characteristics of species itself but also on the trees' geographic origin, a quality known as its provenance[6]. Climate suitability can vary not only between different species (interspecific variation) but also within a single species (intraspecific variation) where a large natural distribution has resulted in some sub-populations of trees with a greater degree of tolerance to climate-related stressors. This means that even trees of the same species may respond differently to future climate conditions depending on where they originate from.

Urban Plant Lab utilises climate modelling tools and plant trait data to assess how suitable different tree species are for future climate scenarios. As no single measure can perfectly predict suitability, we developed a novel composite scoring system that combines species distribution modelling (SDM) with three key plant traits. These traits help us understand a species' 'personality' – how it grows, competes and copes with challenges like drought and heat. Whilst there are many techniques available to evaluate stress tolerance, large-scale controlled-environment trials and common-garden experiments are not practical for hundreds of species. This is why, when screening large inventories, it is critical to rely on existing tools and datasets that offer scalable and scientifically grounded insights.

CLIMATE AND SPECIES DISTRIBUTION MODELLING

The species distribution modelling is based on analysis of global plant and climate data, this facilitates the plotting of species distributions in the context of climate.

To model future climate conditions in London, we used projections from CHELSA (Climatologies at High Resolution for the Earth's Land Surface Areas[7]). This dataset provides high-resolution climate data by downscaling global climate models – a process that refines large scale projections to better reflect local conditions, making the data particularly useful for modelling more local climates, such as those of London.

When assessing how well a tree species might cope with future climate conditions, it is important to consider more than just temperature. Whilst mean *temperature of the growing season* (MTGS[8]) gives a good indication of a tree species' thermal preferences, it does not reflect how much water is likely to be available to the plant – a key factor in its landscape performance. Therefore, to provide a more comprehensive analysis, we included the *climatic moisture index* (CMI), which reflects the ratio of climatic water supply to the climatic water demand within a specific area[9]. More explicitly, it represents the balance between precipitation and potential evapotranspiration (PET). A CMI of 0 represents the situation where precipitation equals PET, accordingly, a positive CMI represents a wetter climate where there is more precipitation than PET and a negative CMI represents a drier climate where there is less precipitation than PET.

By using both MTGS and CMI together, we gain a clearer understanding of the climate envelope in which a species can thrive. This is especially important as climate change is expected to bring not just warmer temperatures but also changes in water availability.

Figure 8 provides an example of a species distribution model for a 'vulnerable' species, silver birch (*Betula pendula*) and a 'high suitability' species, holm oak (*Quercus ilex*).

To evaluate species suitability, future MTGS and CMI projections for London in the 2090s were compared against species-specific tolerance limits. These limits – defined by the 5th to 95th percentile range of observed values – were derived from cleaned observation data obtained from the Global Biodiversity Information Facility (GBIF)[10], an international network and data infrastructure that aggregates biodiversity data from thousands of institutions globally. For this project, GBIF data is used to understand where different tree species naturally occur, which helps to assess their climate suitability based on where they are currently found. These data were then referenced against the TreeGOER database[11].

Therefore, the climate suitability score evaluates the extent to which temperature and moisture availability fall within the species' known limits. The outcome is initially expressed in the categories 'optimal', 'within range', 'marginal' and 'outside range'. These categories are then translated into numerical scores ('optimal' = 4 to 'outside range' = 1) which are then averaged with plant trait scores to achieve the final suitability outcome statement for each species.

REFERENCES AND NOTES

6 Provenance refers to the geographic origin of the plant material. Each individual tree species will have multiple provenances that can yield differences in relation to stress tolerance or in their other attributes which may make them more or less suitable for any given conditions.

7 Climatologies at High Resolution for the Earth's Land Surface Areas (CHELSA).

8 Growing season is defined as April to October (inclusive).

9 For details on how CMI is calculated please see: Martin, K.W.E. and Sjöman, H. (2025) Evaluating urban tree population fitness for a changing climate: Using climatic moisture index. Trees, Forests and People, p.100993.

10 Global Biodiversity Information Facility (GBIF).

11 Kindt, R. (2023) TreeGOER: A database with globally observed environmental ranges for 48,129 tree species. Global Change Biology, 29(22), pp.6303-6318. Database.

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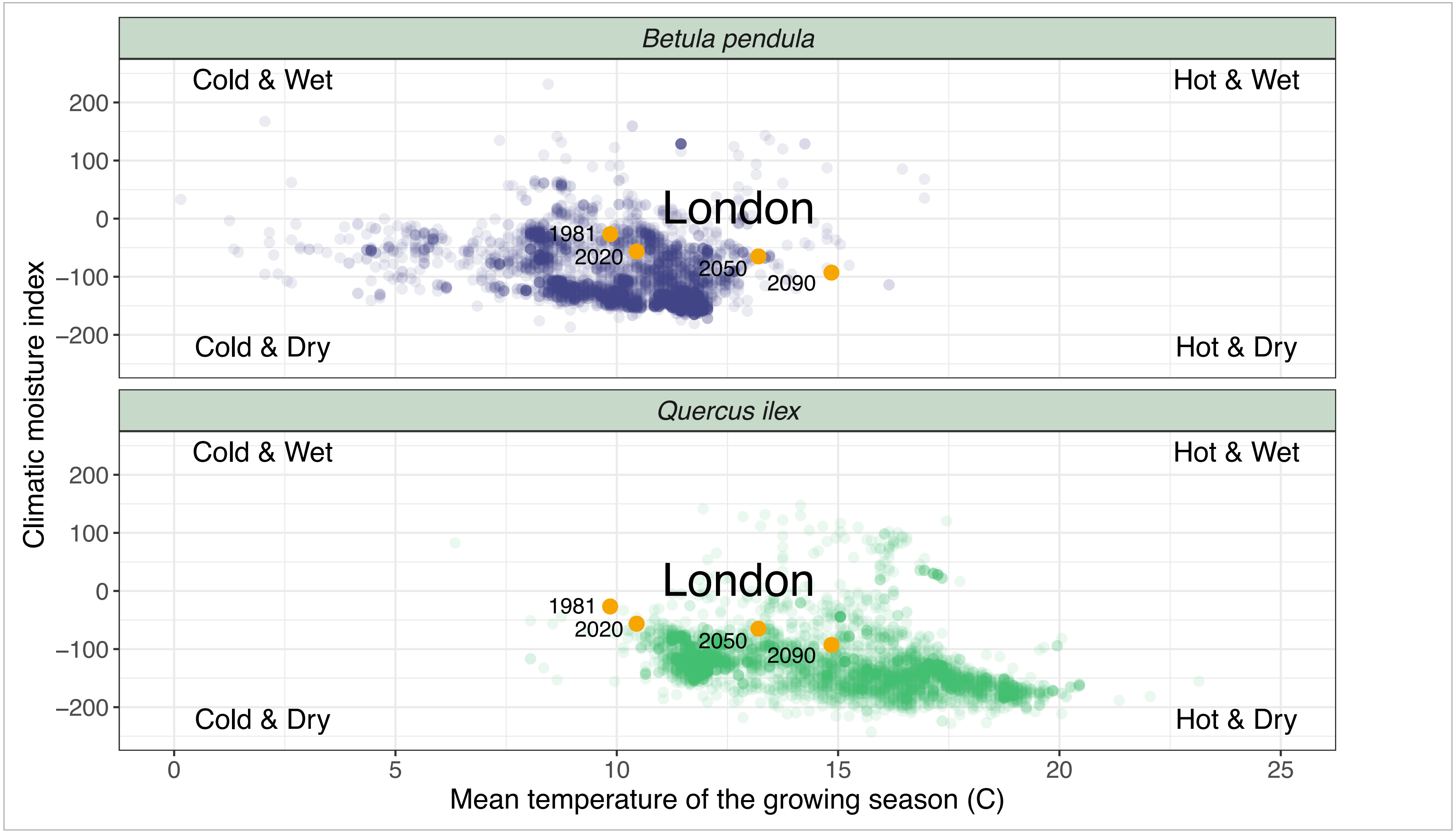

FIGURE 8: Example of a species distribution model for silver birch (*Betula pendula*), a 'vulnerable' species and holm oak (*Quercus ilex*), a 'high suitability' species. Each point represents an observation of the species in relation to its climate. The larger orange points represent the current and future climate of London according to SSP3. N.B. A climate moisture index of 0 represents a climate in which the potential evapotranspiration is equal to precipitation.

OUR METHODOLOGICAL APPROACH TO SPECIES EVALUATION CONTINUED

PLANT TRAIT ANALYSIS

Functional plant traits are measurable characteristics that help infer a species' (or provenance's) ecological strategy – how it grows, reproduces and copes with environmental stress. To support this analysis, global trait data from the TRY Database[12] was combined with data from our own research and other published sources. Specifically, we focused on three key functional traits: *leaf dry matter content* (LDMC), *wood density* (WD), and *leaf water potential at turgor loss point* (TLP). These data help to provide nuance to the macro-level outcomes of the species distribution models.

LEAF DRY MATTER CONTENT (LDMC)

Leaf dry matter content is a key indicator of a tree's resilience to environmental stress. For example, in plant ecological theory, it determines the position of a species along the axis between 'competitor' species with acquisitive investment of resources and 'stress tolerator' species with more conservative strategies[13,14]. Research also shows that species with low LDMC tend to be more vulnerable to heat and drought while those with higher LDMC are better equipped to cope with water scarcity[15]. A higher LDMC reflects a greater investment in robust leaf tissue, which helps trees maintain function during dry periods and is characteristic of a strategy focused on stress tolerance rather than rapid growth.

WOOD DENSITY (WD)

Wood density reflects several aspects of a tree's ecological strategy. Species with denser wood tend to grow in more stressful environments and invest more in structural strength and defence, making them better equipped to withstand drought and other stressors. In contrast, species with less dense wood are typically more competitive in fertile conditions, but less resilient to environmental stress[16]. Globally, temperature has been identified as a major driver of variation in wood density[17], making this trait particularly useful when evaluating how trees may respond to future climate scenarios.

These oaks transform this busy public square. As well as being aesthetically appealing, they help to cool the local environment, improving the experience of diners and employees of local businesses. © Steve Parker

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OUR METHODOLOGICAL APPROACH TO SPECIES EVALUATION CONTINUED

LEAF WATER POTENTIAL AT TURGOR LOSS POINT (TLP)

Turgor loss point refers to the leaf water potential at which turgor pressure is lost. TLP directly quantifies leaf and plant drought tolerance. The more negative the TLP value, the longer a tree can maintain key physiological functions, such as water transport (hydraulic conductance) and gas exchange (stomatal conductance) during dry conditions[18]. It is widely used in ecological research and increasingly applied to guide tree selection for urban environments[19], where drought stress is a concern.

Each of these traits were grouped into four clusters using a k-means clustering algorithm[20] (see Box 2), representing a spectrum from highly acquisitive species – which grow quickly but are less tolerant to stress – to more conservative species, which grow more slowly but are better adapted to withstand environmental challenges. Each species was assigned a trait score from one to four based on its cluster. This statistical approach ensures that scoring is based on statistical inference rather than subjective thresholds. For example, global wood density values were clustered to produce Figure 9, from which scores were extracted for each species evaluated.

GLOBALLY, TEMPERATURE HAS BEEN IDENTIFIED AS A MAJOR DRIVER OF VARIATION IN WOOD DENSITY, MAKING THIS TRAIT PARTICULARLY USEFUL WHEN EVALUATING HOW TREES MAY RESPOND TO FUTURE CLIMATE SCENARIOS.

Box 2: K-means clustering

K-means clustering is a statistical method used to group data points together into a fixed number of groups, or clusters. It helps identify patterns in large datasets and avoids more arbitrary approaches to grouping data. In this case, plant trait data was grouped into four clusters to help place tree species on a scale indicative of environmental stress tolerance.

Persian ironwood (*Parrotia persica*) scores highly on the species distribution model and plant trait analysis so is assessed as highly suitable. It has fantastic autumn colour and is tolerant to drought and heat. © Henrik Sjöman

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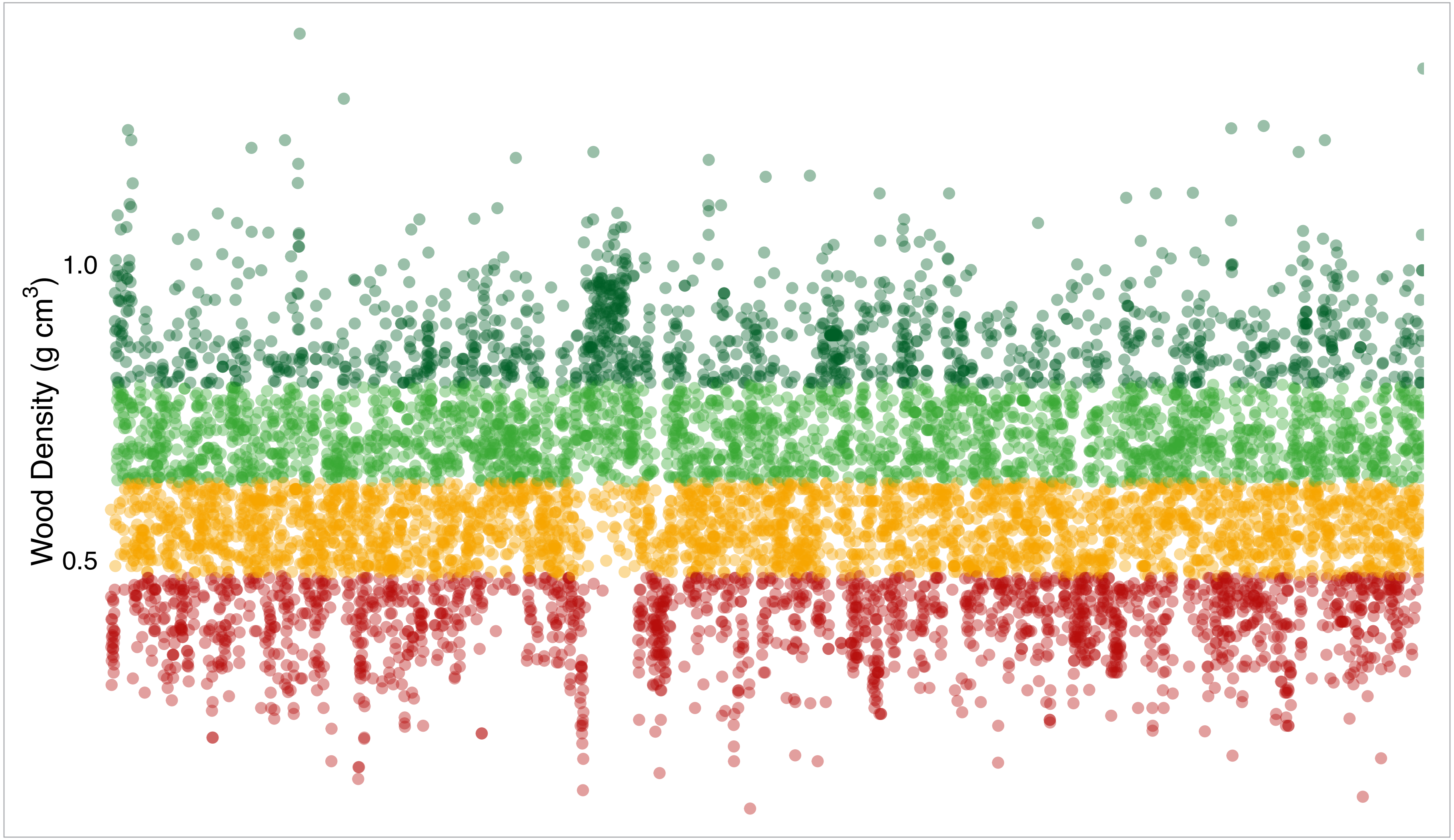

FIGURE 9: An example of the way in which cluster analysis was used to derive a four-point score and used to contribute to the overall climate suitability score. In the case of the wood density: 4 was awarded for a density above 0.78 (g/cm3); 3 was awarded for between 0.61 – 0.78; 2 was awarded between 0.46 and 0.61; and, a score of 1 for <0.46. Cluster levels were determined using the k-means method. A similar analysis was used for the other plant trait data (LDMC, TLP: (plots not shown)).

CLUSTER SCORE	4	3	2	1

DETERMINATION OF SUITABILITY OUTCOME STATEMENTS

To evaluate future climate suitability, each species was assigned a composite score, calculated as the average of its individual scores from species distribution modelling (SDM), wood density (WD), leaf dry matter content (LDMC), and turgor loss point (TLP) (Figure 10). The resulting score ranges from one to four.

SPECIES SCORING:

– 1-2 were evaluated as being 'Vulnerable'.
– 2-3 were classified as 'Low Suitability' if their current species distribution falls 'outside of range' for the future climate projection, and 'Moderate suitability' if their distribution was found to be 'within range'.
– 3-4 were classified as 'High suitability', indicating strong evidence of climate compatibility (their current distribution is 'within range' or 'optimal' for London's future climate) combined with a high stress tolerance score derived from plant traits.

A more detailed explanation of the suitability score can be found in Table 1.

Whilst high-quality data was available for many species, some had gaps in the plant trait data. In such cases, scores were estimated using data from closely related species for which data was available and expert judgement. To enhance transparency of the analysis a confidence score was assigned to each outcome statement (Table 2). Low confidence was given to species with estimated scores for two or more criteria. High confidence was assigned to species that have a maximum of one estimated trait score. This confidence scoring also provides a gap analysis to help focus future research efforts.

TABLE 1: Explanation of tree suitability outcome statements derived from the composite scoring system.

Outcome statement	Narrative description of outcome
High suitability	This species is suited to the current climate norms and its current distribution substantially overlaps with the future climate analogue. Traits indicate excellent tolerance to climate-related stress. These species are likely to have high suitability to future climate. Provenance and ecotype selection is likely to optimise future climate compatibility.
Moderate suitability	This species is suited to the current climate norms and its current distribution overlaps with the future climate analogue. Traits indicate good tolerance to climate-related stress. Therefore, these species are likely to have moderate suitability to future climate. With focused effort, targeted provenance selection is likely to yield plant material that will have high suitability for future climate scenarios.
Low suitability	These species are suited to the today's climate but only a very minor percentage of the species' current distribution occurs in regions within a future climate analogue. Traits indicate some vulnerability to climate-related stress. Therefore, these species are likely to have a low suitability to future climate. With focused effort, targeted provenance selection may yield suitable plant material for successful cultivars. Examples of these species currently in the landscape may require more intensive management to mitigate abiotic stress and maintain tree performance.
Vulnerable	These species are suited to today's climate but their current distribution does not occur in regions within a future climate analogue. Traits indicate vulnerability to climate-related stress. Therefore, these species are likely to have vulnerability to future climate scenarios; targeted provenance selection is not likely to yield suitable plant material for successful cultivars. Examples of these species currently in the landscape may require more intensive management to mitigate abiotic stress and maintain tree performance.

DETERMINATION OF SUITABILITY OUTCOME STATEMENTS CONTINUED

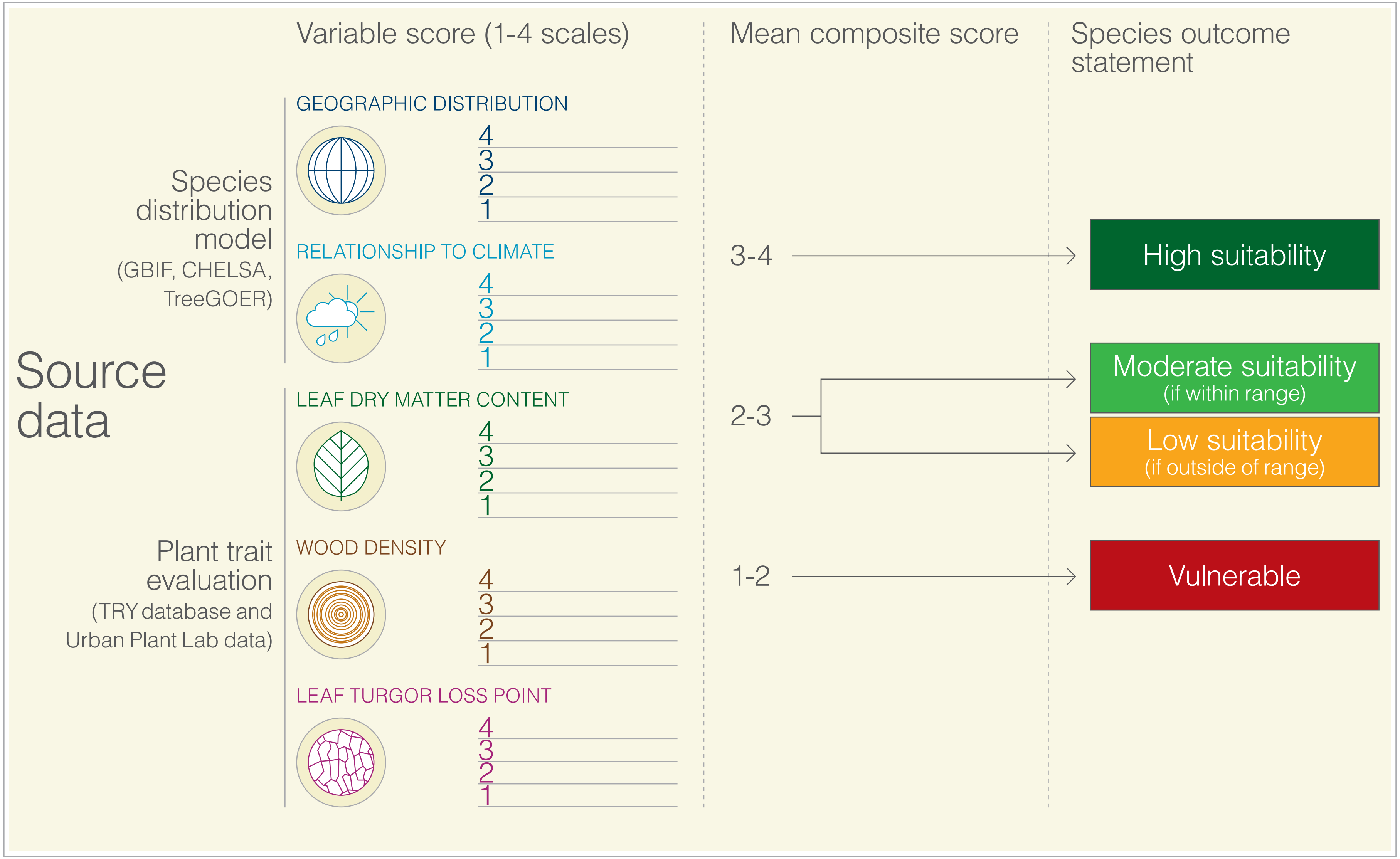

FIGURE 10: An overview of the methodological approach used in this analysis to determine the suitability outcome statements associated with each species.

CLIMATE SUITABILITY OF LONDON'S PUBLIC REALM TREES – RESULTS

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To deliver a comprehensive evaluation of London's public realm trees, we selected the top 100 species identified in the taxonomic review and assessed their suitability to a future climate scenario (SSP3). Together, these species account for 95% of London's public realm trees – making this a robust and highly representative analysis. Only a small number of minor species – each representing less than 0.12 % – were not included in the assessment.

It is important to reiterate here that these results are only relevant for London and they should not be applied to other parts of the UK, which will vary substantively from this analysis.

From the top 100 species, London is assessed to have only two species, holm oak (*Quercus ilex*) and Persian ironwood (*Parrotia persica*) that fall within the 'high suitability' category, representing just 0.38% of the public realm tree population (Figure 11). These species are native to the Mediterranean basin and western Asia respectively. A further 22.05% of trees are assessed as having 'moderate suitability'. Notable species in this category are London plane (*Plantanus* x *hispanica*) and hawthorn (*Crataegus monogyna*).

Trees with 'Low suitability' make up 62.35% of London's public realm trees. This category includes pedunculate oak (*Quercus robur*), Norway maple (*Acer platanoides*) and sycamore (*Acer pseudoplatanus*). Unfortunately, 10.64% of trees were found to be 'vulnerable' to the projected conditions by the end of this century. This group includes the native species, ash (*Fraxinus excelsior*), wild cherry (*Prunus avium*) silver birch (*Betula pendula*) and large-leaved lime (*Tilia platyphyllos*). Further details on species within each category are provided in Tables 2 and 3. The proportions of trees in each suitability class can be visualised in Figure 11.

It is striking that such a high percentage (73%) of trees fall into the lower two suitability categories. Climate risk to trees is further compounded by poor growing environments. Together, these factors present a substantial and strategic challenge for urban forest managers to address over the coming decades.

In spite of this, the foresight delivered through this analysis should provide an imperative to act. It should motivate key stakeholders, such as the GLA and the Forestry Commission, to provide the leadership required to strategically diversify London's urban forest; ensuring good species compatibility with future climate projections. There are opportunities to intentionally design excellent rooting environments for new trees that will help to alleviate future stress events; there are opportunities to enhance the climate resilience of existing trees by improving their growing conditions; there are opportunities to develop policies to ensure pathways for new plant material, well-matched to future climates, to be brought into cultivation.

IT IS IMPORTANT TO REITERATE HERE THAT THESE RESULTS ARE ONLY RELEVANT FOR LONDON AND THEY SHOULD NOT BE APPLIED TO OTHER PARTS OF THE UK, WHICH WILL VARY SUBSTANTIVELY FROM THIS ANALYSIS.

CLIMATE SUITABILITY OF LONDON'S PUBLIC REALM TREES – RESULTS CONTINUED

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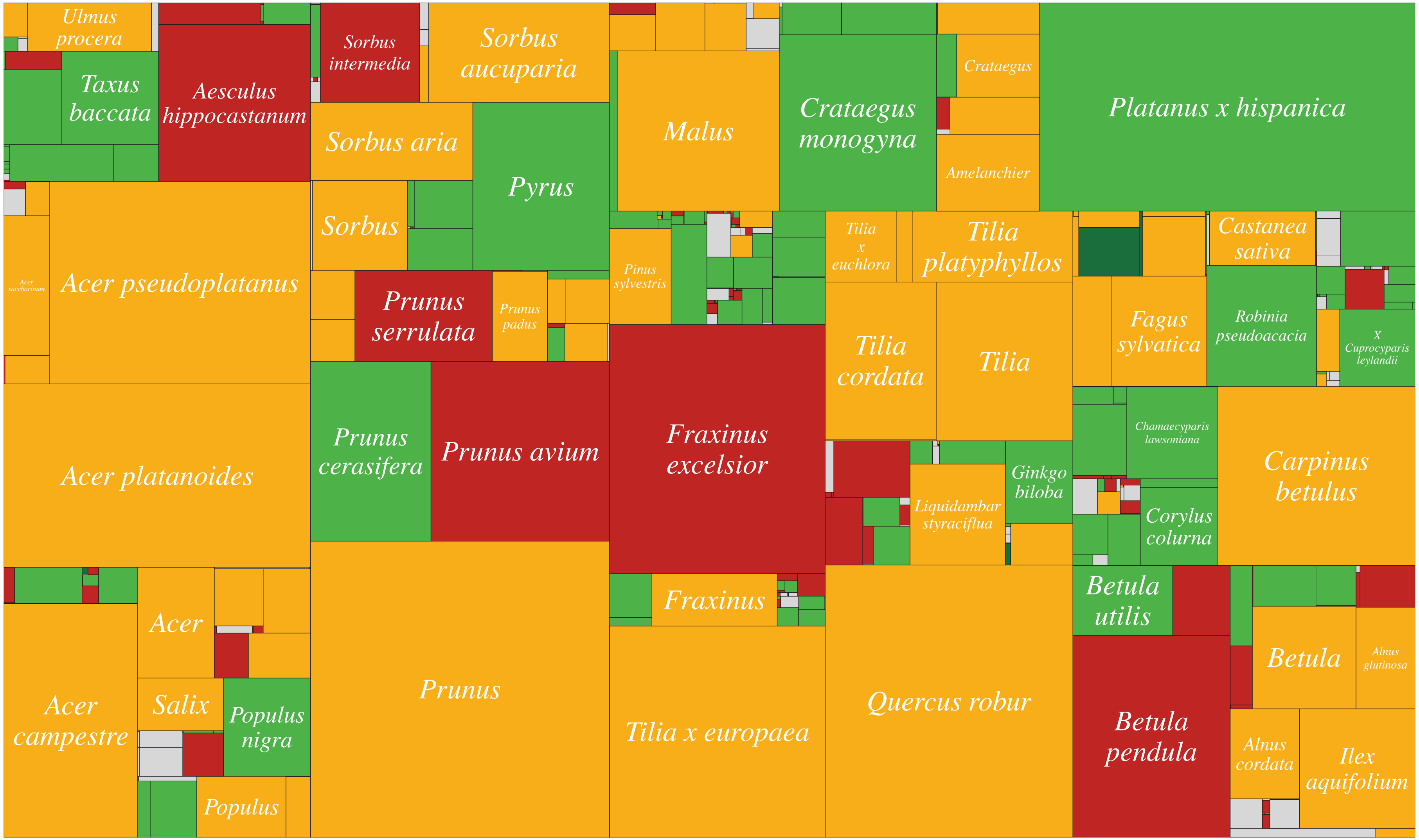

FIGURE 11: Summary of the proportion of trees in each suitability class for the London context. The size of the rectangles represents the population of the species. The colour represents the suitability to London's future climate. Labels are included for the 50 top species.

KEY TO SUITABILITY	High suitability	Moderate suitability	Low suitability	Vulnerable	Not evaluated
	0.38%	22.05%	62.35%	10.64%	4.62%

CLIMATE SUITABILITY OF LONDON'S PUBLIC REALM TREES – RESULTS CONTINUED

TABLE 2: Outcome summaries, with confidence statements for the 100 focus species of this study. Species were given a low confidence score when two or more cluster scores for a trait had to be estimated, rather than based on data from the scientific literature. Native species in bold.

Outcome statement	Confidence	Species
High suitability	High	*Quercus ilex*
	Low	*Parrotia persica*
Moderate suitability	High	*Acer negundo, Betula utilis,* ***Crataegus monogyna****, Juglans regia, Platanus* x *hispanica, Prunus cerasifera, Robinia pseudoacacia,* ***Taxus baccata***
	Low	*Acer cappadocicum, Ailanthus altissima, Betula albosinensis, Betula jacquemontii, Betula papyrifera, Catalpa bignonioides, Celtis australis, Chamaecyparis lawsoniana, Corylus colurna, Crataegus* x *lavallei, Crataegus* x *persimilis, Cupressus, Fraxinus angustifolia, Fraxinus ornus, Ginkgo biloba, Gleditsia triacanthos, Koelreuteria paniculata, Ligustrum, Ligustrum lucidum, Pinus nigra, Pyrus calleryana, Pyrus communis, Ulmus,* X *Cuprocyparis leylandii*
Low suitability	High	***Acer campestre****, Acer platanoides, Acer pseudoplatanus, Acer saccharinum, Aesculus hippocastanum,* ***Alnus glutinosa****,* ***Betula pendula****,* ***Carpinus betulus****, Castanea sativa,* ***Fagus sylvatica****,* ***Ilex aquifolium****,* ***Pinus sylvestris****,* ***Populus tremula****, Quercus cerris,* ***Quercus robur****, Quercus rubra, Salix alba,* ***Salix caprea****,* ***Sorbus aucuparia****,* ***Tilia cordata***
	Low	*Alnus cordata, Amelanchier lamarckii,* ***Crataegus laevigata****, Liquidambar styraciflua, Malus pumila,* ***Malus sylvestris****, Malus* x *purpurea, Metasequoia glyptostroboides, Prunus domestica, Prunus laurocerasus,* ***Prunus padus****, Prunus serrulata,* ***Prunus spinosa****, Prunus* x *fruticans, Salix* x *fragilis, Sorbus,* ***Sorbus aria****, Sorbus intermedia, Sorbus* x *thuringiaca, Thuja plicata, Tilia* x *euchlora, Tilia* x *europaea, Ulmus procera*
Vulnerable	High	*Alnus incana,* ***Betula pubescens****,* ***Fraxinus excelsior****,* ***Populus nigra****,* ***Prunus avium****,* ***Tilia platyphyllos***
	Low	*Aesculus* x *carnea, Liriodendron tulipifera, Magnolia, Populus alba, Salix babylonica*

CLIMATE SUITABILITY OF LONDON'S PUBLIC REALM TREES – RESULTS CONTINUED

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TABLE 3: Outcome summaries, with confidence statements for the 100 focus species of this study. Species were given a low confidence score when two or more cluster scores for a trait had to be estimated, rather than based on data from the scientific literature. Ranked from highest to lowest count.

Botanical name		Analytical outcome		Proportion of trees	
Family	**Species**	**Outcome statement**	**Confidence**	**Count**	**Percentage (%)**
Rosaceae	*Prunus*†	Low suitability	Low	87,837	7.52
Platanaceae	*Platanus x hispanica*	Moderate suitability	High	77,569	6.64
Fagaceae	*Quercus robur*	Low suitability	High	66,892	5.73
Sapindaceae	*Acer platanoides*	Low suitability	High	55,775	4.77
Oleaceae	*Fraxinus excelsior*	Vulnerable	High	53,362	4.57
Sapindaceae	*Acer pseudoplatanus*	Low suitability	High	52,510	4.49
Malvaceae	*Tilia x europaea*	Low suitability	Low	45,204	3.87
Betulaceae	*Carpinus betulus*	Low suitability	High	35,029	3.00
Rosaceae	*Prunus avium*	Vulnerable	High	31,803	2.72
Betulaceae	*Betula pendula*	Low suitability	High	31,530	2.70
Sapindaceae	*Acer campestre*	Low suitability	High	31,019	2.65
Rosaceae	*Crataegus monogyna*	Moderate suitability	High	27,542	2.36
Rosaceae	*Malus*	Low suitability	Low	25,652	2.20

CLIMATE SUITABILITY OF LONDON'S PUBLIC REALM TREES – RESULTS CONTINUED

Botanical name		Analytical outcome		Proportion of trees	
Family	**Species**	**Outcome statement**	**Confidence**	**Count**	**Percentage (%)**
Sapindaceae	*Aesculus hippocastanum*	Low suitability	High	23,652	2.02
Rosaceae	*Pyrus*	Moderate suitability	Low	22,769	1.95
Malvaceae	*Tilia*	Low suitability	Low	21,562	1.85
Rosaceae	*Prunus cerasifera*	Moderate suitability	High	21,472	1.84
Rosaceae	*Sorbus aucuparia*	Low suitability	High	17,829	1.53
Malvaceae	*Tilia cordata*	Low suitability	High	17,314	1.48
Aquifoliaceae	*Ilex aquifolium*	Low suitability	High	13,706	1.17
Fabaceae	*Robinia pseudoacacia*	Moderate suitability	High	13,208	1.13
Rosaceae	*Sorbus aria*	Low suitability	Low	12,600	1.08
Rosaceae	*Prunus serrulata*	Low suitability	Low	12,436	1.06
Malvaceae	*Tilia platyphyllos*	Vulnerable	High	11,252	0.96
Betulaceae	*Betula*	Low suitability	Low	10,566	0.90
Fagaceae	*Fagus sylvatica*	Low suitability	High	10,478	0.90
Rosaceae	*Sorbus intermedia*	Low suitability	Low	9,788	0.84
Hamamelidaceae	*Liquidambar styraciflua*	Low suitability	Low	9,562	0.82
Taxaceae	*Taxus baccata*	Moderate suitability	High	8,982	0.77

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CLIMATE SUITABILITY OF LONDON'S PUBLIC REALM TREES – RESULTS CONTINUED

Botanical name		Analytical outcome		Proportion of trees	
Family	Species	Outcome statement	Confidence	Count	Percentage (%)
Salicaceae	*Populus nigra*	Vulnerable	High	8,481	0.73
Rosaceae	*Sorbus*	Low suitability	Low	8,473	0.73
Sapindaceae	*Acer*	Low suitability	Low	8,417	0.72
Cupressaceae	*Chamaecyparis lawsoniana*	Moderate suitability	Low	8,314	0.71
Rosaceae	*Amelanchier*	Low suitability	Low	7,855	0.67
Betulaceae	*Betula utilis*	Moderate suitability	High	6,920	0.59
Oleaceae	*Fraxinus*	Low suitability	Low	6,544	0.56
Sapindaceae	*Acer saccharinum*	Low suitability	High	6,275	0.54
Betulaceae	*Alnus cordata*	Low suitability	Low	6,183	0.53
Betulaceae	*Corylus colurna*	Moderate suitability	Low	6,022	0.52
Ulmaceae	*Ulmus procera*	Low suitability	Low	5,951	0.51
Betulaceae	*Alnus glutinosa*	Low suitability	High	5,945	0.51
Pinaceae	*Pinus sylvestris*	Low suitability	High	5,892	0.50
Cupressaceae	*X Cuprocyparis leylandii*	Moderate suitability	Low	5,777	0.49
Fagaceae	*Castanea sativa*	Low suitability	High	5,710	0.49
Ginkgoaceae	*Ginkgo biloba*	Moderate suitability	Low	5,524	0.47

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CLIMATE SUITABILITY OF LONDON'S PUBLIC REALM TREES – RESULTS CONTINUED

Botanical name		Analytical outcome		Proportion of trees	
Family	Species	Outcome statement	Confidence	Count	Percentage (%)
Salicaceae	*Populus*	Low suitability	Low	5,396	0.46
Rosaceae	*Crataegus*	Low suitability	Low	5,195	0.44
Malvaceae	*Tilia x euchlora*	Low suitability	Low	5,036	0.43
Rosaceae	*Prunus padus*	Low suitability	Low	4,936	0.42
Salicaceae	*Salix*	Low suitability	Low	4,499	0.39
Ulmaceae	*Ulmus*	Moderate suitability	Low	4,332	0.37
Magnoliaceae	*Magnolia*	Vulnerable	Low	4,276	0.37
Fagaceae	*Quercus*	Low suitability	Low	4,181	0.36
Fabaceae	*Gleditsia triacanthos*	Moderate suitability	Low	4,073	0.35
Betulaceae	*Betula pubescens*	Vulnerable	High	3,984	0.34
Cupressaceae	*Cupressus*	Moderate suitability	Low	3,809	0.33
Simaroubaceae	*Ailanthus altissima*	Moderate suitability	Low	3,795	0.32
Fagaceae	*Quercus cerris*	Low suitability	High	3,725	0.32
Pinaceae	*Pinus nigra*	Moderate suitability	Low	3,553	0.30
Rosaceae	*Amelanchier lamarckii*	Low suitability	Low	3,286	0.28
Rosaceae	*Crataegus laevigata*	Low suitability	Low	3,163	0.27

CLIMATE SUITABILITY OF LONDON'S PUBLIC REALM TREES – RESULTS CONTINUED

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Botanical name		Analytical outcome		Proportion of trees	
Family	**Species**	**Outcome statement**	**Confidence**	**Count**	**Percentage (%)**
Salicaceae	*Salix caprea*	Low suitability	High	3,030	0.26
Rosaceae	*Crataegus x persimilis*	Moderate suitability	Low	3,007	0.26
Fagaceae	*Quercus ilex*	High suitability	High	2,953	0.25
Rosaceae	*Pyrus communis*	Moderate suitability	Low	2,790	0.24
Salicaceae	*Salix x fragilis*	Low suitability	Low	2,773	0.24
Salicaceae	*Salix alba*	Low suitability	High	2,768	0.24
Rosaceae	*Pyrus calleryana*	Moderate suitability	Low	2,701	0.23
Salicaceae	*Populus alba*	Vulnerable	Low	2,599	0.22
Fagaceae	*Quercus rubra*	Low suitability	High	2,580	0.22
Betulaceae	*Betula jacquemontii*	Moderate suitability	Low	2,550	0.22
Magnoliaceae	*Liriodendron tulipifera*	Vulnerable	Low	2,529	0.22
Oleaceae	*Fraxinus ornus*	Moderate suitability	Low	2,461	0.21
Sapindaceae	*Acer negundo*	Moderate suitability	High	2,433	0.21
Rosaceae	*Malus sylvestris*	Low suitability	Low	2,346	0.20
Betulaceae	*Alnus incana*	Vulnerable	High	2,270	0.19
Sapindaceae	*Aesculus x carnea*	Vulnerable	Low	2,194	0.19

CLIMATE SUITABILITY OF LONDON'S PUBLIC REALM TREES – RESULTS CONTINUED

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Botanical name		Analytical outcome		Proportion of trees	
Family	**Species**	**Outcome statement**	**Confidence**	**Count**	**Percentage (%)**
Rosaceae	*Prunus x fruticans*	Low suitability	Low	2,157	0.18
Oleaceae	*Ligustrum*	Moderate suitability	Low	2,042	0.17
Rosaceae	*Malus pumila*	Low suitability	Low	1,930	0.17
Rosaceae	*Prunus laurocerasus*	Low suitability	Low	1,912	0.16
Rosaceae	*Crataegus x lavallei*	Moderate suitability	Low	1,874	0.16
Oleaceae	*Fraxinus angustifolia*	Moderate suitability	Low	1,859	0.16
Rosaceae	*Prunus spinosa*	Low suitability	Low	1,856	0.16
Betulaceae	*Betula papyrifera*	Moderate suitability	Low	1,760	0.15
Salicaceae	*Populus tremula*	Low suitability	High	1,756	0.15
Rosaceae	*Malus x purpurea*	Low suitability	Low	1,672	0.14
Bignoniaceae	*Catalpa bignonioides*	Moderate suitability	Low	1,648	0.14
Sapindaceae	*Koelreuteria paniculata*	Moderate suitability	Low	1,633	0.14
Rosaceae	*Prunus domestica*	Low suitability	Low	1,622	0.14
Betulaceae	*Betula albosinensis*	Moderate suitability	Low	1,595	0.14
Cupressaceae	*Thuja plicata*	Low suitability	Low	1,546	0.13
Hamamelidaceae	*Parrotia persica*	High suitability	Low	1,528	0.13

CLIMATE SUITABILITY OF LONDON'S PUBLIC REALM TREES – RESULTS CONTINUED

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Botanical name		Analytical outcome		Proportion of trees	
Family	**Species**	**Outcome statement**	**Confidence**	**Count**	**Percentage (%)**
Salicaceae	*Salix babylonica*	Vulnerable	Low	1,513	0.13
Rosaceae	*Sorbus x thuringiaca*	Low suitability	Low	1,473	0.13
Cupressaceae	*Metasequoia glyptostroboides*	Low suitability	Low	1,429	0.12
Juglandaceae	*Juglans regia*	Moderate suitability	High	1,424	0.12
Sapindaceae	*Acer cappadocicum*	Moderate suitability	Low	1,411	0.12
Cannabaceae	*Celtis australis*	Moderate suitability	Low	1,411	0.12
Oleaceae	*Ligustrum lucidum*	Moderate suitability	Low	1,359	0.12

†Some 'species' are only recorded to genus level in dataset

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CANDIDATE SPECIES FOR FUTURE PLANTING

Analysis of tree suitability to London's future climate suggests that, from the pool of species already growing in London, approximately 100 species have high or moderate suitability (Box 3). As these species are already present in London, they are generally available through UK nurseries. Increasing their representation in future planting schemes will help enhance the overall climate suitability of London's urban forest to conditions expected by the end of the century.

As tree nurseries continue to tailor their species portfolio to meet growing demand for 'climate resistant' trees, the palette of trees listed in Box 3 is likely to expand further.

It is worth noting that Box 3 includes a diverse range of species. Given the fact that climate suitability is only one of many considerations relating to tree selection for urban environments, decisions about which species are most appropriate for specific planting sites should follow established tree selection protocols. This topic is discussed more fully in *Tree Selection for Green Infrastructure: A guide for specifiers*[21]. Full species profiles for the trees recognised as candidate species for future planting can be found in this guide (Figure 12). However, it is worth stating explicitly here that the invasive potential of species should be evaluated prior to positively selecting a species for planting: climate suitability should never be the sole criteria for tree selection.

Further confidence in favour of some species can be garnered from evaluation of cities which provide a current analogue for London's future climate. Our analysis shows an excellent example of this is New York City as its current climate is a precise match for London's predicted climate in 2090. The top 50 species from New York's 2015 tree census are presented in Figure 13. Many of these species also feature within the list provided in Box 3, however, there are other species from New York's tree inventory that may provide additional inspiration for London's future urban forest. If it works well in New York today, it is likely to be compatible with London's climate in 2090.

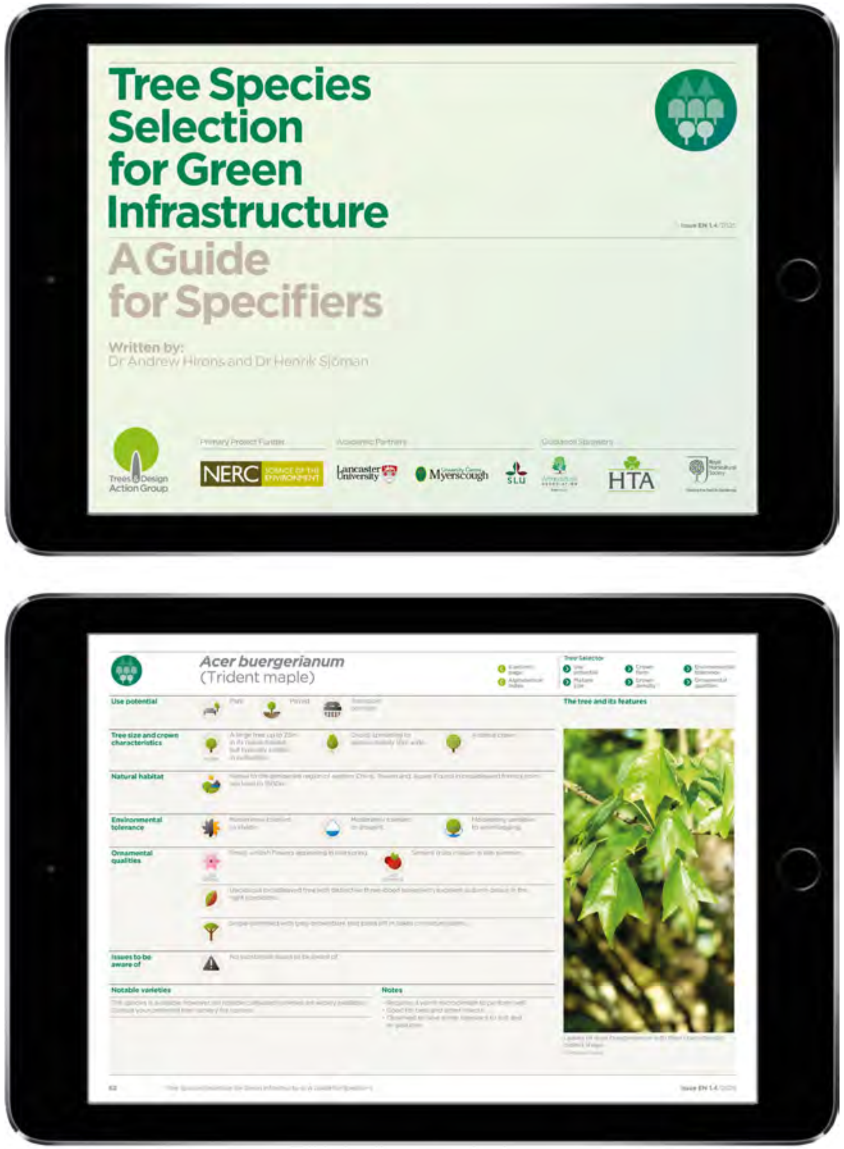

FIGURE 12: The *Tree Species Selection for Green Infrastructure: A Guide for Specifiers, Issue 1.4*. Trees and design Action Group. All the candidate species identified in this analysis feature in this free guidance.

REFERENCES AND NOTES

[21] Hirons, A.D. and Sjöman, H. (2019) *Tree Species Selection for Green Infrastructure: A Guide for Specifiers, Issue 1.4*. Trees and design Action Group. Free to download here.

CANDIDATE SPECIES FOR FUTURE PLANTING CONTINUED

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Box 3: Species evaluated as high and moderate suitability which should play a role in the strategic diversification of London's urban forest. Native species in bold.

HIGH SUITABILITY SPECIES

1. *Acer monspessulanum*
2. *Acer tataricum*
3. *Arbutus unedo*
4. *Cupressus arizonica*
5. *Cupressus macrocarpa*
6. *Eucommia ulmoides*
7. *Olea europaea*
8. *Ostrya carpinifolia*
9. *Parrotia persica*
10. *Quercus frainetto*
11. *Quercus ilex*
12. *Quercus suber*
13. ***Sorbus torminalis***
14. *Tamarix ramosissima*

MODERATE SUITABILITY SPECIES

1. *Abies concolor*
2. Acacia *dealbata*
3. *Acer buergerianum*
4. *Acer cappadocicum*
5. *Acer davidii*
6. *Acer griseum*
7. *Acer negundo*
8. *Aesculus indica*
9. *Aesculus pavia*
10. *Amelanchier alnifolia*
11. *Betula albosinensis*
12. *Betula jacquemontii*
13. *Betula papyrifera*
14. *Betula utilis*
15. *Buxus sempervirens*
16. *Carya illinoinensis*
17. *Catalpa bignonioides*
18. *Catalpa speciosa*
19. *Cedrus atlantica*
20. *Cedrus deodara*
21. *Cedrus libani*
22. *Celtis australis*
23. *Celtis occidentalis*
24. *Cercis siliquastrum*
25. *Chamaecyparis lawsoniana*
26. *Corylus colurna*
27. *Corylus maxima*
28. *Crataegus* x *lavallei*
29. ***Crataegus monogyna***
30. *Crataegus* x *persimilis*
31. *Cupressus sempervirens*
32. *Cydonia oblonga*
33. *Diospyros kaki*
34. *Elaeagnus angustifolia*
35. *Eucalyptus pauciflora*
36. *Fagus orientalis*
37. *Ficus carica*
38. *Ginkgo biloba*
39. *Gleditsia triacanthos*
40. *Gymnocladus dioica*
41. *Heptacodium miconioides*
42. *Hippophae salicifolia*
43. *Juglans nigra*
44. *Juglans regia*
45. *Juniperus scopulorum*
46. *Juniperus virginiana*
47. *Koelreuteria paniculata*
48. *Ligustrum japonicum*
49. *Ligustrum lucidum*
50. *Malus baccata*
51. *Malus yunnanensis*
52. *Morus alba*
53. *Morus nigra*
54. *Nothofagus antarctica*
55. *Paulownia tomentosa*
56. *Picea pungens*
57. *Pinus contorta*
58. *Pinus nigra*
59. *Pinus pinaster*
60. *Pinus pinea*
61. *Pinus radiata*
62. *Pinus wallichiana*
63. *Platanus* x *hispanica*
64. *Platanus orientalis*
65. *Pseudotsuga menziesii*
66. *Prunus cerasifera*
67. *Prunus dulcis*
68. *Prunus maackii*
69. *Prunus serrula*
70. *Pyrus calleryana*
71. *Pyrus communis*
72. *Quercus castaneifolia*
73. *Robinia pseudoacacia*
74. *Sequoia sempervirens*
75. *Sequoiadendron giganteum*
76. *Sorbus discolor*
77. *Sorbus vilmorinii*
78. *Styphnolobium japonicum*
79. *Syringa vulgaris*
80. *Syringa reticulata*
81. *Tamarix gallica*
82. *Tamarix tetrandra*
83. *Taxodium distichum*
84. ***Taxus baccata***
85. *Tilia mongolica*
86. *Ulmus* (resistant cultivars)
87. X *Cuprocyparis leylandii*

CANDIDATE SPECIES FOR FUTURE PLANTING CONTINUED

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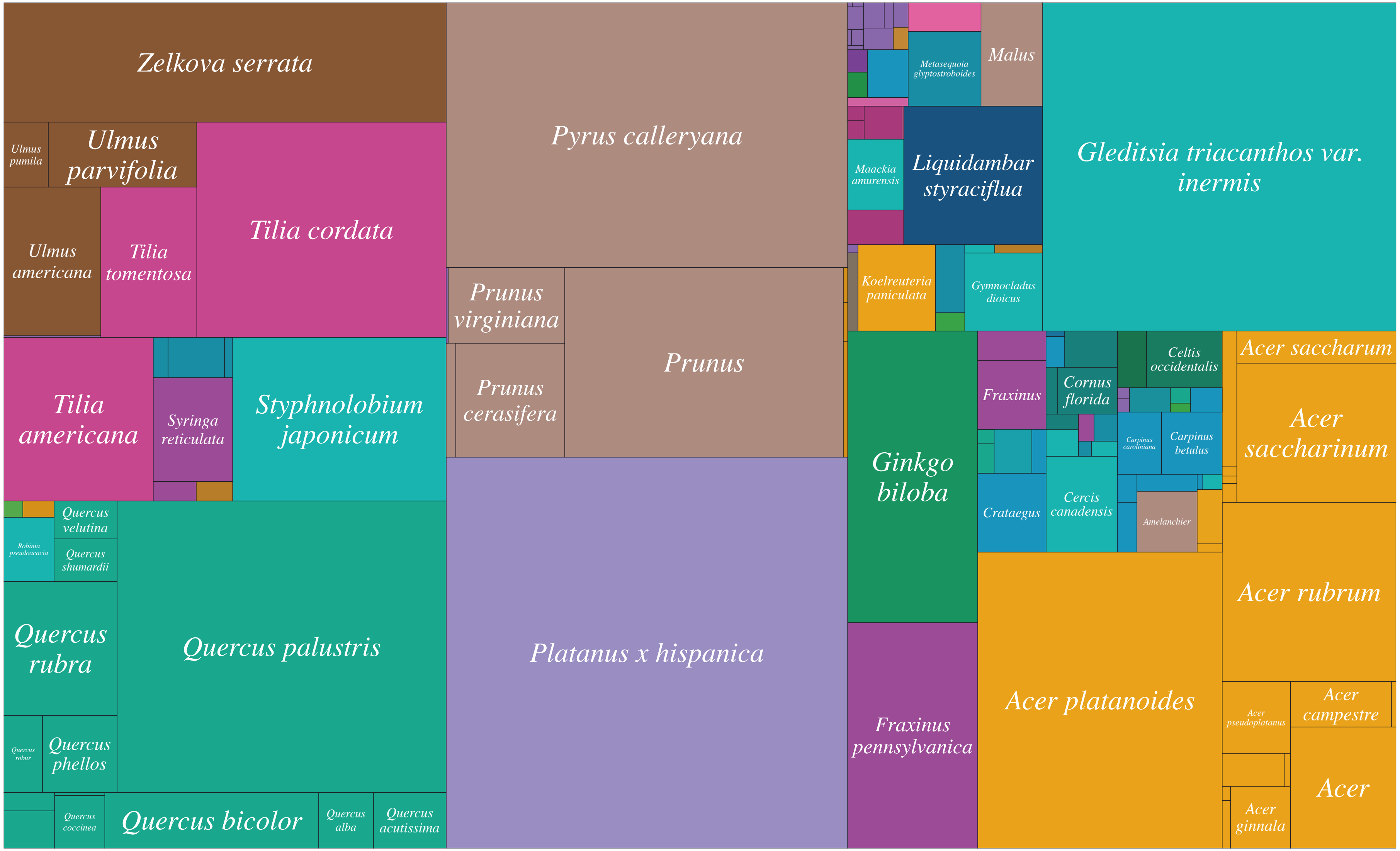


FIGURE 13: The diversity of New York's trees with the top 50 species identified by name. Each rectangle represents a species, the size of the rectangle represents the number of trees, the colour represents the botanical family. *Platanus* x *hispanica* represents 87,014 trees or 13.34% of New York's urban forest.

RECOMMENDATIONS – A CALL TO ACTION

Public realm trees in London, along with the manifold benefits bestowed on communities, are threatened by a changing climate. Whilst most of London's urban forest is in private ownership, the publicly owned trees contribute 60% of the ecosystems services because of the greater prevalence of mature, large stature trees within public ownership[22]. This report makes clear that if nothing is done to address the situation, most (estimated at 73%) of the public realm trees will not be suitable for conditions expected at the end of this century. This suggests that these trees are likely to have reduced performance (growth and other ecosystem services) as a function of climate change: mortality rates within these species are also likely to accelerate.

Despite the sobering results of this analysis, this report will equip tree managers across London with the evidence needed to make choices that will enhance the prospects of London's trees, securing an urban treescape for generations to come. Therefore, within the challenge of these outcomes lie profound opportunities to act in a meaningful and positive way. There is time to act and make impact. Therefore, this report should be received as a call to action for all those with influence on urban tree policy and practice.

We make the following recommendations:

1. ENHANCE THE HEALTH OF EXISTING TREES

Healthy trees are more resilient to stress. Tree performance will be enhanced when trees are growing in good-quality rooting environments, characterised by sufficient soil volume and biologically healthy soils. Given an equivalence in climate, trees in healthy growing conditions experience stress more gradually and less acutely than trees growing in poor-quality conditions. There is long-term value in proactively enhancing tree growing environments, especially of large trees that contribute the greatest benefits to society. Enhancing rooting environments through soil decompaction and amelioration is a critical strategy to mitigate against climate-related stress in trees.

Recommended actions:

1.1 – Prioritise investment in rooting environments – intentionally design space for roots, provide adequate soil volumes and promote healthy soils.
1.2 – Implement soil decompaction and improvement programmes for large, mature trees that deliver the greatest benefits.
1.3 – Recognise and resource tree health enhancement as a critical climate-adaptation action, not a maintenance activity.

2. STRATEGICALLY DIVERSIFY LONDON'S URBAN FOREST.

Given the variation in species suitability, tree species diversity targets measured by taxonomic metrics may lead to increased taxonomic diversity without improving the resilience to future climate. Therefore, new tree planting should focus on species that are likely to be more suitable to London's future climate. Tree selection decisions must also be cognisant of biotic threats (from emerging pests and pathogens) and risks from potentially invasive species. Future research should combine this climate suitability analysis with other risks to produce a composite risk assessment of London's trees and provide guidance on planting palettes that are suitable for future climates, have low risk from biotic threats and low invasive potential.

Recommended actions:

2.1 – Increase taxonomic diversity within the constraints of species predicted to be suitable to London's future climate.
2.2 – Integrate pest, pathogen and invasiveness risk assessments with climate-suitability data to guide suitable species palettes.
2.3 – Embed these criteria into borough tree strategies, policy, procurement frameworks and design guidance.

3. FUND TREE ESTABLISHMENT, NOT TREE PLANTING

Funding instruments designed to increase canopy cover should fund tree establishment, not tree planting. Whilst contracts and grants are awarded for tree planting, rather than the outcome of tree establishment, tree planting initiatives are likely to be compromised by low success rates. Current funding instruments need to be evaluated to ensure that species suitability is fully considered, tree planting aftercare is sufficiently resourced and full payment to contractors only made after evidenced tree establishment (5 years after planting date). Funding tree planting targets based on numbers of trees planted will not deliver vibrant, vital treescapes for future generations.

REFERENCES AND NOTES

[22] Rogers, K., Sacre, K., Goodenough, J. and Doick, K. (2015) Valuing London's urban forest: results of the London i-Tree eco project. Treeconomics, London.

RECOMMENDATIONS – A CALL TO ACTION CONTINUED

Recommended actions:

3.1 – Require species suitability assessment, aftercare and establishment monitoring in funding agreements.
3.2 – Redesign grants and contracts to reward successful tree establishment (typically 5 years post-planting), not initial planting.
3.3 – Phase out numeric "trees planted" targets in favour of establishment success rate.

4. ADOPT A LONDON TREE DATA STANDARD

Tree demographic analysis will be made much more efficient and robust if a shared data standard is adopted. Indeed, accuracy in the outcomes of this report has been reduced by the quality of the underlying tree inventory data – despite it being the best available. Therefore, a Greater London Authority tree data standard should be adopted to support urban forest managers with accurate information. As a minimum: a nomenclature standard (for example, the taxonomic backbone of *Plants of the world online*[23]) and a standard way to measure tree dimensions should be agreed. It is also important to record tree mortality rates in a structured way to help evaluate any systemic failure as a function of species or management protocol.

Recommended action:

4.1 – Implement a London-wide tree data framework covering taxonomy, measurement methods, and mortality reporting.

5. COLLABORATE WITH TREE NURSERIES

The provision of trees for our urban forest relies upon a supply chain from tree nurseries. To ensure that the correct species are available for purchase by London's urban forest managers, it is critical that there continues to be an active dialogue between the nursery sector and Local Authorities. As the lead-time for 'standard' size street trees is often between five to ten years – and could be longer – it is essential that nurseries have clear guidance from tree specifiers regarding the species palettes they require. To ensure availability of the most suitable species, Local Authorities should seek to contract grow these trees with nurseries, setting specific procurement targets for contract growing and collaborating across the Greater London Authority to achieve the economies of scale necessary to guarantee that suitable tree species are available within a biosecure supply chain.

Recommended actions:

5.1 – Provide nurseries with clear guidance on required species palettes.
5.2 – Establish nursery partnerships and contract-growing agreements to secure long-term supply of future climate-suitable and biosecure trees.
5.3 – Use collective London-level procurement to achieve economies of scale and ensure consistent stock quality.
5.4 – Where feasible, support climate-adapted tree production initiatives within London.

6. DEVELOP A STRATEGIC MECHANISM TO GET NOVEL PLANT MATERIAL INTO HORTICULTURAL PRODUCTION

The suitability of trees for London's future urban forest is a function of species and provenance. Unfortunately, knowledge of provenance (region of origin) is absent from most commercially produced trees. In many cases, particularly those identified as having 'Low' or 'Moderate' suitability in this report, targeted provenance selection is very likely to increase the compatibility with future climate scenarios. Research aimed at understanding intraspecific variation in plant traits and provenance selection aimed at selecting optimal plant material for London's future climate should be prioritised.

Whilst working within the constraints of the Nagoya Protocol (Compliance) Regulations 2015[24], mechanisms that facilitate the strategic introduction of new material into the horticultural trade via botanic gardens and new, targeted collection expeditions.

Recommended actions:

6.1 – Work with government bodies and industry to develop compliant mechanisms to introduce and trial new species and provenances suitable for future conditions.
6.2 – Support research on intraspecific variation in plant traits and

REFERENCES AND NOTES

[23] Plants of the world online.
[24] Nagoya Protocol (Compliance) Regulations 2015.

RECOMMENDATIONS – A CALL TO ACTION CONTINUED

targeted provenance selection to identify the most future climate-compatible planting material.
6.3 – Use botanic gardens and arboreta as hubs for research, testing, and knowledge transfer.

7. ADDRESS GAPS IN PLANT TRAIT DATA.

This analysis utilises global plant trait datasets to help inform tree tolerance to abiotic, climate-related stress. However, many of the species did not have all relevant traits available, this resulted in a low confidence score for 65% of the outcome statements. Using this study as a gap analysis, research should prioritise the collection 'missing' trait (LDMC, WD, TLP) data in order to further improve the confidence of this analytical framework.

Recommended actions:

7.1 – Support further research to address the 'missing' trait data gaps in wood density, leaf dry-matter content, and turgor-loss point for under-represented species.
7.2 – Establish a framework for collaboration between research institutions, policymakers and industry to continue to improve the evidence base for urban species selection.

8. EVALUATE POTENTIAL CANOPY COVER IMPACTS OF SPECIES CLIMATE SUITABILITY.

This report has delivered an analysis of tree suitability based on a taxonomic analysis. Variation in how tree dimensions are recorded, particularly the use of size classes (rather than actual tree dimensions) makes statements relating to potential impact on canopy cover difficult. Once a new data standard has been adopted, evaluating tree suitability for future climate through the prism of canopy cover will help prioritise species selection for future climate scenarios. Remote sensing surveys using technologies such as LiDAR could greatly aid this task, providing tree dimensions can be accurately paired to species.

Recommended action:

8.1 – Once standardised data is adopted, use remote sensing (e.g. LiDAR) to map canopy structure and evaluate the impact of species on canopy cover.

9. DEVELOP LONDON-WIDE STRATEGIES AND STRUCTURES TO MANAGE THE WHOLE OF LONDON'S URBAN FOREST.

Landscapes are not defined by political boundaries, therefore, wherever practicable, London-wide strategies for urban forest management should be adopted. Organisations such as the London Urban Forest Partnership should be enabled to help achieve this.

Recommended action:

9.1 – Empower the London Urban Forest Partnership to coordinate data, investment, and planning for public realm trees across the city.

10. APPLY THIS ANALYTICAL FRAMEWORK TO OTHER CITIES AND REGIONS.

Leadership shown by the Greater London Authority and London's Urban Forest Partnership has enabled the development of a novel approach to tree suitability assessment. Other cities and regions could benefit from this approach to help inform their own contexts and ultimately progress towards a national understanding of tree suitability to future climates.

Recommended actions:

10.1 – Apply the methodology prototyped in London to assess the future climate suitability of trees to other UK cities and regions.
10.2 – Develop this analytical framework further to support a national evidence base for improving urban forest resilience within UK-wide climate adaptation policy.

RECOMMENDATIONS – A CALL TO ACTION CONTINUED

LIMITATIONS

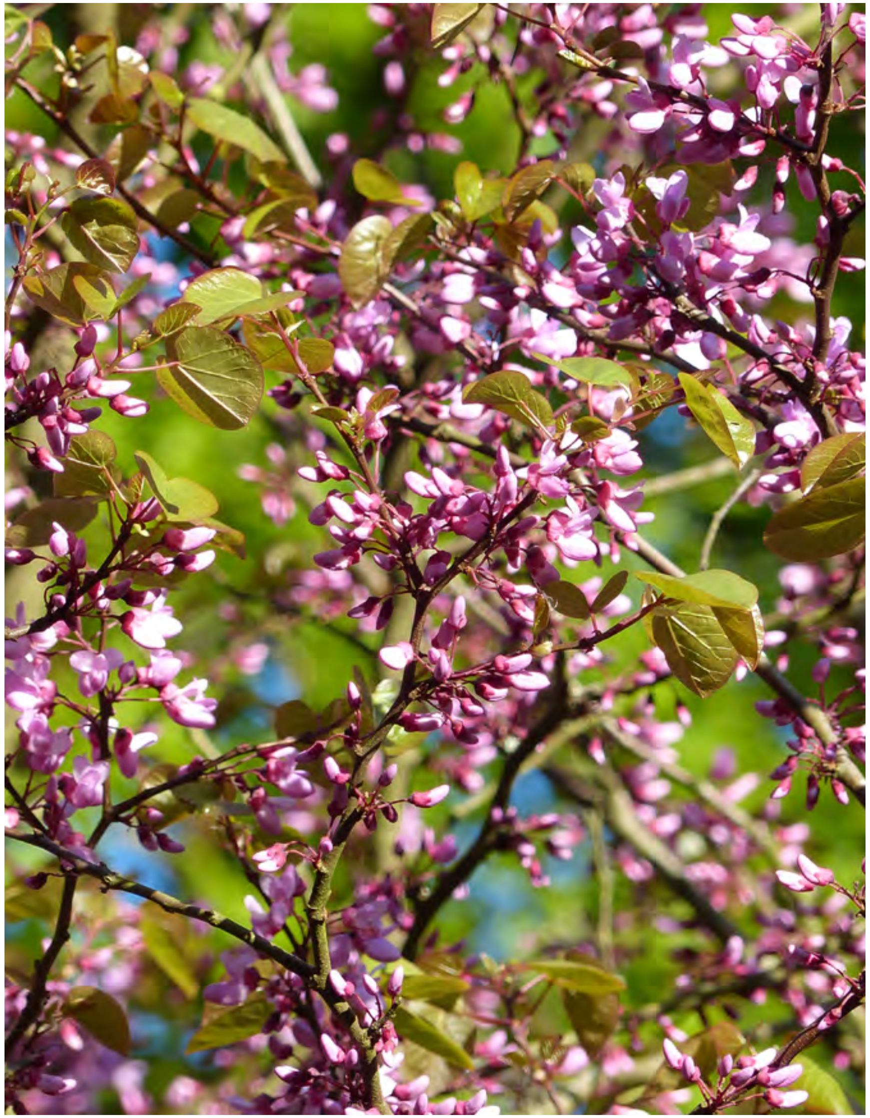
Despite its strengths, this study acknowledges several limitations. Data gaps, including sparse occurrence records for some species, affect the precision of species distribution models. Additionally, whilst the inclusion of plant traits makes outcome statements more robust, some of the trait data clusters were estimated through expert judgement rather than derived from primary data sources. Transparency of this issue was addressed through the inclusion of a confidence score. Nevertheless, it is hoped that future research can reduce the data absences, mitigating this limitation in subsequent analyses. It would also be good to deploy emerging approaches that could integrate species distribution models and plant traits in a more sophisticated way. This will require additional, complementary datasets, ideally from across species' ranges.

Recommended species have only been taken from the database provided. Therefore, these are species that are comparatively under-represented within London but currently available. We have refrained from advocating novel species that are not available to avoid incentivising importation of plant material from beyond UK borders. As recommended by this report, we are seeking to work with UK tree nurseries to bring novel tree species into production in a sustainable and ethical way.

Importantly, this analysis is only relevant for London and should only be considered accurate for this area. Climate projections, even within the same scenario vary across the UK so tree suitability from this study should not be inferred for other parts of the country which often have less consequential projections. This analysis only looked at one SSP scenario. There would be merit in evaluating multiple scenarios as well as looking at medium-term time frames, such as 2050, to help plan for 2090 projections.

CONCLUSION

Ensuring the resilience of London's urban forest requires collective action from strategic authorities, tree managers, nurseries, researchers, funders and Government. Each has role to play in enacting the recommendations of this report; by working together, we can ensure London's treescapes remain healthy, diverse, and resilient whilst providing benefits for generations to come.



London's trees make London more liveable, not just for people, but they also provide critical habitat for wildlife. Ensuring this canopy is available for future generations will require focused effort and collective action. The Judas tree, *Cercis siliquastrum*, shown here provides vibrant flowers in late spring. © Andrew Hirons

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APPENDIX 1

APPENDIX 1 – SUPPLEMENTARY DATA

To ensure transparency and repeatability of the analysis, the data cleaning stages are recorded here. First, we removed observations that had too high a taxonomic level to be useful in this analysis. Details of this are in box A1.

Box A1: Removed observation data

'*Acizzia*', '*Anacardiaceae*', '*Araliaceae*', '*Arecaceae*', '*Arecales*', '*Bignoniaceae*', '*Biota*', '*Cannabaceae*', '*Caprifoliaceae*', '*Celastraceae*', '*Chlorophyta*', '*Cudoniella acicularis*', '*Cupressaceae*', '*Digitalis purpurea*', '*Ericales*', '*Exochorda*', '*Fabaceae*', '*Fallopia baldschuanica*', '*Fallopia japonica*', '*Garryales*', '*Geometridae*', '*Gymnodinium chiastosporum*', '*Gymnodiniaceae*', '*Hippothoa*', '*Homona coffearia*', '*Ipimorpha subtusa*', '*Lauraceae*', '*Lythraceae*', '*Melianthaceae*', '*Moraceae*', '*Myrtaceae*', '*Oleaceae*', '*Pica*', '*Pinaceae*', '*Pinales*', '*Pinophyta*', '*Pinopsida*', '*Plantae*', '*Rosa*', '*Rosacea*', '*Rutaceae*', '*Sapindales*', '*Saxifragaceae*', '*Saxifragales*', '*Subacronicta megacephala*', '*Ulmaceae*', '*Zabrachia tenella*'.

N.B. Some records from these groups are included, but the observations were removed where only the botanical order or family information was included as such a coarse level of resolution is not helpful in subsequent analysis.

Next it was important to harmonise hybrid names in order that names were recorded in a consistent way so that the same hybrid was not recorded in two different ways (Box A2).

Box A2: Harmonised hybrid names

"Arbutus unedo x *andrachne = A.* x *andrachnoides" = "Arbutus* x *andrachnoides",*
"Berberis darwinii x *empetrifolia = B.* x *stenophylla" = "Berberis* x *stenophylla",*
"Cotoneaster frigidus x *salicifolius = C.* x *watereri" = "Cotoneaster* x *watereri",*
"Cotoneaster salicifolius x *dammeri = C. 'Hybridus Pendulus'" = "Cotoneaster Hybridus Pendulus",*
"Cupressus macrocarpa x *Xanthocyparis nootkatensis =* X *Cuprocyparis leylandi" = "X Cuprocyparis leylandii",*
"Forsythia suspensa x *viridissima = F.* x *intermedia" = "Forsythia* x *intermedia",*
"Ilex aquifolium x *perado = I.* x *altaclerensis" = "Ilex* x *altaclerensis",*
"Laburnum anagyroides x *alpinum = L.* x *watereri" = "Laburnum* x *watereri",*
"Larix decidua x *kaempferi = L.* x *marschlinsii" = "Larix* x *marschlinsii",*
"Malus atrosanguinea x *niedzwetskyana = M.* x *purpurea" = "Malus* x *purpurea",*
"Malus baccata x *prunifolia = M.* x *robusta" = "Malus* x *robusta",*
"Osmanthus decorus x *delavayi = O.* x *burkwoodii" = "Osmanthus* x *burkwoodii",*
"Platanus occidentalis x *orientalis = P.* x *hispanica" = "Platanus* x *hispanica",*
"Populus alba x *tremula = P.* x *canescens" = "Populus* x *canescens",*
"Populus balsamifera x *deltoides = P.* x *jackii" = "Populus* x *jackii",*
"Populus nigra x *deltoides = P.* x *canadensis" = "Populus* x *canadensis",*
"Populus nigra x *laurifolia = P.* x *berolinensis" = "Populus* x *berolinensis",*
"Prunus spinosa x *domestica = P.* x *fruticans" = "Prunus* x *fruticans",*
"Pterocarya fraxinifolia x *stenoptera (P.* x *rehderiana)" = "Pterocarya* x *rehderiana",*
"Quercus cerris x *suber = Q.* x *crenata" = "Quercus* x *crenata",*
"Salix alba x *babylonica = S.* x *sepulcralis" = "Salix* x *sepulcralis",*
"Salix euxina x *alba = S.* x *fragilis" = "Salix* x *fragilis",*
"Sorbus aucuparia x *aria = S.* x *thuringiaca" = "Sorbus* x *thuringiaca",*
"Tilia cordata x *dasystyla = T.* x *euchlora" = "Tilia* x *euchlora",*
"Tilia platyphyllos x *cordata = T.* x *europaea" = "Tilia* x *europaea",*
"Ulmus glabra x *minor* x *plotii = U.* x *hollandica" = "Ulmus* x *hollandica",*
"Viburnum farreri x *grandiflorum = V.* x *bodnantense" = "Viburnum* x *bodnantense",*
"Viburnum lantana x *rhytidophyllum = V.* x *rhytidophylloides" = "Viburnum* x *rhytidophylloides".*

APPENDIX 1 – SUPPLEMENTARY DATA CONTINUED

As the analysis for this report cannot resolve cultivar resilience scores, the cultivars present in the dataframe were recoded to represent the species level.

Box A3: Cultivars recoded to species

"*Acer platanoides 'Drummondii'*" = "*Acer platanoides*",
"*Acer platanoides 'Schwedleri'*" = "*Acer platanoides*",
"*Acer pseudoplatanus 'Brilliantissimum'*" = "*Acer pseudoplatanus*",
"*Acer pseudoplatanus 'Leopoldii'*" = "*Acer pseudoplatanus*",
"*Acer pseudoplatanus forma erythrocarpum*" = "*Acer pseudoplatanus*",
"*Acer pseudoplatanus forma purpureum*" = "*Acer pseudoplatanus*",
"*Acer pseudoplatanus forma variegatum*" = "*Acer pseudoplatanus*",
"*Betula pendula 'Laciniata'*" = "*Betula pendula*",
"*Betula pubescens Ehrh.* var. *pubescens*" = "*Betula pubescens*",
"*Chamaecyparis lawsoniana 'Erecta Viridis'*" = "*Chamaecyparis lawsoniana*",
"*Cupressus arizonica* var. *glabra*" = "*Cupressus arizonica*",
"*Fagus sylvatica 'Asplenifolia'*" = "*Fagus sylvatica*",
"*Fagus sylvatica 'Dawyck'*" = "*Fagus sylvatica*",
"*Fagus sylvatica 'Pendula'*" = "*Fagus sylvatica*",
"*Fagus sylvatica 'Purpurea'*" = "*Fagus sylvatica*",
"*Fagus sylvatica Heterophylla group*" = "*Fagus sylvatica*",
"*Fraxinus angustifolia 'Raywood'*" = "*Fraxinus angustifolia*",
"*Fraxinus angustifolia* subsp. *oxycarpa*" = "*Fraxinus angustifolia*",
"*Fraxinus excelsior 'Diversifolia'*" = "*Fraxinus excelsior*",
"*Fraxinus excelsior 'Jaspidea'*" = "*Fraxinus excelsior*",
"*Mespilus germanica 'Nottingham'*" = "*Mespilus germanica*",
"*Pinus contorta* var. *latifolia*" = "*Pinus contorta*",
"*Pinus nigra* subsp. *laricio*" = "*Pinus nigra*",
"*Platanus*" = "*Platanus* x *hispanica*",
"*Populus candicans*" = "*Populus* x *candicans*",
"*Populus candicans 'Aurora'*" = "*Populus* x *candicans*",
"*Populus nigra 'Italica'*" = "*Populus nigra*",
"*Populus nigra 'Plantierensis'*" = "*Populus nigra*",
"*Populus nigra* subsp. *betulifolia*" = "*Populus nigra*",
"*Populus* x *canadensis 'Marilandica'*" = "*Populus* x *canadensis*",
"*Populus* x *canadensis 'Regenerata'*" = "*Populus* x *canadensis*",
"*Populus* x *canadensis 'Serotina'*" = "*Populus* x *canadensis*",
"*Prunus avium 'Plena'*" = "*Prunus avium*",
"*Prunus cerasifera* var. *pissardii*" = "*Prunus cerasifera*",
"*Prunus domestica* subsp. *insititia*" = "*Prunus domestica*",
"*Prunus Maackii*" = "*Prunus maackii*",
"*Quercus robur forma fastigiata*" = "*Quercus robur*",
"*Salix cinerea* subsp. *oleifolia*" = "*Salix cinerea*",
"*Salix* x *sepulcralis 'Chrysocoma'*" = "*Salix* x *sepulcralis*",
"*Taxodium*" = "*Taxodium distichum*",
"*Taxus baccata 'Fastigiata'*" = "*Taxus baccata*",
"*Tilia platyphyllos 'Rubra'*" = "*Tilia platyphyllos*",
"*Tilia 'Petiolaris'*" = "*Tilia tomentosa*",
"*Tilia tomentosa 'Petiolaris'*" = "*Tilia tomentosa*",
"*Ulmus glabra 'Exoniensis'*" = "*Ulmus glabra*",
"*Ulmus glabra 'Horizontalis' (Pendula)*" = "*Ulmus glabra*",
"*Ulmus minor* agg." = "*Ulmus minor*",
"*Ulmus minor* subsp. *minor*" = "*Ulmus minor*"
"X *Cuprocyparis*" = "X *Cuprocyparis leylandii*",
"X *Cupressocyparis*" = "X *Cuprocyparis leylandii*",
"X *Cuprocyparis leylandi*" = "X *Cuprocyparis leylandii*",
"*Yucca*" = "*Yucca filamentosa*".

APPENDIX 1 – SUPPLEMENTARY DATA CONTINUED

Finally, the shrub and climber species were removed.

Box A4: Shrub and climber observations that have been removed

'Azara', 'Berberis darwinii', 'Berberis x *stenophylla', 'Berberis* x *stenophylla', 'Buddleja', 'Buddleja alternifolia', 'Buddleja davidii', 'Camelina', 'Camellia', 'Ceanothus', 'Cordyline australis', 'Corylus avellana', 'Corylus maxima', 'Cotinus', 'Cotinus coggygria', 'Cotoneaster', 'Cotoneaster Hybridus Pendulus', 'Cotoneaster conspicuus', 'Cotoneaster franchetii', 'Cotoneaster integrifolius', 'Cotoneaster salicifolius', 'Cotoneaster* x *watereri', 'Cytisus', 'Cytisus battandieri', 'Cytisus scoparius', 'Elaeagnus umbellata', 'Euonymus europaeus', 'Euonymus japonicus', 'Euonymus latifolius', 'Forsythia', 'Forsythia* x *intermedia', 'Frangula alnus', 'Fremontodendron californicum', 'Genista aetnensis', 'Genista hispanica', 'Griselinia', 'Griselinia littoralis', 'Hedera', 'Hedera helix', 'Homona coffearia', 'Hippophae rhamnoides', 'Ligustrum ovalifolium', 'Ligustrum vulgare', 'Lonicera periclymenum', 'Luma apiculata', 'Mahonia', 'Osmanthus', 'Osmanthus heterophyllus', 'Osmanthus* x *burkwoodii', 'Philadelphus', 'Philadelphus coronarius', 'Phillyrea latifolia', 'Photinia', 'Photinia davidiana', 'Pittosporum', 'Pittosporum tenuifolium', 'Pyracantha', 'Pyracantha atalantoides', 'Pyracantha coccinea', 'Rhamnus', 'Rhamnus cathartica', 'Rhododendron', 'Rhododendron ponticum', 'Ribes', 'Ribes sanguineum', 'Rosa canina', 'Rosa rugosa', 'Rubus cockburnianus', 'Rubus fruticosus* agg.', *'Sambucus nigra', 'Viburnum', 'Viburnum davidii', 'Viburnum lantana', 'Viburnum opulus', 'Viburnum rhytidophyllum', 'Viburnum tinus', 'Viburnum* x *bodnantense', 'Viburnum* x *rhytidophylloides', 'Viburnum lantana* x *rhytidophyllum', 'Viburnum farreri* x *grandiflorum', 'Viburnum lantana* x *rhytidophyllum', 'Viburnum farreri* x *grandiflorum ', 'Viburnum lantana* x *rhytidophyllum', 'Wisteria sinensis'.*

Table A1: List of tree species in London's public realm trees with relative counts and percentage data. Data is ordered alphabetically by family name. N.B. Some of the 'Species' are recorded as Genus, but these have been preserved as 'Species' to give a more accurate summary of the dataset.

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Rosaceae	*Prunus*†	87,837	7.5180
Platanaceae	*Platanus x hispanica*	77,569	6.6392
Fagaceae	*Quercus robur*	66,892	5.7253
Sapindaceae	*Acer platanoides*	55,775	4.7738
Oleaceae	*Fraxinus excelsior*	53,362	4.5673
Sapindaceae	*Acer pseudoplatanus*	52,510	4.4944
Malvaceae	*Tilia x europaea*	45,204	3.8690
Betulaceae	*Carpinus betulus*	35,029	2.9982
Rosaceae	*Prunus avium*	31,803	2.7220
Betulaceae	*Betula pendula*	31,530	2.6987
Sapindaceae	*Acer campestre*	31,019	2.6549
Rosaceae	*Crataegus monogyna*	27,542	2.3573
Rosaceae	*Malus*	25,652	2.1956
Sapindaceae	*Aesculus hippocastanum*	23,652	2.0244
Rosaceae	*Pyrus*	22,769	1.9488
Malvaceae	*Tilia*	21,562	1.8455

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Rosaceae	*Prunus cerasifera*	21,472	1.8378
Rosaceae	*Sorbus aucuparia*	17,829	1.5260
Malvaceae	*Tilia cordata*	17,314	1.4819
Aquifoliaceae	*Ilex aquifolium*	13,706	1.1731
Fabaceae	*Robinia pseudoacacia*	13,208	1.1305
Rosaceae	*Sorbus aria*	12,600	1.0784
Rosaceae	*Prunus serrulata*	12,436	1.0644
Malvaceae	*Tilia platyphyllos*	11,252	0.9631
Betulaceae	*Betula*	10,566	0.9044
Fagaceae	*Fagus sylvatica*	10,478	0.8968
Rosaceae	*Sorbus intermedia*	9,788	0.8378
Altingiaceae	*Liquidambar styraciflua*	9,562	0.8184
Taxaceae	*Taxus baccata*	8,982	0.7688
Salicaceae	*Populus nigra*	8,481	0.7259
Rosaceae	*Sorbus*	8,473	0.7252
Sapindaceae	*Acer*	8,417	0.7204

Table A1: List of tree species in London's public realm trees with relative counts and percentage data. Data is ordered alphabetically by family name. N.B. Some of the 'Species' are recorded as Genus, but these have been preserved as 'Species' to give a more accurate summary of the dataset.

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Cupressaceae	*Chamaecyparis lawsoniana*	8,314	0.7116
Rosaceae	*Amelanchier*	7,855	0.6723
Betulaceae	*Betula utilis*	6,920	0.5923
Oleaceae	*Fraxinus*	6,544	0.5601
Sapindaceae	*Acer saccharinum*	6,275	0.5371
Betulaceae	*Alnus cordata*	6,183	0.5292
Betulaceae	*Corylus colurna*	6,022	0.5154
Ulmaceae	*Ulmus procera*	5,951	0.5094
Betulaceae	*Alnus glutinosa*	5,945	0.5088
Pinaceae	*Pinus sylvestris*	5,892	0.5043
Cupressaceae	*X Cuprocyparis leylandii*	5,777	0.4945
Fagaceae	*Castanea sativa*	5,710	0.4887
Ginkgoaceae	*Ginkgo biloba*	5,524	0.4728
Salicaceae	*Populus*	5,396	0.4618
Rosaceae	*Crataegus*	5,195	0.4446
Malvaceae	*Tilia x euchlora*	5,036	0.4310

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Rosaceae	*Prunus padus*	4,936	0.4225
Salicaceae	*Salix*	4,499	0.3851
Ulmaceae	*Ulmus*	4,332	0.3708
Magnoliaceae	*Magnolia*	4,276	0.3660
Fagaceae	*Quercus*	4,181	0.3579
Fabaceae	*Gleditsia triacanthos*	4,073	0.3486
Betulaceae	*Betula pubescens*	3,984	0.3410
Cupressaceae	*Cupressus*	3,809	0.3260
Simaroubaceae	*Ailanthus altissima*	3,795	0.3248
Fagaceae	*Quercus cerris*	3,725	0.3188
Pinaceae	*Pinus nigra*	3,553	0.3041
Rosaceae	*Amelanchier lamarckii*	3,286	0.2813
Rosaceae	*Crataegus laevigata*	3,163	0.2707
Salicaceae	*Salix caprea*	3,030	0.2593
Rosaceae	*Crataegus persimilis*	3,007	0.2574
Fagaceae	*Quercus ilex*	2,953	0.2527

Table A1: List of tree species in London's public realm trees with relative counts and percentage data. Data is ordered alphabetically by family name. N.B. Some of the 'Species' are recorded as Genus, but these have been preserved as 'Species' to give a more accurate summary of the dataset.

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Rosaceae	*Pyrus communis*	2,790	0.2388
Salicaceae	*Salix x fragilis*	2,773	0.2373
Salicaceae	*Salix alba*	2,768	0.2369
Rosaceae	*Pyrus calleryana*	2,701	0.2312
Salicaceae	*Populus alba*	2,599	0.2225
Fagaceae	*Quercus rubra*	2,580	0.2208
Betulaceae	*Betula jacquemontii*	2,550	0.2183
Magnoliaceae	*Liriodendron tulipifera*	2,529	0.2165
Oleaceae	*Fraxinus ornus*	2,461	0.2106
Sapindaceae	*Acer negundo*	2,433	0.2082
Rosaceae	*Malus sylvestris*	2,346	0.2008
Betulaceae	*Alnus incana*	2,270	0.1943
Sapindaceae	*Aesculus x carnea*	2,194	0.1878
Rosaceae	*Prunus x fruticans*	2,157	0.1846
Oleaceae	*Ligustrum*	2,042	0.1748
Rosaceae	*Malus pumila*	1,930	0.1652

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Rosaceae	*Prunus laurocerasus*	1,912	0.1636
Rosaceae	*Crataegus x lavallei*	1,874	0.1604
Oleaceae	*Fraxinus angustifolia*	1,859	0.1591
Rosaceae	*Prunus spinosa*	1,856	0.1589
Betulaceae	*Betula papyrifera*	1,760	0.1506
Salicaceae	*Populus tremula*	1,756	0.1503
Rosaceae	*Malus x purpurea*	1,672	0.1431
Bignoniaceae	*Catalpa bignonioides*	1,648	0.1411
Sapindaceae	*Koelreuteria paniculata*	1,633	0.1398
Rosaceae	*Prunus domestica*	1,622	0.1388
Betulaceae	*Betula albosinensis*	1,595	0.1365
Cupressaceae	*Thuja plicata*	1,546	0.1323
Hamamelidaceae	*Parrotia persica*	1,528	0.1308
Salicaceae	*Salix babylonica*	1,513	0.1295
Rosaceae	*Sorbus x thuringiaca*	1,473	0.1261
Cupressaceae	*Metasequoia glyptostroboides*	1,429	0.1223

APPENDIX 1 – SUPPLEMENTARY DATA CONTINUED

Table A1: List of tree species in London's public realm trees with relative counts and percentage data. Data is ordered alphabetically by family name. N.B. Some of the 'Species' are recorded as Genus, but these have been preserved as 'Species' to give a more accurate summary of the dataset.

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Juglandaceae	*Juglans regia*	1,424	0.1219
Cannabaceae	*Celtis australis*	1,411	0.1208
Sapindaceae	*Acer cappadocicum*	1,411	0.1208
Oleaceae	*Ligustrum lucidum*	1,359	0.1163
Rosaceae	*Malus baccata*	1,350	0.1155
Betulaceae	*Betula nigra*	1,291	0.1105
Aquifoliaceae	*Ilex*	1,276	0.1092
Sapindaceae	*Acer rubrum*	1,252	0.1072
Rosaceae	*Crataegus crus-galli*	1,245	0.1066
Salicaceae	*Populus x canadensis*	1,240	0.1061
Pinaceae	*Cedrus atlantica*	1,208	0.1034
Malvaceae	*Tilia tomentosa*	1,123	0.0961
Lauraceae	*Laurus nobilis*	1,058	0.0906
Pinaceae	*Pinus*	1,045	0.0894
Ulmaceae	*Ulmus glabra*	1,008	0.0863
Sapindaceae	*Aesculus indica*	1,001	0.0857

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Fagaceae	*Quercus palustris*	987	0.0845
Rosaceae	*Malus floribunda*	983	0.0841
Betulaceae	*Alnus*	941	0.0805
Fabaceae	*Laburnum anagyroides*	866	0.0741
Cupressaceae	*Chamaecyparis*	865	0.0740
Aquifoliaceae	*Ilex x altaclerensis*	849	0.0727
Platanaceae	*Platanus orientalis*	822	0.0704
Pinaceae	*Cedrus deodara*	813	0.0696
Rosaceae	*Prunus lusitanica*	808	0.0692
Sapindaceae	*Acer saccharum*	800	0.0685
Ulmaceae	*Zelkova serrata*	789	0.0675
Fabaceae	*Cercis siliquastrum*	784	0.0671
Oleaceae	*Syringa vulgaris*	729	0.0624
Cupressaceae	*Cupressus macrocarpa*	709	0.0607
Rosaceae	*Sorbus torminalis*	708	0.0606
Salicaceae	*Populus x canescens*	707	0.0605

APPENDIX 1 – SUPPLEMENTARY DATA CONTINUED

Table A1: List of tree species in London's public realm trees with relative counts and percentage data. Data is ordered alphabetically by family name. N.B. Some of the 'Species' are recorded as Genus, but these have been preserved as 'Species' to give a more accurate summary of the dataset.

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Salicaceae	*Populus balsamifera*	691	0.0591
Betulaceae	*Ostrya carpinifolia*	662	0.0567
Myrtaceae	*Eucalyptus gunnii*	620	0.0531
Paulowniaceae	*Paulownia tomentosa*	589	0.0504
Rosaceae	*Prunus dulcis*	586	0.0502
Sapindaceae	*Aesculus*	569	0.0487
Cupressaceae	*Sequoiadendron giganteum*	541	0.0463
Rosaceae	*Mespilus germanica*	540	0.0462
Rosaceae	*Prunus maackii*	539	0.0461
Pinaceae	*Picea abies*	537	0.0460
Juglandaceae	*Juglans nigra*	521	0.0446
Rosaceae	*Sorbus commixta*	514	0.0440
Cornaceae	*Cornus mas*	509	0.0436
Cupressaceae	*Taxodium distichum*	475	0.0407
Pinaceae	*Cedrus libani*	475	0.0407
Pinaceae	*Larix decidua*	464	0.0397

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Moraceae	*Ficus carica*	437	0.0374
Malvaceae	*Hibiscus syriacus*	435	0.0372
Rosaceae	*Cotoneaster frigidus*	415	0.0355
Rosaceae	*Malus hupehensis*	400	0.0342
Juglandaceae	*Pterocarya fraxinifolia*	393	0.0336
Moraceae	*Morus nigra*	393	0.0336
Sapindaceae	*Acer palmatum*	368	0.0315
Oleaceae	*Fraxinus americana*	365	0.0312
Anacardiaceae	*Rhus typhina*	351	0.0300
Fagaceae	*Quercus petraea*	344	0.0294
Moraceae	*Morus alba*	342	0.0293
Fagaceae	*Quercus coccinea*	341	0.0292
Ulmaceae	*Ulmus minor*	340	0.0291
Oleaceae	*Olea europaea*	338	0.0289
Rosaceae	*Pyrus salicifolia*	301	0.0258
Sapindaceae	*Acer davidii*	290	0.0248

APPENDIX 1 – SUPPLEMENTARY DATA CONTINUED

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Table A1: List of tree species in London's public realm trees with relative counts and percentage data. Data is ordered alphabetically by family name. N.B. Some of the 'Species' are recorded as Genus, but these have been preserved as 'Species' to give a more accurate summary of the dataset.

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Ericaceae	*Arbutus unedo*	275	0.0235
Salicaceae	*Populus canescens*	274	0.0235
Fabaceae	*Laburnum*	264	0.0226
Pinaceae	*Cedrus*	260	0.0223
Salicaceae	*Salix matsudana*	260	0.0223
Cercidiphyllaceae	*Cercidiphyllum japonicum*	257	0.0220
Cornaceae	*Cornus*	256	0.0219
Pinaceae	*Pinus pinea*	254	0.0217
Rosaceae	*Sorbus glabriuscula*	242	0.0207
Buxaceae	*Buxus sempervirens*	211	0.0181
Cupressaceae	*Cupressus lawsoniana*	210	0.0180
Myrtaceae	*Eucalyptus*	204	0.0175
Lamiaceae	*Clerodendrum trichotomum*	202	0.0173
Rosaceae	*Sorbus latifolia*	200	0.0171
Ulmaceae	*Zelkova carpinifolia*	198	0.0169
Cupressaceae	*Sequoia sempervirens*	194	0.0166

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Rosaceae	*Sorbus 'Joseph Rock'*	182	0.0156
Fabaceae	*Laburnum x watereri*	177	0.0151
Sapindaceae	*Acer griseum*	176	0.0151
Malvaceae	*Tilia americana*	171	0.0146
Fagaceae	*Quercus frainetto*	163	0.0140
Sapindaceae	*Aesculus flava*	163	0.0140
Bignoniaceae	*Chitalpa taschkentensis*	158	0.0135
Cornaceae	*Davidia involucrata*	149	0.0128
Nothofagaceae	*Nothofagus antarctica*	149	0.0128
Rosaceae	*Sorbus domestica*	149	0.0128
Nyssaceae	*Nyssa sylvatica*	147	0.0126
Betulaceae	*Alnus rubra*	137	0.0117
Fagaceae	*Fagus*	136	0.0116
Salicaceae	*Salix x sepulcralis*	129	0.0110
Juglandaceae	*Carya*	127	0.0109
Cupressaceae	*Juniperus communis*	126	0.0108

APPENDIX 1 – SUPPLEMENTARY DATA CONTINUED

Table A1: List of tree species in London's public realm trees with relative counts and percentage data. Data is ordered alphabetically by family name. N.B. Some of the 'Species' are recorded as Genus, but these have been preserved as 'Species' to give a more accurate summary of the dataset.

Botanical name		Proportion of trees	
Family	Species	Count	Percentage (%)
Cornaceae	*Cornus kousa*	124	0.0106
Pinaceae	*Pinus wallichiana*	123	0.0105
Fabaceae	*Acacia*	120	0.0103
Ulmaceae	*Ulmus x hollandica*	119	0.0102
Rosaceae	*Malus prunifolia*	118	0.0101
Pinaceae	*Larix*	115	0.0098
Fagaceae	*Quercus suber*	112	0.0096
Pinaceae	*Abies*	112	0.0096
Pinaceae	*Abies alba*	109	0.0093
Pinaceae	*Pinus radiata*	106	0.0091
Araucariaceae	*Araucaria araucana*	103	0.0088
Cupressaceae	*Cryptomeria japonica*	96	0.0082
Arecaceae	*Trachycarpus fortunei*	94	0.0080
Cupressaceae	*Calocedrus decurrens*	94	0.0080
Cupressaceae	*Juniperus*	90	0.0077
Tamaricaceae	*Tamarix tetrandra*	85	0.0073

Botanical name		Proportion of trees	
Family	Species	Count	Percentage (%)
Betulaceae	*Betula maximowicziana*	84	0.0072
Pinaceae	*Abies grandis*	83	0.0071
Fagaceae	*Quercus castaneifolia*	82	0.0070
Sapindaceae	*Acer japonicum*	79	0.0068
Cupressaceae	*Hesperocyparis glabra*	78	0.0067
Rosaceae	*Cydonia oblonga*	77	0.0066
Lauraceae	*Laurus*	76	0.0065
Rosaceae	*Malus domestica*	75	0.0064
Nothofagaceae	*Nothofagus obliqua*	73	0.0062
Pinaceae	*Picea*	69	0.0059
Pinaceae	*Pseudotsuga menziesii*	68	0.0058
Rosaceae	*Prunus incisa*	68	0.0058
Salicaceae	*Salix cinerea*	68	0.0058
Cupressaceae	*Thuja*	67	0.0057
Rosaceae	*Amelanchier ovalis*	67	0.0057
Salicaceae	*Populus trichocarpa*	65	0.0056

APPENDIX 1 – SUPPLEMENTARY DATA CONTINUED

Table A1: List of tree species in London's public realm trees with relative counts and percentage data. Data is ordered alphabetically by family name. N.B. Some of the 'Species' are recorded as Genus, but these have been preserved as 'Species' to give a more accurate summary of the dataset.

Botanical name		Proportion of trees	
Family	Species	Count	Percentage (%)
Cupressaceae	*Cupressus sempervirens*	63	0.0054
Pinaceae	*Pinus strobus*	59	0.0050
Rosaceae	*Prunus cerasus*	59	0.0050
Elaeagnaceae	*Hippophae*	57	0.0049
Oleaceae	*Fraxinus pennsylvanica*	56	0.0048
Pinaceae	*Picea omorika*	56	0.0048
Salicaceae	*Populus x candicans*	54	0.0046
Cornaceae	*Cornus sanguinea*	52	0.0045
Cornaceae	*Cornus alba*	49	0.0042
Pinaceae	*Larix kaempferi*	49	0.0042
Cupressaceae	*Chamaecyparis obtusa*	48	0.0041
Fagaceae	*Quercus x crenata*	45	0.0039
Pinaceae	*Picea pungens*	45	0.0039
Sapindaceae	*Aesculus pavia*	45	0.0039
Pinaceae	*Larix x marschlinsii*	42	0.0036
Sapindaceae	*Acer monspessulanum*	40	0.0034

Botanical name		Proportion of trees	
Family	Species	Count	Percentage (%)
Fagaceae	*Quercus x turneri*	38	0.0033
Fabaceae	*Styphnolobium japonicum*	37	0.0032
Tamaricaceae	*Tamarix*	37	0.0032
Pinaceae	*Abies procera*	35	0.0030
Pinaceae	*Pinus mugo*	34	0.0029
Myrtaceae	*Eucalyptus niphophila*	33	0.0028
Rosaceae	*Malus robusta*	32	0.0027
Magnoliaceae	*Magnolia grandiflora*	31	0.0027
Cupressaceae	*Xanthocyparis nootkatensis*	30	0.0026
Salicaceae	*Populus x jackii*	30	0.0026
Pinaceae	*Pinus pinaster*	29	0.0025
Rosaceae	*Prunus serotina*	29	0.0025
Tamaricaceae	*Tamarix gallica*	29	0.0025
Betulaceae	*Alnus viridis*	28	0.0024
Fagaceae	*Quercus phellos*	28	0.0024
Myrtaceae	*Eucalyptus coccifera*	28	0.0024

APPENDIX 1 – SUPPLEMENTARY DATA CONTINUED

Table A1: List of tree species in London's public realm trees with relative counts and percentage data. Data is ordered alphabetically by family name. N.B. Some of the 'Species' are recorded as Genus, but these have been preserved as 'Species' to give a more accurate summary of the dataset.

Botanical name		Proportion of trees	
Family	Species	Count	Percentage (%)
Sapindaceae	*Acer rufinerve*	28	0.0024
Ulmaceae	*Ulmus laevis*	28	0.0024
Nothofagaceae	*Nothofagus*	27	0.0023
Betulaceae	*Betula alba*	26	0.0022
Betulaceae	*Betula lenta*	26	0.0022
Cupressaceae	*Chamaecyparis pisifera*	26	0.0022
Cupressaceae	*Juniperus chinensis*	26	0.0022
Cupressaceae	*Juniperus virginiana*	26	0.0022
Tamaricaceae	*Tamarix africana*	26	0.0022
Juglandaceae	*Juglans*	25	0.0021
Rosaceae	*Crataegus mollis*	25	0.0021
Rosaceae	*Prunus persica*	25	0.0021
Moraceae	*Broussonetia papyrifera*	24	0.0021
Pinaceae	*Abies fraseri*	24	0.0021
Platanaceae	*Platanus occidentalis*	23	0.0020
Oleaceae	*Ligustrum sinensis*	22	0.0019

Botanical name		Proportion of trees	
Family	Species	Count	Percentage (%)
Salicaceae	*Populus tremuloides*	21	0.0018
Rosaceae	*Sorbus sargentiana*	19	0.0016
Elaeagnaceae	*Elaeagnus angustifolia*	18	0.0015
Fabaceae	*Acacia dealbata*	17	0.0015
Garryaceae	*Garrya elliptica*	17	0.0015
Nothofagaceae	*Nothofagus dombeyi*	17	0.0015
Araliaceae	*Aralia elata*	16	0.0014
Cupressaceae	*Thuja occidentalis*	16	0.0014
Pinaceae	*Abies nordmanniana*	16	0.0014
Rosaceae	*Sorbus vilmorinii*	16	0.0014
Cupressaceae	*Cupressus arizonica*	15	0.0013
Cupressaceae	*Platycladus orientalis*	15	0.0013
Oleaceae	*Fraxinus latifolia*	15	0.0013
Pinaceae	*Picea glauca*	15	0.0013
Pinaceae	*Tsuga heterophylla*	15	0.0013
Rosaceae	*Sorbus thibetica*	15	0.0013

APPENDIX 1 – SUPPLEMENTARY DATA CONTINUED

Table A1: List of tree species in London's public realm trees with relative counts and percentage data. Data is ordered alphabetically by family name. N.B. Some of the 'Species' are recorded as Genus, but these have been preserved as 'Species' to give a more accurate summary of the dataset.

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Salicaceae	*Salix pentandra*	14	0.0012
Tamaricaceae	*Tamarix parviflora*	14	0.0012
Moraceae	*Morus*	13	0.0011
Pinaceae	*Pinus ponderosa*	13	0.0011
Fabaceae	*Sophora tetraptera*	12	0.0010
Magnoliaceae	*Magnolia acuminata*	12	0.0010
Pinaceae	*Abies koreana*	12	0.0010
Pinaceae	*Picea breweriana*	12	0.0010
Rosaceae	*Sorbus pseudohupehensis*	12	0.0010
Taxaceae	*Cephalotaxus fortunei*	12	0.0010
Ulmaceae	*Zelkova*	12	0.0010
Asparagaceae	*Yucca filamentosa*	11	0.0009
Juglandaceae	*Pterocarya x rehderiana*	11	0.0009
Nothofagaceae	*Nothofagus alpina*	11	0.0009
Pinaceae	*Picea sitchensis*	11	0.0009
Rosaceae	*Hedlundia mougeotii*	11	0.0009

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Celastraceae	*Euonymus*	10	0.0009
Myrtaceae	*Eucalyptus globulus*	10	0.0009
Fagaceae	*Fagus orientalis*	9	0.0008
Juglandaceae	*Pterocarya*	9	0.0008
Pinaceae	*Cedrus brevifolia*	9	0.0008
Rosaceae	*Malus sieboldii*	9	0.0008
Salicaceae	*Salix daphnoides*	9	0.0008
Sapindaceae	*Acer opalus*	9	0.0008
Sapindaceae	*Acer tataricum*	9	0.0008
Sapindaceae	*Aesculus parviflora*	9	0.0008
Juglandaceae	*Carya ovata*	8	0.0007
Pinaceae	*Pinus cembra*	8	0.0007
Rosaceae	*Cotoneaster salicifolius*	8	0.0007
Rosaceae	*Crataegus succulenta*	8	0.0007
Araucariaceae	*Wollemia nobilis*	7	0.0006
Oleaceae	*Fraxinus velutina*	7	0.0006

APPENDIX 1 – SUPPLEMENTARY DATA CONTINUED

Table A1: List of tree species in London's public realm trees with relative counts and percentage data. Data is ordered alphabetically by family name. N.B. Some of the 'Species' are recorded as Genus, but these have been preserved as 'Species' to give a more accurate summary of the dataset.

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Pinaceae	*Pinus contorta*	7	0.0006
Pinaceae	*Pinus x holfordiana*	7	0.0006
Rosaceae	*Pyrus cordata*	7	0.0006
Styracaceae	*Styrax japonicus*	7	0.0006
Cornaceae	*Cornus florida*	6	0.0005
Cupressaceae	*Thujopsis dolabrata*	6	0.0005
Pinaceae	*Abies lasiocarpa*	6	0.0005
Pinaceae	*Pinus peuce*	6	0.0005
Rosaceae	*Crataegus coccinea*	6	0.0005
Rutaceae	*Citrus trifoliata*	6	0.0005
Rosaceae	*Pyrus pyraster*	5	0.0004
Sapindaceae	*Acer hersii*	5	0.0004
Dicksoniaceae	*Dicksonia antarctica*	4	0.0003
Fabaceae	*Acacia melanoxylon*	4	0.0003
Fabaceae	*Laburnum alpinum*	4	0.0003
Lauraceae	*Umbellularia californica*	4	0.0003

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Pinaceae	*Abies concolor*	4	0.0003
Pinaceae	*Picea smithiana*	4	0.0003
Sapindaceae	*Acer macrophyllum*	4	0.0003
Sapindaceae	*Aesculus turbinata*	4	0.0003
Arecaceae	*Phoenix dactylifera*	3	0.0003
Pinaceae	*Abies cephalonica*	3	0.0003
Pinaceae	*Tsuga canadensis*	3	0.0003
Rosaceae	*Crataegus punctata*	3	0.0003
Salicaceae	*Populus laurifolia*	3	0.0003
Fabaceae	*Acacia pravissima*	2	0.0002
Fabaceae	*Caragana arborescens*	2	0.0002
Fagaceae	*Quercus alba*	2	0.0002
Fagaceae	*Quercus velutina*	2	0.0002
Juglandaceae	*Carya cordiformis*	2	0.0002
Juglandaceae	*Carya illinoensis*	2	0.0002
Lauraceae	*Persea americana*	2	0.0002

APPENDIX 1 – SUPPLEMENTARY DATA CONTINUED

Table A1: List of tree species in London's public realm trees with relative counts and percentage data. Data is ordered alphabetically by family name. N.B. Some of the 'Species' are recorded as Genus, but these have been preserved as 'Species' to give a more accurate summary of the dataset.

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Myrtaceae	*Eucalyptus pauciflora*	2	0.0002
Pinaceae	*Abies delavayi*	2	0.0002
Pinaceae	*Picea orientalis*	2	0.0002
Pinaceae	*Tsuga*	2	0.0002
Rosaceae	*Prunus armeniaca*	2	0.0002
Rosaceae	*Sorbaria tomentosa*	2	0.0002
Salicaceae	*Salix viminalis*	2	0.0002
Betulaceae	*Betula nana*	1	0.0001
Cornaceae	*Cornus alternifolia*	1	0.0001
Cupressaceae	*Austrocedrus chilensis*	1	0.0001
Fabaceae	*Sophora microphylla*	1	0.0001
Fabaceae	*Ulex europaeus*	1	0.0001
Fagaceae	*Quercus imbricaria*	1	0.0001
Fagaceae	*Quercus phillyreoides*	1	0.0001
Fagaceae	*Quercus pubescens*	1	0.0001
Myrtaceae	*Eucalyptus perriniana*	1	0.0001

Botanical name		Proportion of trees	
Family	**Species**	**Count**	**Percentage (%)**
Pinaceae	*Picea obovata*	1	0.0001
Pinaceae	*Pinus muricata*	1	0.0001
Rosaceae	*Malus niedzwetzkyana*	1	0.0001
Salicaceae	*Populus deltoides*	1	0.0001
Salicaceae	*Populus x berolinensis*	1	0.0001
Salicaceae	*Populus yunnanensis*	1	0.0001
Salicaceae	*Salix x pendulina*	1	0.0001

†Some 'species' are only recorded to genus level in dataset

FUTURE CLIMATE SUITABILITY OF LONDON'S PUBLIC REALM TREES

FINAL REPORT
NOVEMBER 2025

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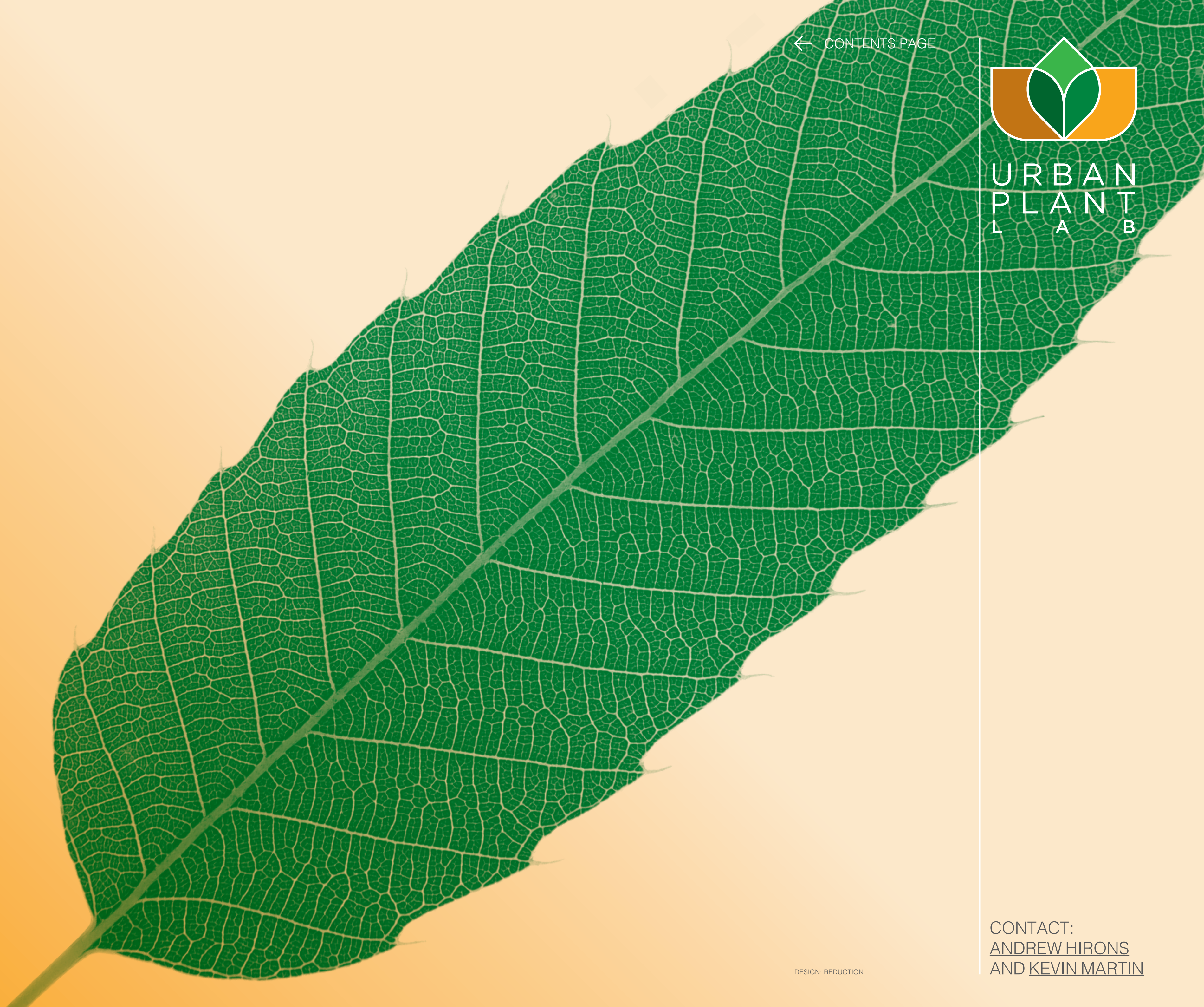

URBAN PLANT LAB

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AND KEVIN MARTIN

DESIGN: REDUCTION

Royal Botanic Gardens Kew