



An Urban Forest Master Plan for Birmingham 2021-2051

Executive Report



Acknowledgements

Project Team



Are the project instigators, and oversaw the development of this plan.



Provided the funding for the plan as well as crucial information and local expertise and insight.



Prepared this Urban Forest Master Plan in collaboration with the project team, the stakeholder group and the individual consultees and experts.



Assisted with this Urban Forest Master Plan and delivered the workshops with Treeconomics and the project team.

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1. Birmingham City Council

“We are now facing the major challenges of climate change and where the majority of the global population live.

We are experiencing changes in our weather patterns that include prolonged periods of hotter weather and of intense rainfall.

For those living in cities that brings significant impacts such as the Urban Heat Island effect and risks to health and well-being.

With an expected 70 % of the world’s population living in cities by 2050 this could affect some 5.6 billion people worldwide.

The natural environment and trees especially can help adapt our living environment and mitigate some of the effects we experience from climate change.

We are already recognising the importance of trees to lock away carbon, a key component of greenhouse gases, within their trunks, branches and leaves.

However, trees also provide a calming visual aspect that aids mental health and well-being, can help in the absorption and interception of storm water and create air cooling effects amongst other benefits.

Knowing that trees play such an important part in ensuring cities remain habitable for the future we need to protect the trees we have and enhance the tree scape of Birmingham through continual planting and expansion of canopy cover.

However, trees themselves are also susceptible to climate change and the rise in non-native pests and diseases.

So, to ensure we have a resilient tree scape that continues to deliver all these benefits there needs to be a comprehensive plan for the management of our Urban Forest.

We therefore have great pleasure in introducing this, Birmingham’s Urban Forest Master Plan for 2021- 2051”.



**Deborah Cadman OBE –
Chief Executive –
Birmingham City Council**



**Cllr Ian Ward - Leader of
Birmingham City Council**

2. Birmingham Tree People

“Birmingham Tree People is the charity for volunteer Tree Wardens in the city and we are delighted to have led on the co-creation of this Urban Forest Master Plan for Birmingham.

We’re certain that the only way to bring the multiple benefits of trees to every person in the city is to start with a well thought out plan. We also know that a plan that impacts on people will be more successful if the people it impacts help to write it so community tree wardens from across the city helped develop this plan.

Involving as many citizens as possible in delivery will be vital if we are to achieve the aspirational goals within it; this engagement will also aid our understanding of some of the more challenging aspects of implementation. We know that there are difficult decisions ahead, but by listening to the experts and citizens alike the right ones will be made.

We hope that by being brave enough to put this this impressive vision for the city in writing it will reassure citizens that we want a city in which every person, in every ward benefit from trees and is healthier and happier as a result.

No one thinks that creating this tree filled beautiful Birmingham will be easy or quick because it won’t; but we must try as future generations will not forgive us if we fail to deliver. We owe it to them to act now. Citizens, Elected Members and Professionals will need to work hard and work collaboratively to make the vision a reality.

Birmingham TreePeople looks forward to a very exciting 30 years of helping to deliver the UFMP with you.”



**Tonia Clark – Chair
Birmingham Tree People
CIO**

Contents

Acknowledgements	- i.
Forward	- ii.
Background	- 1.
Vision	- 5.
Targets, Priorities and Actions:	
1. Trees and Urban Forest Structure	- 7.
2. Community Framework	- 19.
3. Sustainable Resource Management Approach	- 30.
Glossary	- 51.

List of Tables

Table 1: Urban Tree Cover Estimates For Birmingham
Table 2: Comparable Cities' Canopy Cover Estimates And Goals
Table 3: Current Risk Zoning Criteria And Inspection Frequency From Birmingham's Site Zoning - Trees Policy

List of Figures

Figure 1: Birmingham's Existing Canopy Cover By Ward
Figure 2: The Ideal Distribution Of Tree Age Across The Urban Forest Showing Typical DBH For Each Age Class
Figure 3: Dominance Diversity Curves For Several UK Cities
Figure 4: Tool To Show Species Suitability And Carbon Sequestration Projections
Figure 5: National Tree Map Data Showing Individual Tree Canopy Cover In Birmingham
Figure 6: Map Of Priority Habitats Across Birmingham
Figure 7: National Forest Inventory (NFI) Map Of Woodlands
Figure 8: Graphic Of Other Elements Of The Urban Forest
Figure 9: Heat Map Of PM2.5 Concentration Across Birmingham
Figure 10: Network Of Existing And Proposed Green Space From The Our Future Cities Plan, 2021
Figure 11: Map Showing The Hydrology Of Birmingham
Figure 12: Map Showing Birmingham University Campus And Surrounding Green Space
Figure 13: Public Tree Inventory Detail By Ward
Figure 14: Cavat Data At The Ward Level
Figure 15: Tree Canopy Cover Across Birmingham From National Tree Map (NTM) Satellite Data
Figure 16: Indices Of Multiple Deprivation Ranking By Ward
Figure 17: Soil Nutrient Regime Map Of Birmingham And The Surrounding Area
Figure 18: Birmingham's Interactive Online TPO Map
Figure 19: Trees Surrounding Birmingham Library
Figure 20: Map Of Birmingham's Nature Reserves, SSSI's And Other Public Areas
Figure 21: Timeline Of Pest And Disease Introduction In The UK
Figure 22: Uses Of Urban Wood
Figure 23: Distribution Of Ancient Oak Across Birmingham And The UK
Figure 24: Web-Maps For Birmingham Featuring Canopy Cover Data

“A great opportunity to create an ecological network through Birmingham for species and for habitats, and it provides a lot of extra benefits for people.”

Sammy Prichard, Biodiversity and Planning Officer for

B&BC Wildlife Trust

Section 1

Background

Urban Forestry in Birmingham

Birmingham's urban forest, which comprises of all trees and associated vegetation along streets, in parks and woodland, in private gardens, and elsewhere, provides the city with a range of essential benefits.

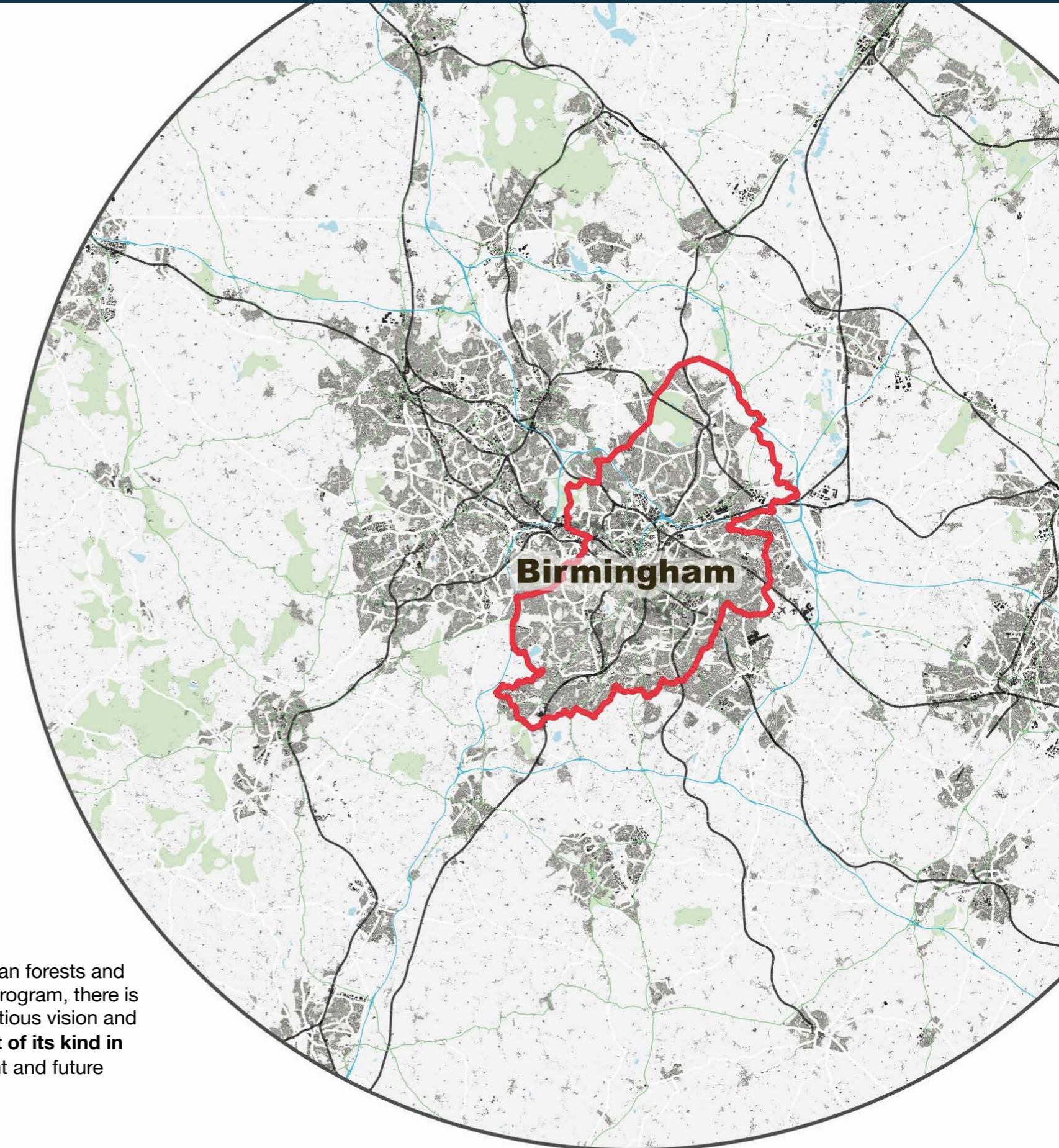
Birmingham is the UK's second city and has more parks than any other in Europe, with an estimated 1 million trees. It recognises that trees are its natural lungs and are necessary for the wellbeing of the people who live and work there. The urban forest is also essential for buffering the impacts of climate change, for example by managing stormwater and cooling the city during hot days. It hosts a wide range of species of plants, birds and animals and offers key meeting places for the community.

Birmingham wants to stay at the forefront of green development and sustainability as a city, something which is reflected by the comprehensive policy and planning framework developed during recent years. Elements of the latter include, among others, Our Future City Plan-2021, the Climate Action Plan, the Green Living Spaces Plan, the Parks and Open Space Strategy, and the Birmingham Tree Policy. Various best practice manuals have been developed specifically for the management of urban trees. This Master Plan is to link upward to both existing and forthcoming policy including international, national and local documents.

The city has a very diverse population and has high levels of deprivation in some areas. These areas often have lower levels of tree canopy cover and green space and this plan seeks to address this imbalance.

As an important component of this, the city wants to deliver excellence in urban forestry, both locally but also as a regional, national, and even international leader. Over the years, Birmingham City Council, in close collaboration with local partners such as Birmingham TreePeople, has developed and implemented an ambitious urban forestry programme. Its international leadership is shown by its status as a Tree City of the World and one of the world's first Biophilic Cities.

Over the years, the city has developed a wide range of policies, plans, and guidelines for its urban forests and other green spaces. However, to take the next step in developing a world-class urban forestry program, there is a need for a long-term, coherent, and action-based Urban Forest Master Plan that sets an ambitious vision and ties all initiatives together and provides guidance for future initiatives. This Master Plan, **the first of its kind in the UK**, has a timeline of thirty years. Covering 2021 to 2031. It provides a framework for current and future plans and guidelines from the strategic to the operational level.



Why an Urban Forest Master Plan ?

Birmingham's Urban Forest Master Plan is the collective vision for all of Birmingham's natural capital and green infrastructure. It outlines how to develop and manage the urban forest and defines the aspirations of stakeholders who will continue to benefit from a healthy and diverse green city. It aims to act as a roadmap, providing detailed information, recommendations and resources to effectively and proactively manage and grow the city's tree canopy. The Master Plan provides structure for the implementation of long-term strategies which can be used to encourage all those involved with the urban forest to understand, respect, and enhance Birmingham's urban forest.

The decision to create an Urban Forest Master Plan stemmed from the understanding that a cohesive and structured strategic approach will be the most effective and comprehensive way to manage this resource. It aims to ensure that no aspect of Birmingham's urban forest is forgotten or ignored, and to establish priorities for both the health of the urban forest, and the management of resources. In doing so, the priorities of different departments within the council and those of other stakeholders align, and the prioritisation of targets and actions can be justified.

Birmingham's Urban Forest Master Plan will help to bring together existing policies, plans, guidelines and frameworks under one umbrella. It will provide a comprehensive and suitable guide to all practices involving any and all aspects of the urban forest, including both green and blue infrastructure. It will inspire further research into the urban forest, its needs, its impacts, and its progress in Birmingham.

The urban forest influences the lives of everyone in Birmingham, from private landholders with a host of trees to manage, to commuters cycling through parks or driving down treelined avenues. Trees in cities have often only been noted for their disbenefits, however the trees in Birmingham provide a host of services to those who interact with them, and are now being recognised as the asset they are. **Birmingham is a leader in urban forestry**, and has reached national and international acclaim for its efforts.

This Plan will contribute to Birmingham's reputation as a green city, as well as improving the lives of its inhabitants. Improving the urban forest and its management practices will result in a healthier city. A diverse treescape promotes biodiversity, improves health and wellbeing, and can even influence socio-economic factors such as crime rates, educational attainment and life expectancy.

Through the development of the Urban Forest Master Plan, Birmingham hopes to lead by example and inspire other cities to follow suit. As such, its impacts and successes must be monitored and reviewed. Dividing the Master Plan into smaller targets makes this task more manageable. The Plan outlines a number of key indicators for the overall success and health of the urban forest. Monitoring performance in this way will help achieve Birmingham's goals and ultimately the wider vision.



The Scope of the Urban Forest Master Plan

Birmingham is a city that takes its urban forest seriously. Over the years, Birmingham City Council and its local partners have developed a suite of policies, plans, and guidelines pertaining to trees and urban green space. As a next step, the decision was made to develop an Urban Forest Master Plan (UFMP) to bring many of these initiatives together and to provide long-term strategic guidance.

The UFMP outlines a vision for the development of the urban forest. In the case of Birmingham, it sets out to answer the question where the local urban forestry program wants to be in 30 years. The UFMP provides the ambition and overall direction, but not necessarily the detail. As a framework document, it sets a series of targets with associated priorities, actions, and performance indicators under a range of key topics, but it will need to be supported by and implemented through specific strategies and plans for each of these targets.

The UFMP also links to other relevant policies and initiatives at the city level, and even beyond. An example of this is 'Our Future City Plan' which sets out strategic directions for Birmingham towards the year 2040, for example under the theme of City of Nature. A full policy review of relevant documents from international, national, regional and local levels has been undertaken as part of this project to ensure this Master Plan supports and is supported by all aspects of urban forestry policy. The UFMP provides a 'planning home' for urban forestry and will strive for creating synergies with other plans and programs that aim to make Birmingham greener, healthier, more attractive to residents and visitors, and more resilient to the impacts of climate change.



Section 2

Vision

Having more trees for Birmingham, that deliver benefits for health, nature, and climate change, for all the communities within the city, now and in the future, as part of an inclusive and sustainable urban forest.

Although the Vision has a city-wide scope, it is important to work at the neighbourhood level, together with local communities and stakeholders, to ensure the successful implementation of the plan.

This new Urban Forest Master Plan is championed by Birmingham City Council and Birmingham TreePeople, and was developed in a collaborative process with representatives of the local government; interest groups; and representatives of the community; and with the support of Treeconomics. The Plan outlines key topics, priorities, and actions under three central themes:

- 1) Trees and Forest Structure,
- 2) Community Framework,
- 3) Sustainable Resource Management Approach.

The Master Plan is structured around a comprehensive set of key performance indicators, informed by the current state of evidence and good practices, and developed in a collaborative process. For each of these performance indicators, an assessment of the current situation is made, ambitions are laid out, and priorities are identified. Moreover, specific actions and roles and responsibilities are defined.

This ambitious Urban Forest Master Plan is an important step forward. Its future implementation, with a coordination role for the new Birmingham Urban Tree Board and in collaboration with a wide range of local partners and members of the community, will make the city greener, healthier, and more resilient to climate and other challenges.



The overall Vision for Birmingham’s urban forestry program is:

Having more trees for Birmingham, that deliver benefits for health, nature, and climate change, for all the communities within the city, now and in the future, as part of an inclusive and sustainable urban forest.

This Vision is delivered by:

- **Developing a diverse and resilient urban forest.**
- **Building meaningful relationships between trees and all members of Birmingham’s diverse communities.**
- **Managing the urban forest in an evidence-based and highly professional way.**
- **Working collaboratively and in partnership, crossing communities, ownership, sectors, and scales.**

“Birmingham’s treescape is a legacy of both city planning and the philanthropic work of notable residents who bequeathed land for public parks and open spaces. This history of joint working for the benefit of all is something we are continuing today with the Urban Forest Master Plan, it being a truly co-created document for the long-term protection and advancement of the urban forest.”

Simon Needle, Principal Arboriculturist at BCC

“A culture is no better
than its woods”

W.H.Auden

Section 3

Targets, Priorities and Actions

1. Trees and Urban Forest Structure

03 At A Glance - Trees and Urban Forest Structure

Key Performance Indicator	Performance Level				Priority
	Low	Moderate	Good	Optimal	
T1 - Relative tree canopy cover	Low	Grey	Grey	Grey	High
T2 - Age diversity	Low	Grey	Grey	Grey	High
T3 - Species diversity	Low	Grey	Grey	Grey	High
T4 - Species suitability	Low	Grey	Grey	Grey	High
T5 – Publicly owned trees (trees managed “intensively”)	Moderate	Grey	Grey	Grey	High
T6 – Publicly owned natural areas (trees managed “extensively”)	Moderate	Grey	Grey	Grey	Medium
T7 – Trees on private property	Low	Grey	Grey	Grey	High
T8 – Other elements of the UF; shrubs, hedges, green walls and roofs, plants, animals and water	Moderate	Grey	Grey	Grey	Medium
T9 – Tree benefits (including biodiversity)	Moderate	Grey	Grey	Grey	High
T10 – Wider Environmental Considerations (including Climate Change, Air quality and Water)	Good	Grey	Grey	Grey	Medium

T1 Relative Tree Canopy Cover

Canopy cover, which is often also referred to as tree canopy cover or urban canopy cover, can be defined as the area of leaves, branches, and stems of trees covering the ground, across a given area, when viewed from above. Canopy cover is a two dimensional metric, indicating the spread of canopy cover across an area. Assessing canopy cover is popular because it is relatively simple to determine from a variety of means and it can be calculated at relatively little expense.

Several studies have already been undertaken on estimating the canopy cover in Birmingham, including the Forest Research 2017 i-Tree Canopy survey, the 2020 urban canopy cover citizen science survey and the Bluesky National Tree Map data already held by BCC. However, these studies are not directly comparable with each other as they used different methods, definitions (of what constituted urban tree canopy cover) and project boundaries. Going forward Birmingham will identify a suitable project area and method of assessment so that repeat surveys can be compared in order to track and monitor performance.

Canopy Cover	Study type	Study Year	Source
23%	i-Tree Canopy	2012	www.urban treecover.org
18.6%	Forest Research Canopy Assessment	2016	BCC website and Birmingham's tree policy
19.1%	Bluesky NTM	2019	Bluesky National Tree Map
21.3%	i-Tree Canopy Ward level	2020	https://www.forestresearch.gov.uk/research/i-tree-eco/urbancanopycover/

Table 1: Historic Urban Tree Cover Estimates for Birmingham

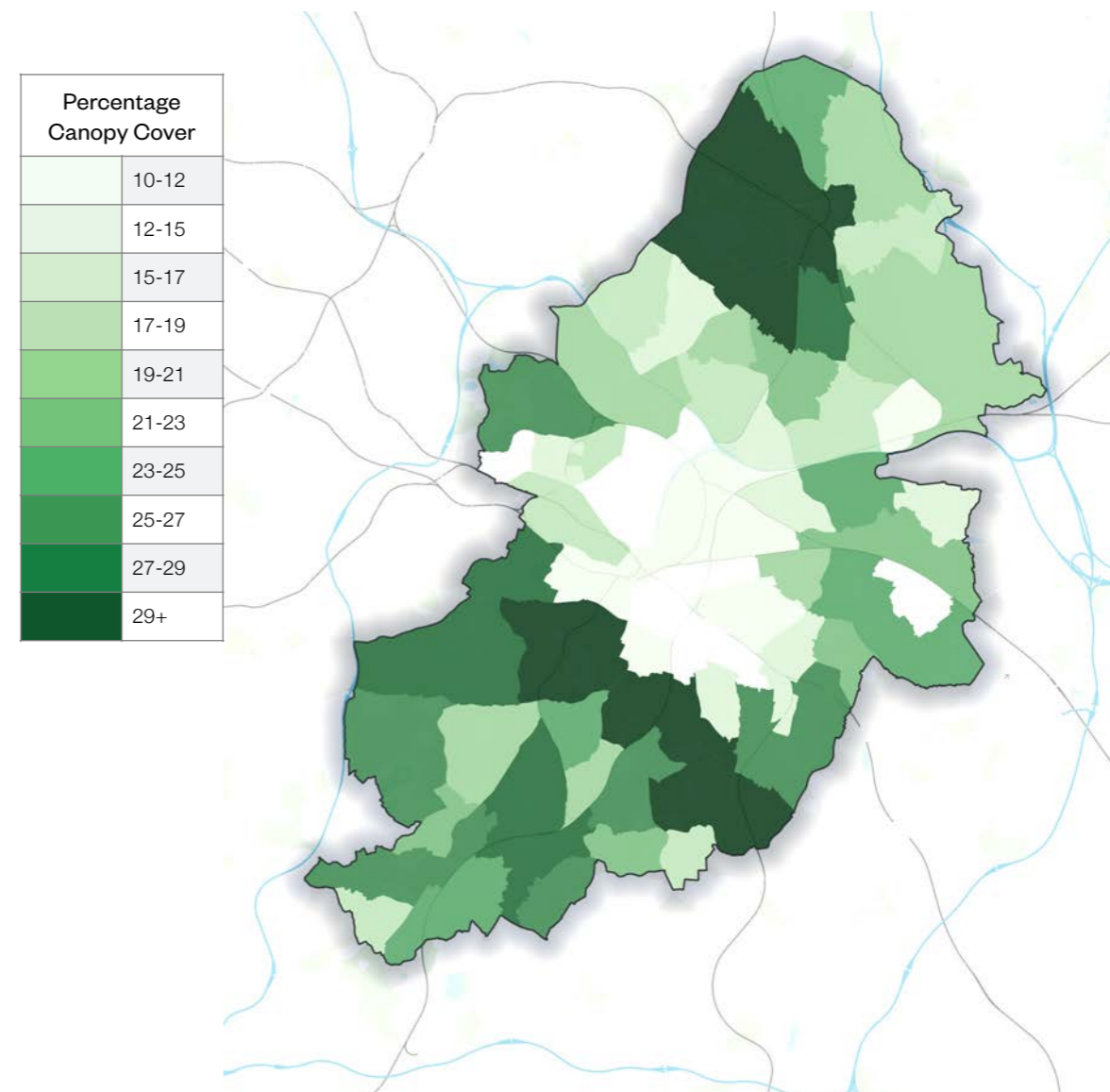


Figure 1: Birmingham's Existing Canopy Cover By Ward measured with Sentinel Satellite Data

Actions

1. Assess and determine which sets of data are best to use for establishing Birmingham's relative tree canopy cover;
2. Determine what the potential and actual tree canopy cover are at the ward level.

Priority	Responsibility for Action	For Review:
High	1. BCC will collate the available information from various sources including the Woodland Trust, Birmingham University and Forest Research. 2. BTP will commission a piece of work to ascertain how the existing tree canopy cover compares with the potential canopy cover.	April 2022 - Short term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Data source decision required	The existing canopy cover equals 0–25% of the potential.	The existing canopy cover equals 25–30% of the potential.	The existing canopy cover equals 50–75% of the potential.	The existing canopy cover equals 75–100% of the potential.

T2 Age Diversity

A healthy urban forest relies on age diversity to maintain its ability to provide constant benefits to the people who live in the city. Maturing trees must be protected and managed to ensure they thrive and survive to become veteran trees (senescent), and juvenile trees must be planted constantly to replace old trees, dying trees, and trees removed for safety reasons. Larger, older trees typically provide more annual benefits than smaller, younger trees. However, these younger trees are vital to maintaining a healthy and sustainable forest.

Generally, the most accurate way to gauge age diversity is to compare current tree size in each species (in terms of diameter at breast height, or DBH) to the maximum diameter for that species. The goal would then be to maintain a tree population that is unevenly distributed among different age classes, making sure that there are enough juvenile trees for the future.

It is of course also important to strive for age diversity across the entire tree population – including public trees managed “extensively” (as a group) in parks and natural areas, as well as trees on private property, both city-wide and at neighbourhood level.

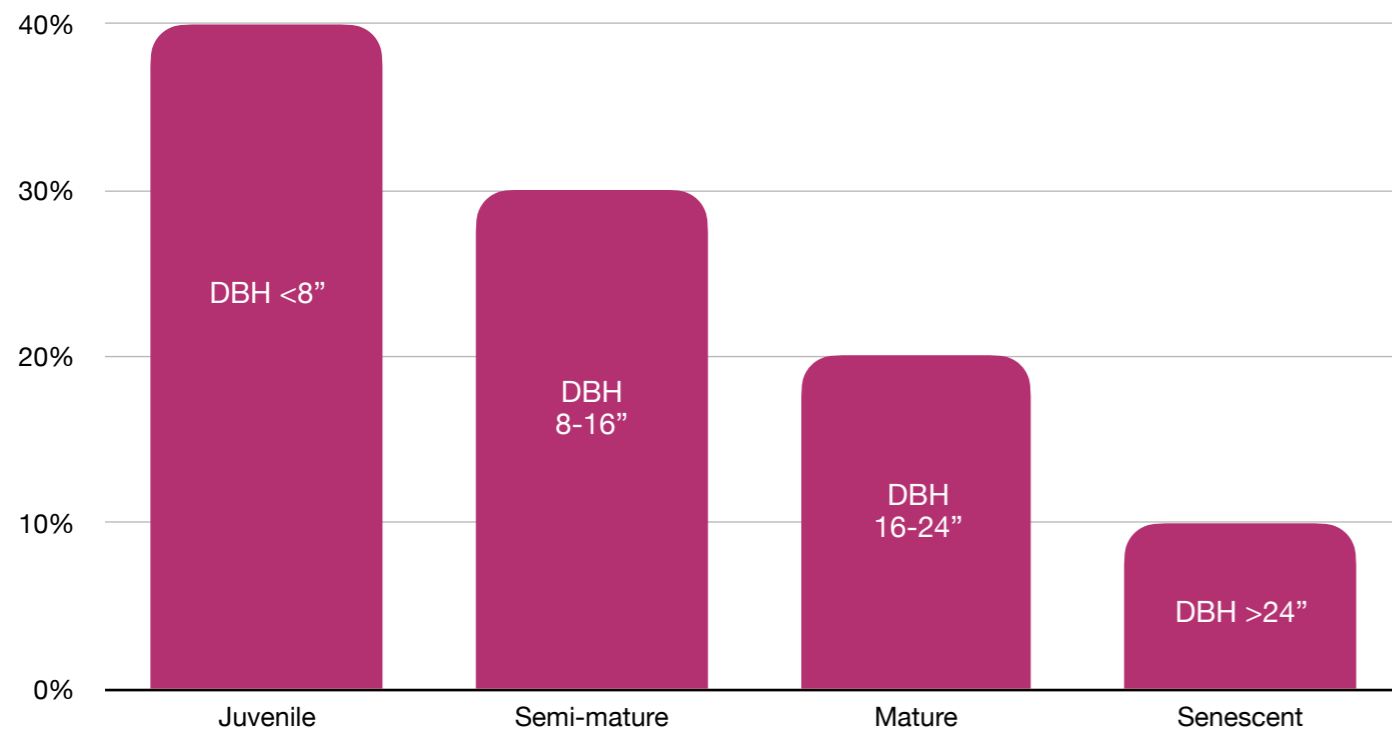


Figure 2: The “Ideal” Distribution of Tree Age Across the Urban Forest Showing Typical DBH for Each Age Class

Actions

1. Assess current age distribution by ward using BCC tree inventories and/or an i-Tree Eco sample survey;
2. Seek advice/report on the implications of what BCC's age diversity is and how best to achieve T2 through operations for optimal ideal distribution;
3. Identify prioritised parcels (wards) where data followed by action could be stimulated quickly;
4. Assess current replacement requirements to achieve the target.

Sources and references:

Richards, N.A., 1982/1983. Diversity and stability in a street tree population. *Urban Ecology* 7, 159–171 – as cited in McPherson, *Urban Forestry & Urban Greening* 12 (2013) 134– 143.

Priority	Responsibility for Action	For Review:
High	1. BCC and Birmingham Tree People	April 2022 - Medium term project
	2. BTP with Birmingham University; Myerscough College and Kier using existing tree inventories (mainly Highway trees, modifying species list for planting) or wider i-Tree Eco data	
	3. BTP to use i-Tree opportunity mapping coupled with species detail	
	4. BTP with BCC	

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Incomplete Data	Even age distribution or highly skewed toward a single age class.	Some uneven distribution, but most of the tree population falls into a single age class.	Total tree population across 50% of the wards approaches an ideal age distribution of 40% juvenile, 30% semi-mature, 20% mature, and 10% senescent.	Total population across all wards approaches the ideal distribution.

T3 Species Diversity

Diversity is an important aspect of the urban forest to monitor. Trees are split into families, genera, species and varieties and it is essential to have a mix of these to create a diverse urban forest. However, maintaining a high level of inter- and intra- species diversity is also key to urban forest sustainability. Sufficient tree diversity can increase overall resilience in the face of biotic and environmental stresses and threats. A more diverse tree-landscape is better able to deal with possible changes in climate or pest and disease impacts.

Understanding the species diversity of Birmingham's existing urban forest is a vital first step. From there, tree planting and management plans can enhance the diversity in line with the goals and KPI's of the action plan.

Santamour's 10-20-30 rule for species, genus and family, and Barker's benchmark of 5% per species are useful tools in assessing and providing targets for species diversity in the urban forest.

Ideally, the array and location of suitable tree species would be so diverse that no single species would represent more than 5% of the tree population across the municipality or more than 10% in any given neighbourhood.

Species diversity can be measured through a combination of species richness (the number of species present) and species evenness (the relative abundance of each species). Species richness and evenness can be combined into a single indicator, such as Hubbell's dominance diversity curves, in ecology the Shannon Index is also commonly used.

Actions

1. Assess current diversity on public ownership;
2. Assess current diversity on private ownership;
3. Seek advice/report on the implications of what BCC's species diversity is and how best to achieve T3;
4. Identify prioritised parcels (political ward) where action could be stimulated quickly;
5. Assess current replacement requirements (is a one for one replacement policy enough to achieve T1, T2 and T3).

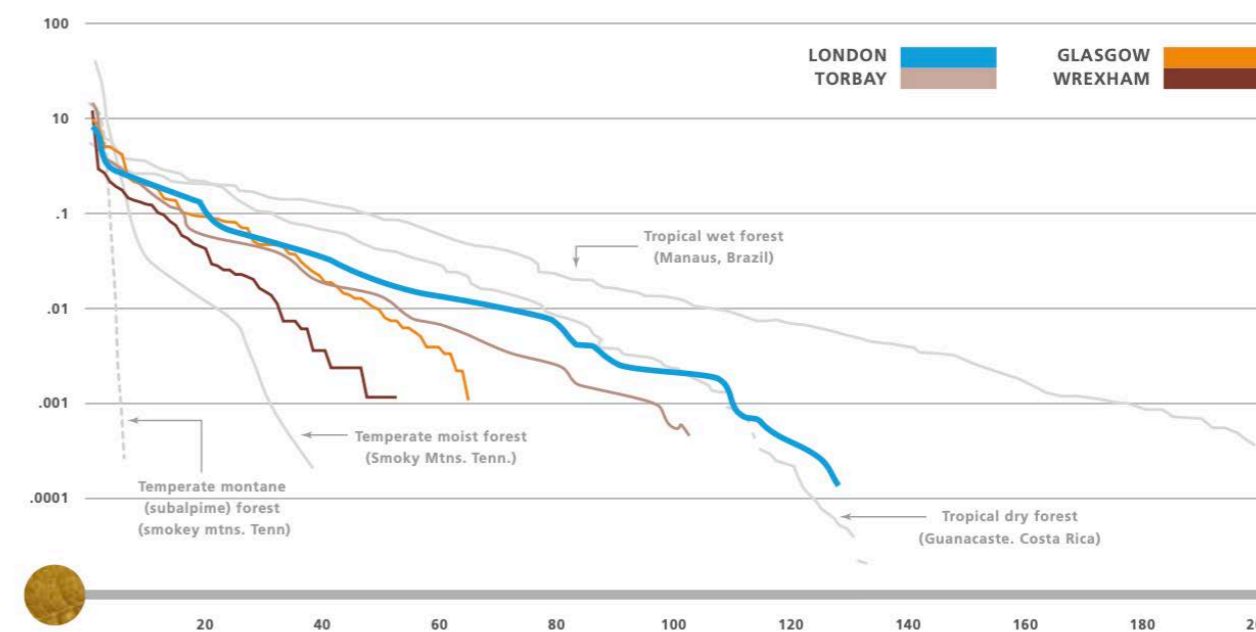


Figure 3: Dominance diversity curves for UK cities

Sources and references:

Santamour, F.S. (1990) Trees for urban planting: Diversity, uniformity and common sense, in: Proceedings of the Conference Metropolitan Tree Improvement Alliance (METRIA). pp. 57-65.

Barker, P.A. (1975) Ordinance Control of Street Trees. Journal of Arboriculture. 1. pp. 121-215.

Beeauchamp, K. 2016 Measuring Forest Tree Species Diversity. Forest Research.

Rosindell, J., Hubbell, S.P. and Etienne, R.S., 2011. The unified neutral theory of biodiversity and biogeography at age ten. Trends in ecology & evolution, 26(7), pp.340-348.

Priority	Responsibility for Action	For Review:
High	1. BCC and Partners	April 2022 - Medium term project
	2. BTP using i-Tree Eco sample survey	
	3. BTP and Research Partner	
	4. BTP with BCC and Kier	

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Incomplete Data	Five or fewer species dominate the entire tree population across municipality.	No single species represents more than 10% of total tree population; no genus more than 20%; and no family more than 30%.	No single species represents more than 5% of total tree population; no genus more than 10%; and no family more than 15%.	At least as diverse as "Good" rating (5/10/15) municipality-wide – and at least as diverse as "Moderate" (10/20/30) at the neighbourhood level.

T4 Species Suitability

Species suitability involves selecting a broad array of species which are well suited to the urban and regional environment.

Trees have unique needs; all tree species have different genetic characteristics and growth strategies which have been developed to maximise survival and growth in their natural habitats. Climate, soil, and other environmental aspects can affect their ability to survive and thrive. In cities, trees are subject to more external stresses than their woodland counterparts, and this can limit their lifespan and make them more susceptible to pests and disease. By promoting the planting of suitable species in suitable locations, trees are less likely to suffer from these stresses and therefore reach their full potential.

The determination of species suitability should take into account concerns such as adaptability to local climate and future climate change, invasive potential, soils, moisture demands, disease risk, and management considerations.

Checking plant hardiness zones is a good place to start. The USDA-designed system maps zones on minimum temperatures, and is now available for the rest of the world. Forest Research have developed a [climate matching tool](#) which may be of some use in predicting future climates. FR's [Ecological Site Classification Decision Support System \(ESC-DSS\)](#) can indicate a trees suitability depending on a range of factors such as soil moisture and nutrient regime, climate and topography etc.

In the example opposite, species suitability has been mapped using multiple different layers in an interactive tree planting opportunity map which also displays potential carbon storage and sequestration.

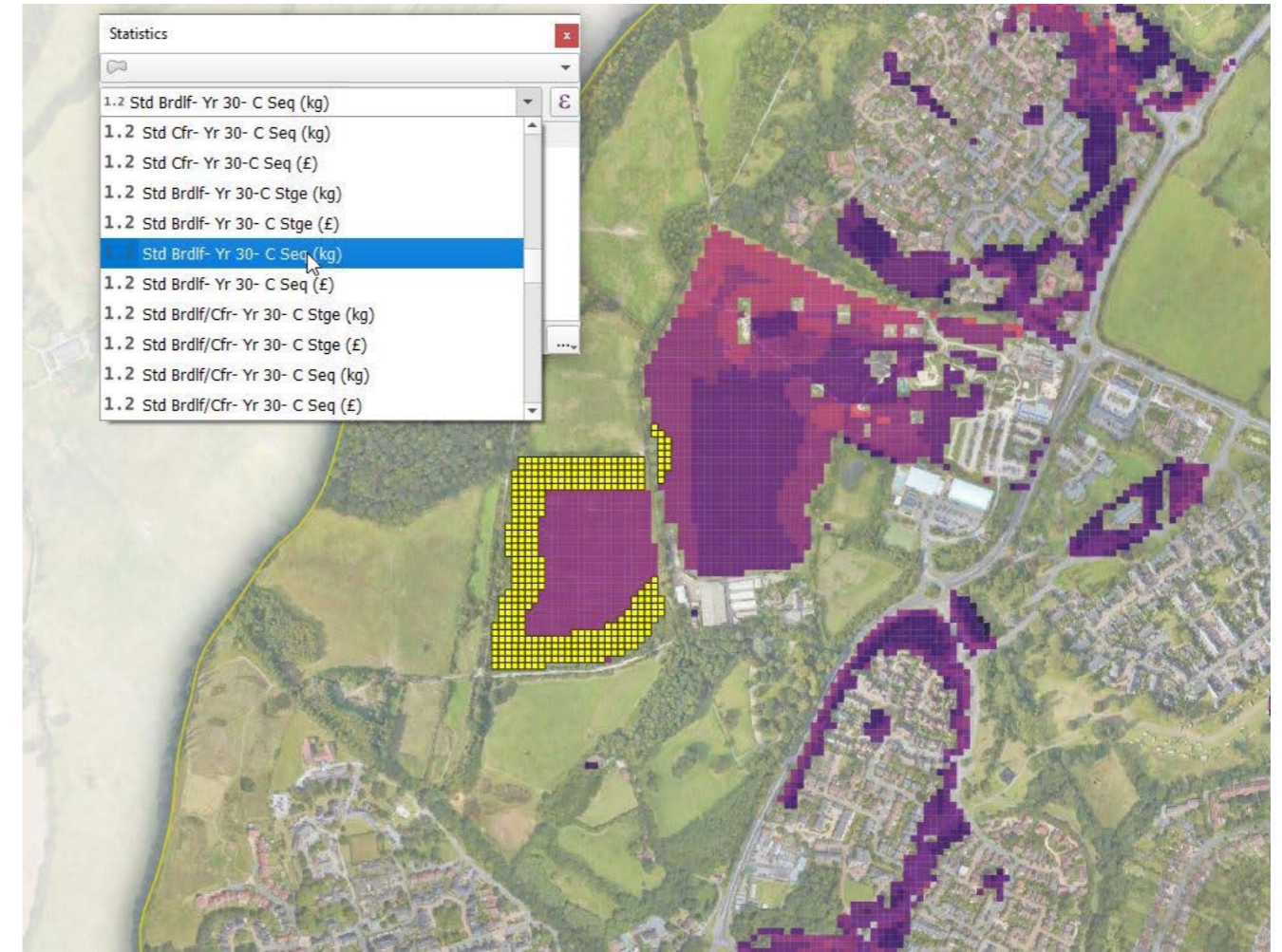


Figure 4: Tool to show species suitability and carbon sequestration projections

Actions

1. Assess baseline by ward to establish areas of concern and prioritise;
2. Analyse the baseline data and establish the criteria on what is a suitable species;
3. Use Kier's knowledge of what works and what doesn't work currently to assess the suitability of tree species currently used in Birmingham;
4. Assess the potential for the introduction of new species and determine which sets of data are best to use for establishing Birmingham's relative tree canopy (RTC).

Priority	Responsibility for Action	For Review:
High	1. BTP with BCC	April 2022 - Medium to Long term project
	2. BTP and BCC with Andy Hiron, Henrik Sjoman and Keith Sacre as experts	
	3. Kier	
	4. BTP and BCC with Andy Hiron, Henrik Sjoman and Keith Sacre as experts	

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Incomplete Data	Fewer than 50% of all trees are from species considered suitable for the area.	>50%-75% of trees are from species suitable for the area.	More than 75% of trees are suitable for the area.	Virtually all trees are suitable for the area.

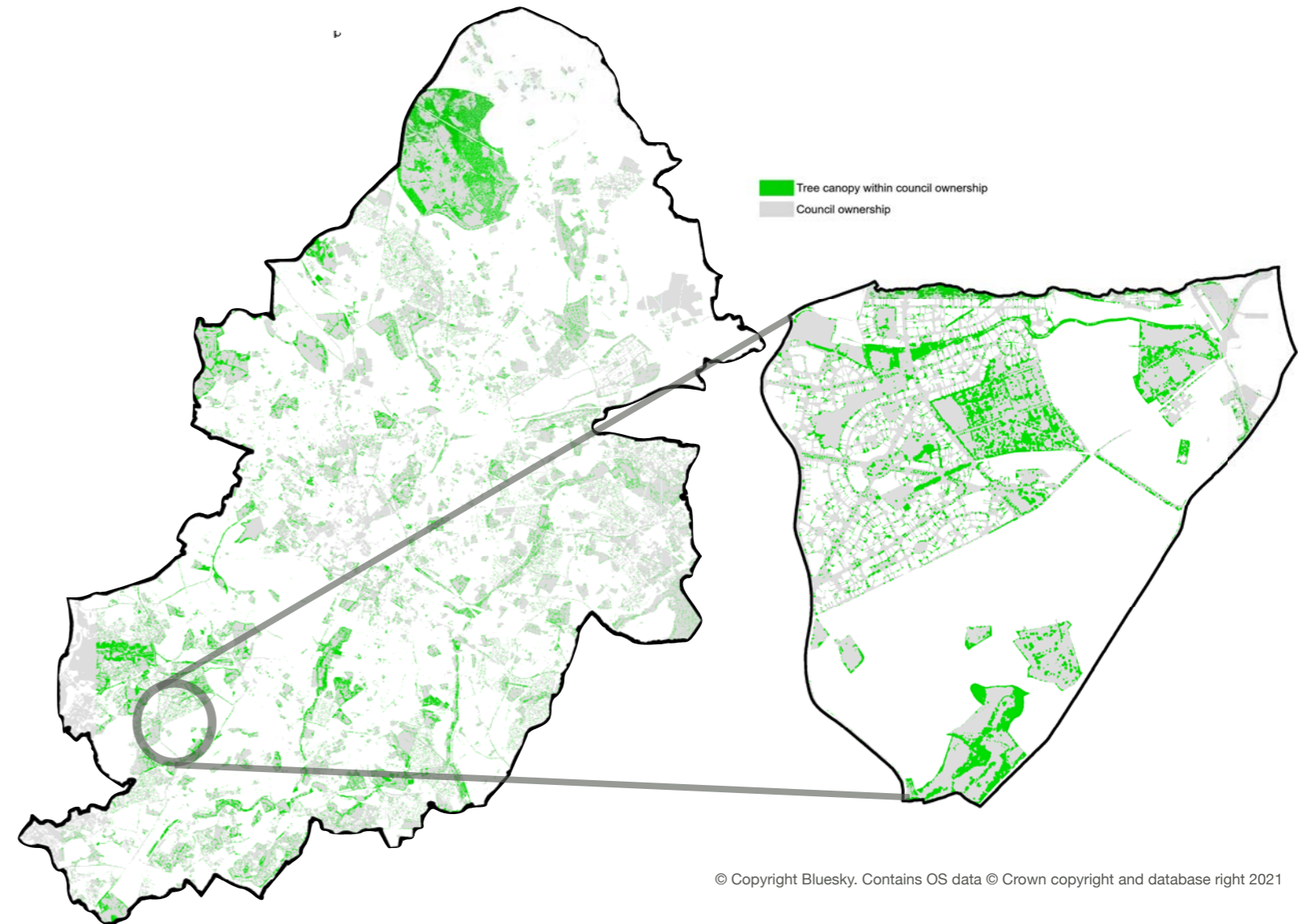
T5 Publicly Owned Trees (Trees Managed “Intensively”)

Trees managed individually, such as street trees, are considered to be “managed intensively,” according to arboricultural techniques – whereas trees in woodlands or other natural areas are typically “managed extensively,” as a group. Park trees or trees on institutional campuses can fall into either category, depending on how they are managed.

Understanding how many trees are managed in this way and what this type of management entails will help provide a baseline for improving future ‘intensive’ practices. A tree inventory documenting these trees, their location, species, health, etc is invaluable for tree maintenance and risk management.

Actions

1. Look at co-ordinating all tree surveys and to establish the same standards of survey and reporting across the board and also to identify any gaps;
2. Assess current management practices and stress levels found in the existing tree population;
3. Priorities within the population to be identified where management impact might be greatest. For example large mature trees, middle aged trees that have the potential to develop.



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Figure 5: Birmingham Tree Canopy Coverage within council ownership and detail for Weoley and Selly Oak Ward

Priority	Responsibility for Action	For Review:
High	1. BCC and Kier	April 2022 - Medium term project
	2. BCC and Birmingham University	
	3. BCC and Kier	

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	Condition of urban forest is unknown.	Sample-based tree inventory indicating tree condition and risk level.	Complete tree inventory that includes detailed tree condition ratings.	Complete tree inventory that is GIS-based and includes detailed tree condition as well as risk ratings.

T6 Publicly Owned Natural Areas and Trees Managed “Extensively”

Trees in woodlands or other natural areas are typically “managed extensively,” as a group whereas trees managed individually, such as street trees, are considered to be “managed intensively,” according to arboricultural techniques (See T5). Park trees or trees on institutional campuses can fall into either category, depending on how they are managed.

Understanding how many trees are managed in this way and what this type of management entails will help provide a baseline for improving future ‘extensive’ practices. A natural area survey would be a good start point to identify these areas and the trees within them, and identify priority habitats. Developing a web map of these areas could be a useful tool for both management and community engagement. Current ‘extensive’ management methods should be reviewed and updated if necessary.

Actions

1. Citywide habitat mapping to be completed and priority habitats to be identified (Desktop Exercise);
2. Identify parcels of land where natural regeneration might be possible;
3. Commission study to look at level and type of public use.

Priority	Responsibility for Action	For Review:
Medium	1. BCC	April 2022 - Medium term project
	2. BTP with community groups and other stakeholders	
	3. BTP to commission study	

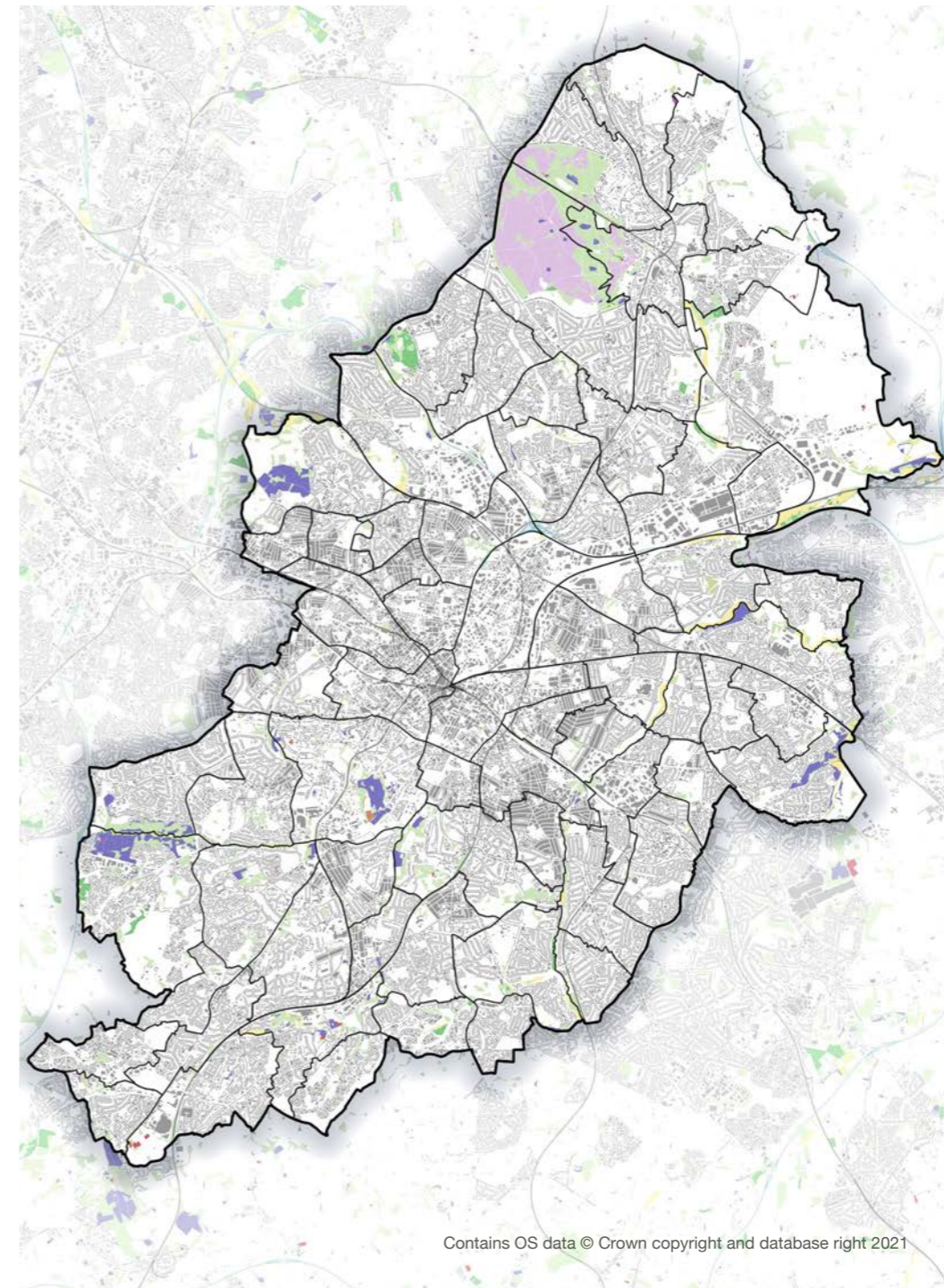


Figure 6: Priority Habitats across Birmingham

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	No information about publicly owned natural areas.	Publicly owned natural areas identified in a “natural areas survey” or similar document or on webmap.	Survey document also tracks level and type of public use in publicly owned natural areas.	In addition to usage patterns, ecological structure and function of all publicly owned natural areas are also assessed and documented.

T7 Trees on Private Property

Trees on private property are more difficult to survey and manage than those on public land due to the extent and inaccessibility of these trees. It relies on land owners taking an active role in tree management.

An I-Tree Eco sample survey would be useful in assessing trees on private land. Whilst this type of survey relies on a random point system, the data can be stratified (prior to or post data collection and assessment) to reveal an estimate of tree numbers, species diversity, and benefits provided by private trees.

A full inventory of trees on private properties may be a tall order, however many of Birmingham's trees will fall into conservation areas, and many more will be on record with a tree preservation order (TPO). Fully collating the data already held on these trees may be useful in combination with an i-Tree Eco sample survey.

Furthermore the Bluesky National Tree Map (NTM) also provides an estimate of tree numbers and could be used in conjunction with OS mastermap to provide a point based assessment relatively quickly.

Actions

1. An i-Tree Eco sample survey is one way to provide this baseline data;
2. Assess suitability and practicality of using conservation area assessments and NTM combined with OS mastermap of private trees in the short term.

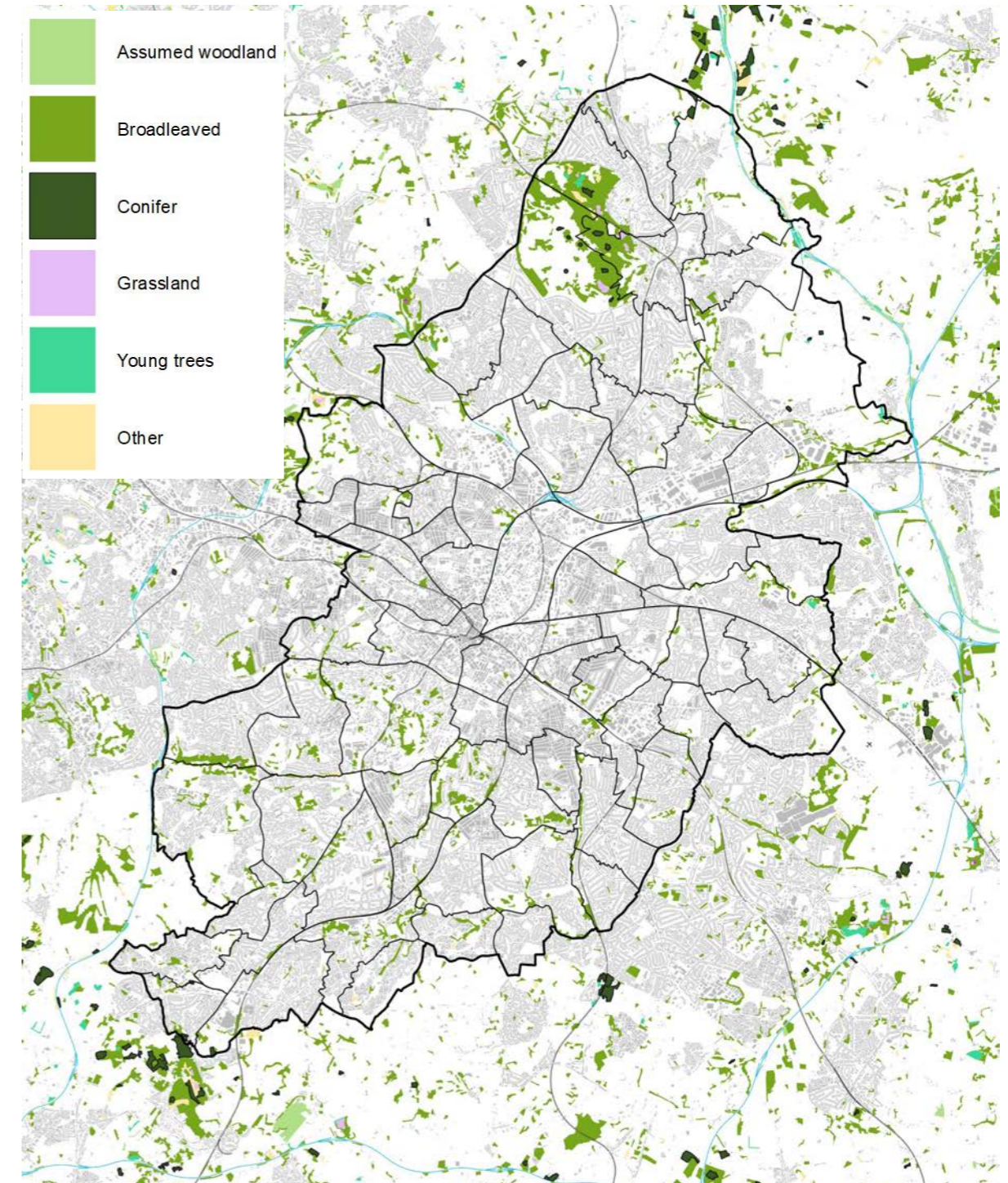


Figure 7: National Forest Inventory (NFI) data for Birmingham

Priority	Responsibility for Action	For Review:
High	1. BTP to lead and i-Tree eco study either by BCC citizen science projects, Birmingham University (PhD students) or other.	April 2022 - Short to Medium term project
	2. BTP and partners to assess other methods.	

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Data Currently Unavailable	No information about privately owned trees.	Aerial, point-based assessment of trees on private property, capturing overall extent and location.	Bottom-up, sample-based assessment of trees on private property, as well as basic aerial view (as described in "Fair" rating).	Bottom-up, sample-based assessment on private property, as well as detailed Urban Tree Canopy (UTC) analysis of entire urban forest, integrated into municipality-wide GIS system.

T8 Other Elements of the Urban Forest

Other elements of the urban forest include shrubs (1), hedges (2), green walls (3) and roofs (4), plants (5), wildlife (6), and water (7). These elements, along with trees, provide a wide range of benefits, including ecosystem services and amenity value.

Whilst shrubs, like trees, can be surveyed (for example in an i-Tree Eco Sample project), and green walls and roofs can be counted and measured, many of these other elements are very difficult to quantify. Assessing and valuing their environmental impacts and services is even more complex, however the Urban Greening Factor (UGF) used in London can provide a guideline and targets for urban greening

Birmingham needs to assess the existing elements and establish its own targets based around the UGF. This will help the city to make the most of its urban forest and to continue to enhance its natural capital in a meaningful and quantifiable way.

Actions

1. Look at Urban Greening Factor provide GI baseline and targets;
2. An i-Tree Eco sample survey will provide baseline data;
3. Utilise data from the Local Nature Recovery Network Strategy;
4. Engage with as many other nature based organisations and other stakeholders to build the many elements involved in urban forest management to be taken into account (Wildlife trusts, RSPB for example).

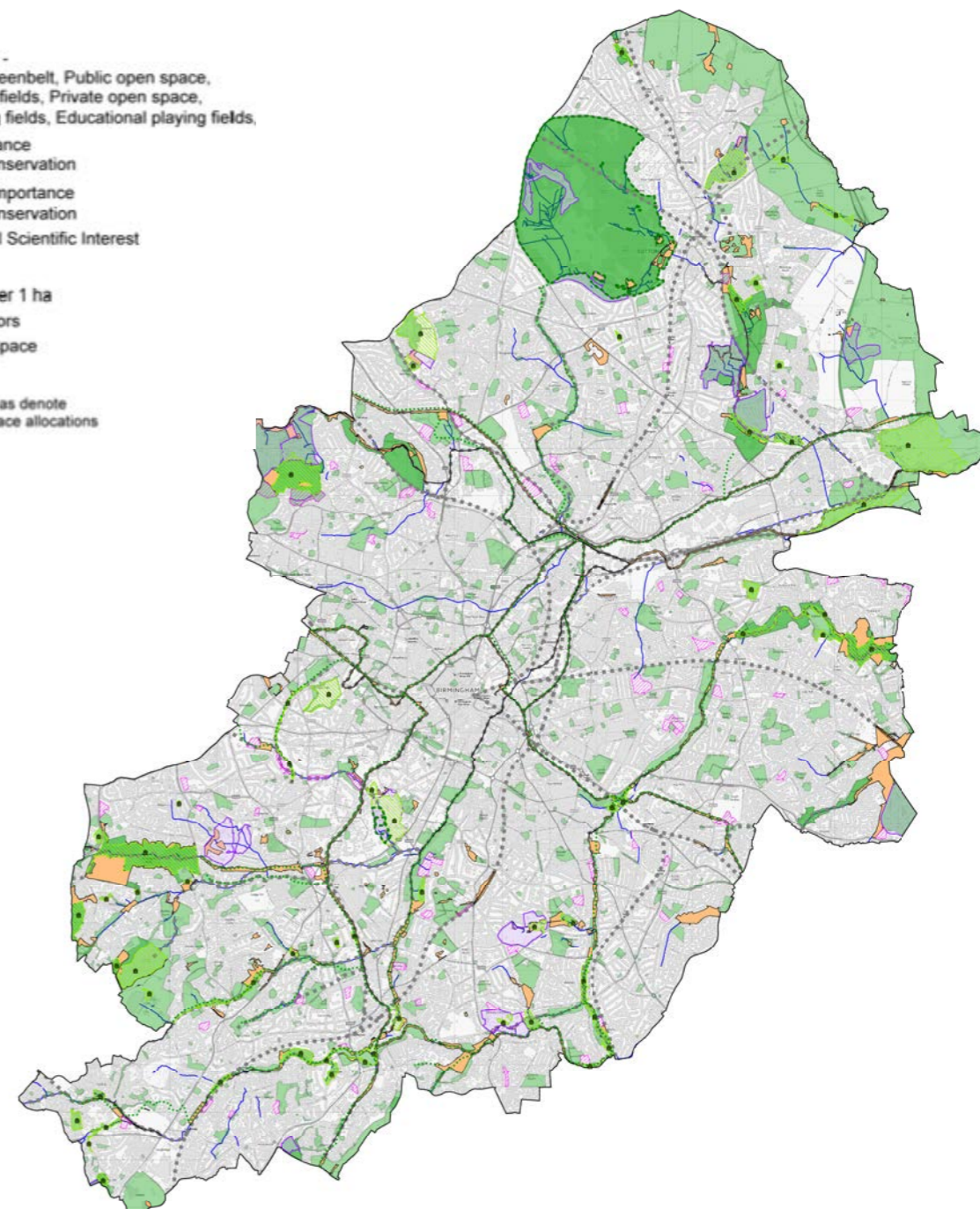


Figure 8: Green Infrastructure across Birmingham

Priority	Responsibility for Action	For Review:
Medium	1-4. BCC and other nature-based organisations.	April 2022 - Short to Medium term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	No information about other elements of the Urban Forest.	An assessment of existing elements of the urban forest has been carried out and a green infrastructure baseline has been established.	Establish relevant local UFG targets. Identify opportunities for new greening in development.	A relevant local UFG policy has been developed and implemented. Monitoring is ongoing.

T9 Tree Benefits

Trees in cities bring with them both benefits and costs. Whilst many of the costs are well known, the benefits can be difficult to quantify or justify. Nevertheless, a considerable and expanding body of research exists on the benefits that urban trees provide to those who live and work in our cities, to green infrastructure and to the wider urban ecosystem.

Trees provide a 'sense of place', moderate extremes of high temperature in urban areas, improve air quality, reduce rainwater runoff, and act as a carbon sink. Yet, trees are often overlooked and undervalued. Understanding and valuing these services allows us to make more informed planting and management decisions for the benefit of current and future generations. It can also help communicate the importance of trees to the public and to those in the planning and development sector, encouraging the protection and management of existing trees as well as new planting.

Birmingham Tree People have set up a community engagement map which shows the current i-Tree values for street trees available [here](#).

i-Tree Eco is a tool which can be used to quantify tree benefits whilst also giving an overview of the structure of the urban forest. A random plot sample survey of Birmingham would be the most useful and comprehensive way to analyse tree benefits.

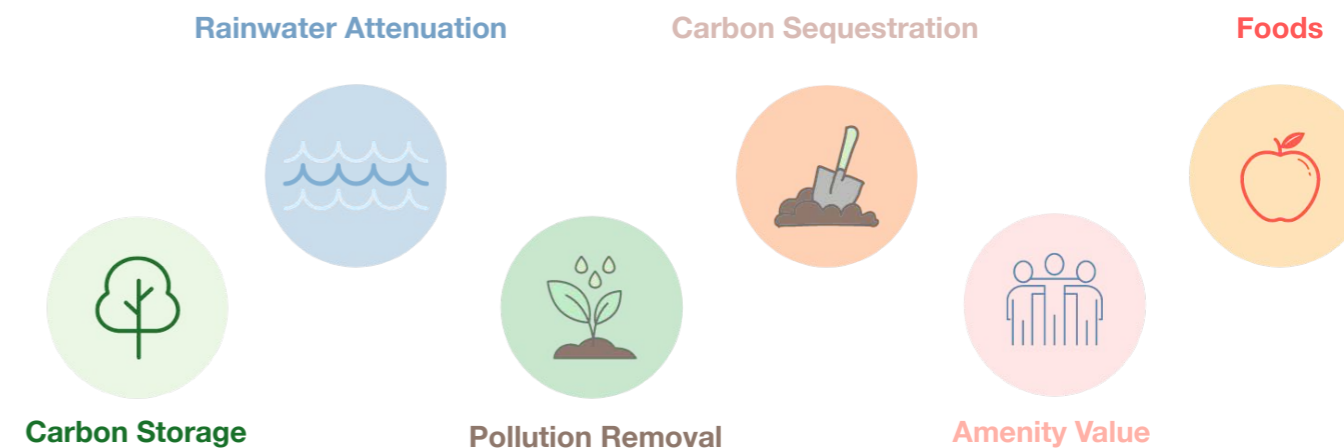


About i-Tree:

i-Tree is a suite of tools developed to assess the value of the urban forest and the ecosystem services provided which:

- Quantifies the benefits and values of trees around the world.
- Aids in tree and forest management and advocacy.
- Shows potential risks to tree and forest health.
- Is based on peer-reviewed, USDA Forest Service Research.

i-Tree Eco is an application designed to use field data from individual trees, complete inventories, or randomly allocated plots across the sample area to analyse the forest structure and ecosystem services provided.



Actions

1. Commission an i-Tree Eco sample survey to provide this baseline data;
2. Biodiversity data will also come through T6 and T8 work;
3. Data on Highways Trees Inventory is being run through iTree by Kier;
4. Prioritised zones to be identified where specific benefits can have the highest impact. (Shade, storm water, pollution etc) with species choice related to species ability to deliver required benefits.

Priority	Responsibility for Action	For Review:
High	1-4. BCC and BTP.	April 2022 - Short to Medium term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	No comprehensive information available about tree benefits in the city.	Some information available on key tree benefits, such as biodiversity.	Sound information available on a key set of tree benefits, such as biodiversity, recreation, environmental services (see below).	Comprehensive information available on all tree benefits across the city.

T10 Wider Environmental Considerations

Trees have a vital part in the fight against climate change and can be part of both adaptation and mitigation strategies. Urban trees are particularly important as a way of reducing the urban heat island effect, and in removing air pollution from built up areas and highways. In certain situations, trees can also reduce the energy use of buildings by providing shade in summer (reducing the need for air conditioning) and insulation from cold winds in winter (reducing the heating costs).

With the UK target of carbon net neutrality by 2050, and the Birmingham Development Plan target of a 60% reduction in CO₂ emissions by 2027 and by at least 80% by 2050 (compared to 1990 levels), the trees and other elements of the urban forest in Birmingham are key.

Climate change poses a direct risk to the residents in Birmingham; a warming climate increases risk of heatstroke, while increased rainfall will cause more frequent and more severe flooding. Biodiversity is also at risk, as species will struggle to adapt to warming climates, earlier springs and mild winters.

These considerations should be taken into account when managing the urban forest to ensure that the correct management practices are being enforced, tree and shrub species are as suitable to the future environment as possible, and that biodiversity is protected and enhanced, with biodiversity net gain as a key drive. Monitoring species and numbers will be important, and considering opinions from outside groups regarding more specific systems and locations will be key to preserving existing environments in Birmingham. Working with the most up to date and location relevant climate and weather data is important to avoid generalisations and achieve the best results for the future.

Actions

1. All the other work within the Tree Board and in the UFMP being undertaken mean that this target will be acted upon and the Key Objective will be met.
2. Prioritised zones to be identified where specific benefits can have the highest impact. (Shade, storm water, pollution etc.) with species choice related to species ability to deliver required benefits.

Priority	Responsibility for Action	For Review:
Medium	1. BTP and BCC 2. BCC to identify zones and environmental priorities where trees can make a significant contribution. Others may be involved for inventory data ie. Kier.	April 2022 - Medium term project

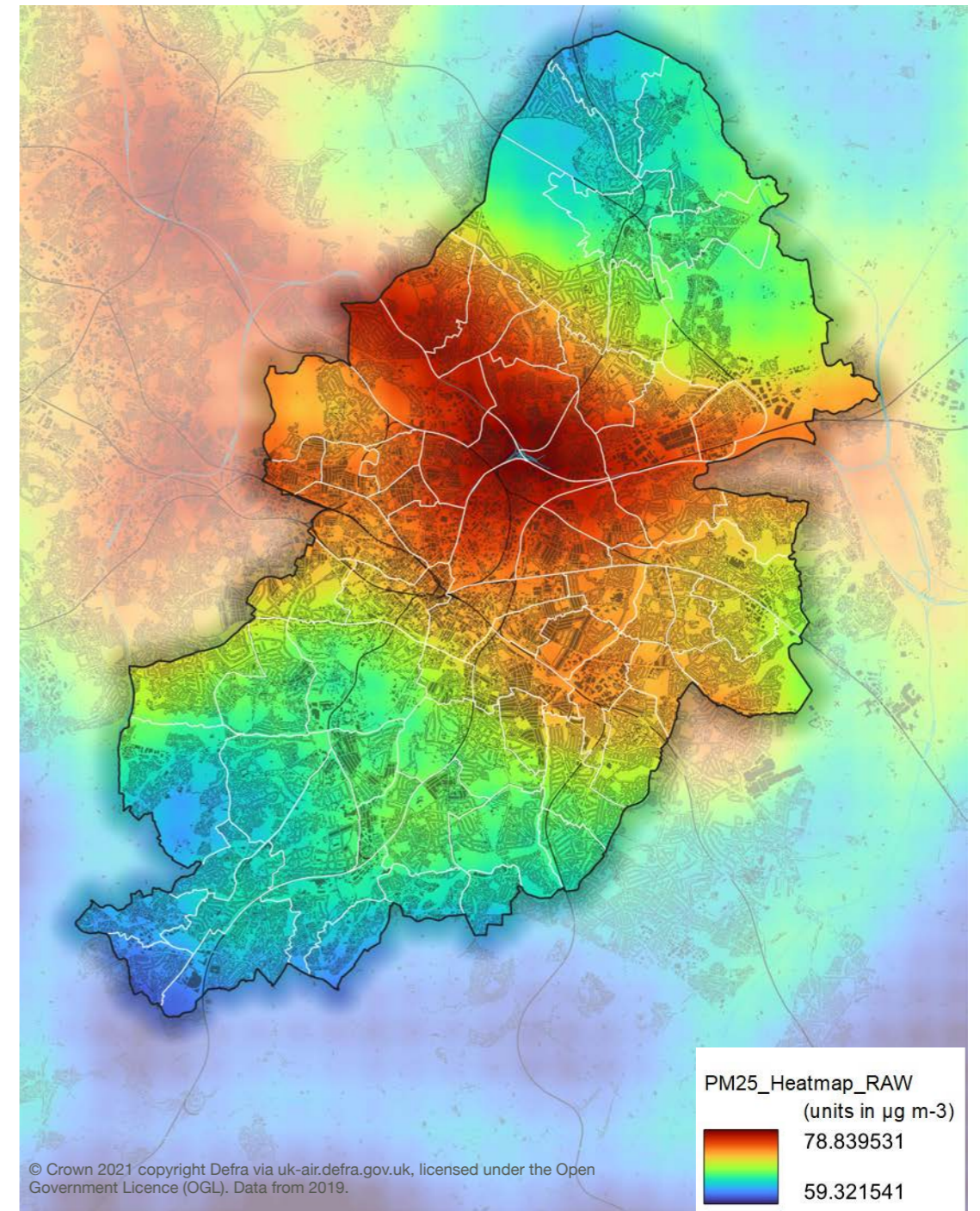


Figure 9: PM2.5 concentration across Birmingham

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Good	No consideration/information that relates urban trees to climate change, air quality, water.	Some consideration of environmental aspects in relation to urban trees, e.g. looking at climate change.	Consideration of at least major environmental aspects in relation to urban trees.	Full consideration of environmental aspects in relation to trees, based on comprehensive, state-of-the-art information.

Targets, Priorities and Actions

2. Community Framework

03 At A Glance - Community Framework

Key Performance Indicator	Performance Level				Priority
	Low	Moderate	Good	Optimal	
C1 – Governance and leadership	Moderate		Good		High
C2 – Birmingham City Council departmental cooperation	Moderate		Good		Medium
C3 – Utilities cooperation	Moderate		Good		Medium
C4 – Green industry cooperation	Moderate		Good		Medium
C5– Involvement of large private and institutional landholders	Moderate		Good		High
C6 – Community involvement and neighbourhood action	Moderate		Good		High
C7 – General appreciation of trees as a community resource	Moderate		Good		Medium
C8– Regional collaboration	Moderate		Good		Low
C9 - International Reputation	Good			Optimal	Medium

03 Targets, Priorities and Actions

C1 Governance and Leadership

The aim of this target is to help all municipal departments and agencies within Birmingham to communicate and cooperate to advance goals related to urban forest issues and opportunities. Presently, Birmingham City Council (BCC) work with other NGO's and agencies when necessary, however building a focussed network of urban forest partners would be desirable. To this end, a Tree Board was recently set up to provide leadership and co-ordination for managing the urban forest. The first meeting of the Tree Board was held in April, 2021. Currently, the Tree Board are working to develop key terms of reference and governance structure.

As well as BCC and the Tree Board, a number of external partners will work with the council to manage and maintain the urban forest. This includes, among others, Birmingham Tree People, Birmingham Trees for Life, Birmingham and Black Country Wildlife Trust, Friends of Parks groups, Birmingham Open Spaces Forum, Greener Birmingham Coalition, and Naturally Birmingham.



Actions

1. The Tree Board will become the focus point for governance and leadership by April 2022 and will use the implementation of the plan to work closer with other NGO's and Agencies on projects which help to achieve the realisation of the plan.
2. Actively seek to recruit cultural champions and ambassadors.



Priority	Responsibility for Action	For Review:
High	1-2. The Tree Board	April 2022 - Short term project



Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	Agencies take actions impacting urban forest with no cross-departmental coordination, consultation or consideration of the urban forest resource. Leadership for urban forest management is fragmented.	BCC works with other NGO's and Agencies on ad-hoc projects as and when they arise.	BCC regularly and frequently works with other NGO's and Agencies to establish projects and plans. There is a cultural champion in place.	Integrated urban forest governance and leadership provided by a Tree Board and is measured to plan and reflects local and international policies.

C2 Birmingham Council Departmental Co-operation

This target aims to encourage all departments within BCC to consult and collaborate with the Tree Board / urban forest managers on issues relating to the urban forest. Regular communication across departments and agencies will be key to ensuring that the urban forest is considered to the fullest extent throughout the council. Key departments to incorporate into this network are public health, education, planning and development, and highways.

Naturally Birmingham works to promote education of the natural capital in Birmingham to link BCC's goals with schools and the wider community. Birmingham's project in the Future Parks Accelerator (FPA) programme is called Naturally Birmingham. It is supported by a range of BCC departments including the Parks Service, Landscape Practice Group, Ecology Team, Public Health, Housing Development, the Children's Trust and Employment and Skills.

Actions

1. The Tree Board will become the focal point;
2. Wider involvement of departments (e.g. public health, education, highways) through improved communication;
3. Expand on work within the Tree Safety Group (involving parks tree officers from all departments, Kier, and some highway officers);
4. Work with the Future Parks Accelerator (FPA) for education and to link to the wider community;
5. Use programs e.g. Queen's Green Canopy Initiative to initiate co-operation.

Priority	Responsibility for Action	For Review:
Medium	1-5. The Tree Board	April 2022 - Short term project

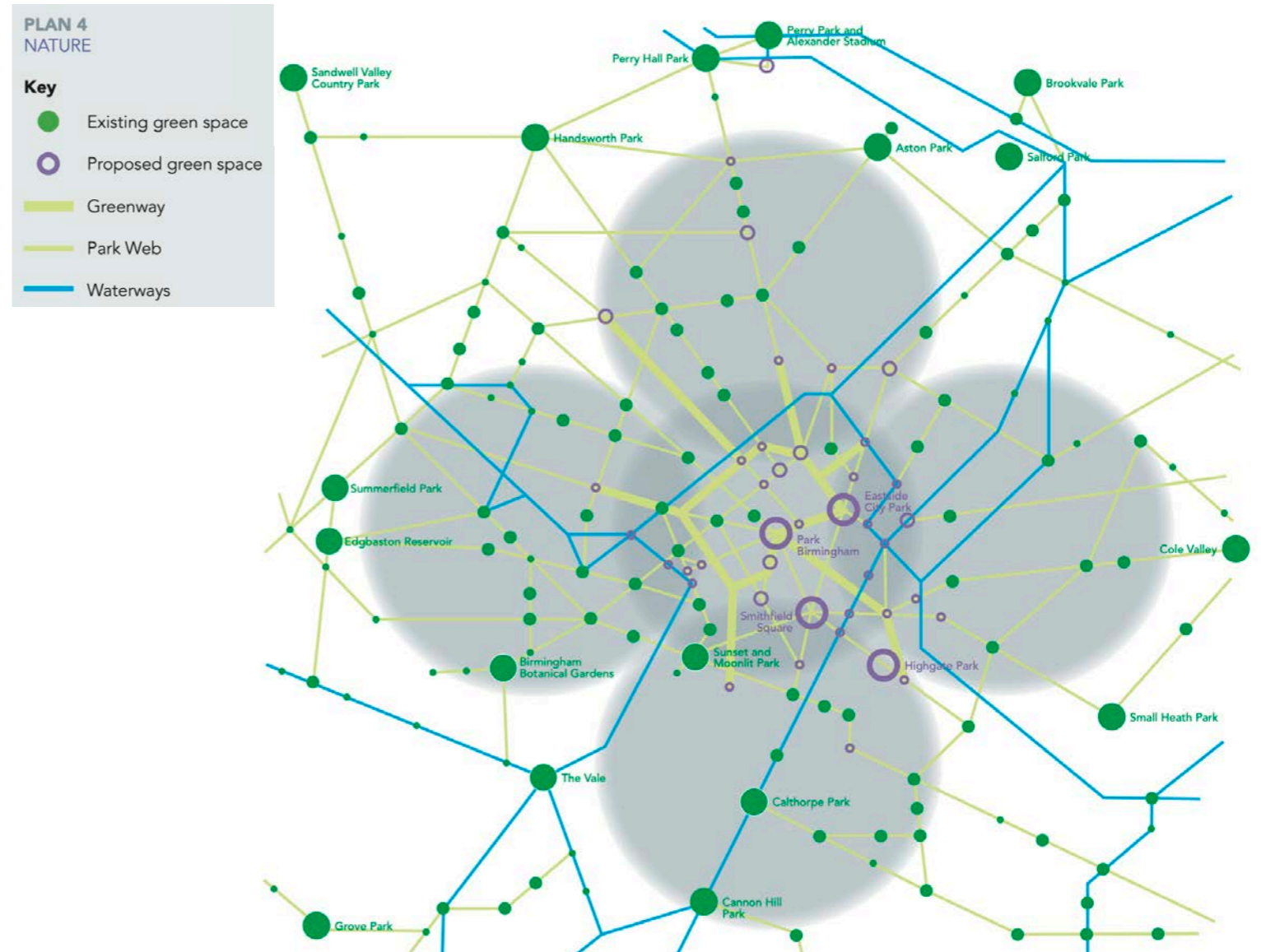


Figure 10: Network of existing and proposed green space from the Our Future Cities Plan, 2021

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	Departments/agencies take actions impacting urban forest with no cross-departmental coordination, consultation or consideration of the urban forest resource.	Departments/agencies recognise potential conflicts and reach out to urban forest managers on an ad hoc basis – and vice versa.	Informal teams among departments and agencies communicate regularly and collaborate on a project-specific basis.	UF policy implemented by formal interdepartmental/interagency working teams on all projects.

C3 Utilities Co-operation

C3 aims to ensure that all utilities – above and below ground – employ best management practices and cooperate with the city to advance goals and objectives related to urban forest issues and opportunities. This includes electric, gas, water, cable, telephone, fibre-optics, etc.

Utilities are required to follow certain standards for managing vegetation – including pruning branches, protecting roots, and performing overall management of trees and other vegetation that could impact their services, and city policies may also regulate certain utility management practices, such as overhead line clearance. Introducing and enforcing best practice standards which protect trees and other elements of the urban forest will be key, and collaboration with utilities could help advance the goals and objectives of the UFMP. To this end, one of the Tree Board members will be a Utilities representative. Kier are the current Highways management contractor and will have representation on the board as well. Others will be ad hoc members of the Tree Board.

Some utilities extend beyond the Birmingham area. Figure 11 shows the water catchment areas which supply Birmingham. These areas are not constrained by political boundaries, and this should be taken into account when assessing how the urban forest and utilities interact. Water companies will also be encouraged to develop systems in which trees provide a vital role in water management.

Actions

1. List the utilities companies and get contact details for each utility;
2. Active coordination by the Tree Board;
3. Strengthen communication usually through planning;
4. Raising tree protection standards along highways which requires proper agreements, getting more buy-in, being clear in documentation.
5. Develop water management and tree pit practices.

Priority	Responsibility for Action	For Review:
Medium	1-4. The Tree Board in collaboration with Kier and BCC	April 2022 - Short term project
	5. The Tree Board with Severn Trent, BCC and Keir	

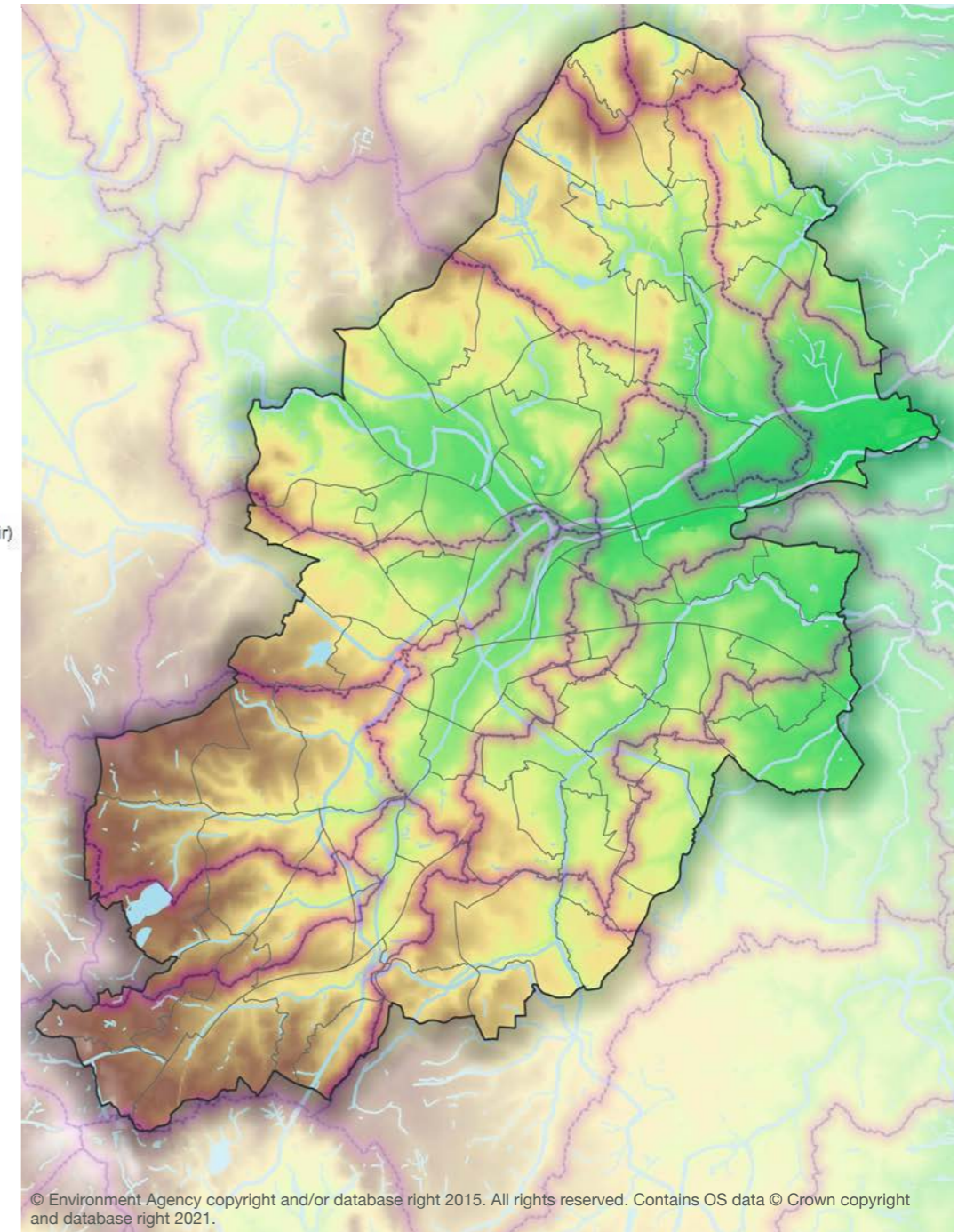
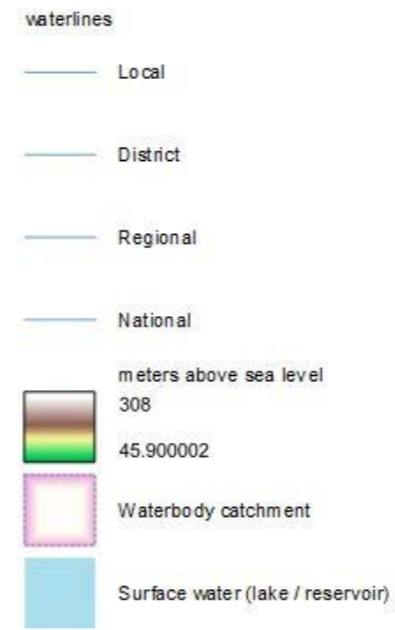


Figure 11: Hydrology of Birmingham extends beyond political boundaries

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	Utilities take actions impacting urban forest with no council coordination or consideration of the urban forest resource.	Utilities employ best management practices, recognise potential municipal conflicts, and reach out to urban forest managers on an ad hoc basis – and vice versa.	Utilities are included in informal council teams that communicate regularly and collaborate on a project-specific basis.	Utilities help advance urban forestry goals and objectives by participating in formal interdepartmental/interagency working teams on all municipal projects.

C4 Green Industry Co-operation

The “green industry” encompasses all professions and businesses that routinely support or engage in tree and vegetation management activities. Among others, these can include landscapers, nurseries, garden centres, contractors, maintenance professionals, tree care companies, landscape architects, foresters, planners, and even developers.

Green industry must work together with the council and the Tree Board to advance municipality-wide urban forest goals and objectives, and adhere to high professional standards.

Close co-operation with the green industry presents an excellent opportunity for municipal urban forest managers to influence management of the forest resource on private property.



Actions

1. List representatives and contact details for each utility;
2. Coordinate collaborative arrangements to meet the objectives of the plan (e.g. a tree charter that businesses can sign up to if they want to work on BCC land, training courses on trees for relevant employees in these businesses);
3. Tie in with green infrastructure, other key initiatives, and the way tree benefits play in (e.g. climate, runoff, energy), using tools such as i-Tree appraisals to show tree services (also compared to other interventions);
4. Demonstrate trees role in carbon zero/retrofitting opportunities; linking to wider industries (e.g. building, energy), looking into urban greening factor as delivery tool;
5. Set up a Tree Business of the Year Award to encourage best practice.

Priority	Responsibility for Action	For Review:
Medium	1-5. The Tree Board	April 2022 - Short term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	Little or no cooperation among segments of green industry or awareness of municipality-wide urban forest goals and objectives.	Some cooperation among green industry as well as general awareness and acceptance of municipality-wide goals and objectives.	Specific collaborative arrangements across segments of green industry in support of municipality-wide goals and objectives.	Shared vision and goals and extensive committed partnerships in place. Solid adherence to high professional standards.

C5 Involvement of Large Private and Institutional Landholders

As a large proportion of land within cities is owned by private individuals, organisations and institutions, enlisting their help in enhancing and protecting the urban forest is paramount. Outreach programs, management plans and funding strategies will help to incorporate these landholders. Communicating the benefits of trees will help inspire landholders and institutions to invest time and money in natural resources.

The goal is to help large private landholders embrace and advance city-wide urban forest goals and objectives by implementing specific resource management plans so that they can manage trees on their property in the most beneficial way.

The Arbor Day Foundation’s “[Tree Campus USA](#)” program is an example of suggested standards and strategies which could be used to guide the development and achievement of this target.

Actions

1. List landholders and contact details for each;
2. Coordinate collaborative arrangements to meet the objectives of the plan;
3. Mobilise wider network and the respective contacts of partner organisations;
4. Communicating about e.g. health benefits to support partnerships and enhance tree protection.

Priority	Responsibility for Action	For Review:
High	1-4. The Tree Board and representatives	April 2022 - Short term project



Figure 12: Map showing Birmingham University campus and surrounding green space

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	Large private landholders are generally uninformed about urban forest issues and opportunities.	Birmingham conducts outreach directly to landholders with educational materials and technical assistance, providing clear goals and incentives for managing their tree resource.	Landholders develop comprehensive tree management plans (including funding strategies) that advance city-wide urban forest goals.	As described in “Good” rating, plus active community engagement and access to the property’s forest resource.

C6 Community Involvement and Neighbourhood Action

At the neighbourhood level, citizens and groups must be encouraged to participate and collaborate with BCC and its partnering NGOs in urban forest management activities.

A number of groups and organisations already work towards enhancing the natural capital within the city, including Birmingham Trees for Life, Trees for Cities, and the Birmingham Open Spaces Forum. Collaborating with these groups and encouraging further community involvement with projects in small neighbourhoods and wider district areas would benefit the whole city. Neighbourhood activities often help the community members to connect more with their urban forest, and encouraging communities to get involved will reduce the likelihood of conflict or opposition to tree planting.

Creating an interactive Stewardship Mapping and Assessment Project (STEW-MAP) such as those completed in Paris and New York is a research methodology, community organising approach, and partnership mapping tool developed by the USDA which shows who is responsible for the local environment. It would be the first of its kind in the UK and an invaluable tool to engage local residents and establish a network of UF management teams across the city.

The UFMP and the formation of the Tree Board should also be publicised to help raise awareness of the work that is ongoing within the community.

Actions

1. List reps and contact details for key groups;
2. Stewardship map/mapping of community groups;
3. Link to other, wider initiatives such as establishing of a Youth Forum, Green Champion scheme for the City of Nature;
4. Create a tree equity map;
5. Raise awareness of trees as part of broader initiatives (can be an important 'connector');
6. Publicise events and launching of e.g. Tree Board, UFMP



Priority	Responsibility for Action	For Review:
High	1-6. The Tree Board as key actor - close collaboration with key partners such as BTP, BTFL, Tree Wardens. Role for local groups for delivery at local/neighbourhood level.	April 2022 - Short to Medium term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	At the neighbourhood level, citizens participate and groups collaborate with Birmingham and/or its partnering NGOs in urban forest management activities to advance municipality-wide plans.	Little or no citizen involvement or neighbourhood action.	Some neighbourhood groups engaged in advancing urban forest goals, but with little or no overall coordination with or direction by city or its partnering NGOs.	Many active neighbourhood groups engaged across the community, with actions coordinated or led by municipality and/or its partnering NGOs.

C7 General Appreciation of Trees as a Community Resource

In order for the UFMP to be a true success, one of its legacies should be that the people of Birmingham love, respect and appreciate its green infrastructure. By engaging and encouraging the community in this way, it can be ensured that the urban forest will be protected and enhanced for generations to come. Changing peoples values can be difficult, but through education, celebration and engagement, the hope is that people will come to value the trees around them and the wider part which they play in the health of the city, the nation, and the world.

Not only local citizens, but also stakeholders from all sectors and constituencies within the city – private and public, commercial and nonprofit, entrepreneurs and elected officials, community groups and individual citizens – must understand, appreciate, and advocate for the role and importance of the urban forest as a resource.

“Having public agencies, private landholders, the green industry, and neighbourhood groups all share the same vision of the city’s urban forest is a crucial part of sustainability. This condition is not likely to result from legislation. It will only result from a shared understanding of the urban forest’s value to the community and commitment to dialogue and cooperation among the stakeholders.”

Clark et al, 1997

Actions

1. *Identify ways to gauge and demonstrate the full-spectrum of support, e.g. organising popular tree celebrations, presenting recognition awards to businesses and elected officials, achieving an environmental designation, offering programs that address problems (real or perceived) caused by trees, holding successful tree giveaways, and so on;*
2. *Build greater confidence and empower people to manage trees they own (e.g. provide good information (website, social media, being approachable) in language appropriate for the audience (non technical) and in the language of the target audience).*

Priority	Responsibility for Action	For Review:
Medium	1-2. The Tree Board and BCC, and various stewardship and community groups. Also individual tree owners. Engaging community champions, faith groups etc. In general: more collaboration-community support to the program will be key.	April 2022 - Short to Medium term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	General ambivalence or negative attitudes about trees, which are perceived as neutral at best or as the source of problems. Actions harmful to trees may be taken deliberately.	Trees generally recognised as important and beneficial.	Trees widely acknowledged as providing environmental, social, and economic services – resulting in some action or advocacy in support of the urban forest.	Urban forest recognized as vital to the community’s environmental, social, and economic well-being. Widespread public and political support and advocacy for trees, resulting in strong policies and plans that advance the viability and sustainability of the entire urban forest.

C8 Regional Collaboration

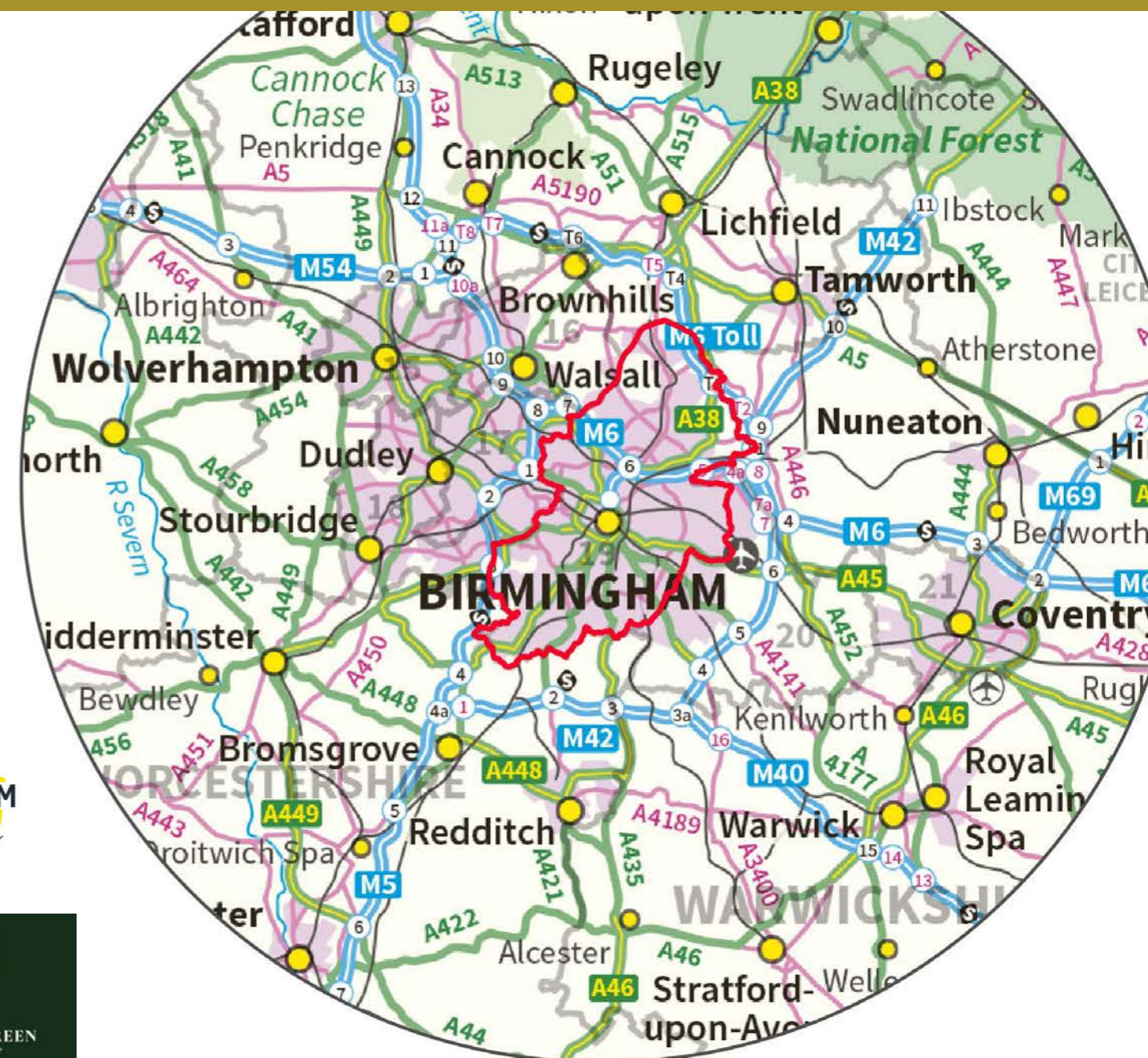
Already Birmingham has shown itself to be a pioneering city within the UK in regards to the urban forest. It has been a Biophilic Cities member since 2013- one of only two cities in the UK (the other being Edinburgh) to have this status- and it has been recognised for the second year as a Tree City of the World. This Urban Forest Master Plan is the first of its kind in the UK, and the hope is to inspire others to follow suit.

As a national leader in green infrastructure and urban forest management it is important that Birmingham reaches out to neighbouring towns, cities and municipalities to encourage collaboration, co-operation and innovation of the urban forests across the Midlands and the country. In supporting its neighbours, Birmingham can help provide much needed guidance and advice by creating a communication network, and in doing so, secure the future of many smaller areas.

Several initiatives could be used to promote Birmingham and the West Midlands in the future, for example, The Queen's Green Canopy (QGC). The Commonwealth Games are to be held in Birmingham in 2022, and provide an invaluable opportunity to promote the progress made by the city in terms of urban greening and green infrastructure. Widely publicising events all year round such as National Tree Week (usually in March), Birmingham Trees for Life planting days (winter time), and the Urban Tree Festival (held in May), will keep the focus on Birmingham's urban forest.

Actions

1. The work on the UFMP and the TB will achieve this target. Ongoing work on this will be undertaken by the TB. Initiatives such as Queen's Green Canopy Initiative also has regional component with a green infrastructure focus. The 2022 Commonwealth Games are a publicity and investment opportunity.



Priority	Responsibility for Action	For Review:
Low	1. TB will lead, also involving BCC. Various existing regional collaborations, e.g. entrepreneurial, business networks (e.g. green credentials).	April 2022 - Short to Medium term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	Const. and Wards have no interaction with each other or the broader region. No regional planning or coordination on urban forestry.	Some neighbouring municipalities and regional agencies share similar policies and plans related to trees and urban forest.	Some urban forest planning and cooperation across municipalities and regional agencies.	Widespread regional cooperation resulting in development and implementation of regional urban forest plan.

C9 International Reputation

Birmingham is both a Biophilic City and a Tree City of the World. These internationally recognised titles prove that Birmingham's Urban Forest and the management of it, is of a recognised and high international standard. Birmingham's reputation of being a 'green' city is growing, and the city must continue to look for new initiatives to join.

Birmingham already has its sister cities of Chicago, Guangzhou and Johannesburg and a Treaty of Friendship with Changchun - China, Mirpur - Kashmir and has partner city agreements with Lyon, Frankfurt, Leipzig and Milan.

Not only must Birmingham keep up with international initiatives, it must endeavour to lead by example and provide guidance to other cities worldwide. To succeed in this, Birmingham should promote its successes and continue to innovate its forest management strategies and GI development plans.



“Birmingham have been acknowledged as doing something brilliant, and need to keep it up. They have harvested the low-hanging fruit, but what is the next big challenge and how will they apply this plan to meet it?”

Jim Clark-HortScience

Actions

1. Continuous horizon scanning for new initiatives, techniques and awards;
2. Spread the knowledge and techniques used by BUF;
3. Develop a media and communication strategy and put a plan in place.

Priority	Responsibility for Action	For Review:
Medium	1-3. TB to lead with BCC to engage with the international urban forestry community to keep abreast of new initiatives.	April 2022 - Medium term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Good	There is no vision - aspiration or consideration of Birmingham as an urban forest of International reputation.	Birmingham is sometimes considered for its leadership in international contexts, based on specific efforts and projects.	Birmingham has signed up to international programs such as Tree cities of the World and the Biophilic City Network and makes good use of these networks to further its urban forest program.	Birmingham is regarded as an international example and leader in its UFM and is prominent on the international stage as an urban forest city.

Targets, Priorities and Actions

3. Sustainable Resource Management Approach

Key Performance Indicator	Performance Level				Priority
	Low	Moderate	Good	Optimal	
R1 – Tree and woodlands inventory					High
R2 – Tree valuation and asset management approach					Medium
R3 – Canopy cover assessment and goals					High
R4 – Environmental justice					High
R5 – Reviewing and improving the Urban Forest Master Plan					Medium
R6a– Urban forestry funding					High
R6b– Arboricultural funding					High
R7 – Urban forestry program capacity and staffing					High
R8 – Tree establishment planning and implementation					High
R9– Growing site suitability					High
R10 – Tree protection policy development and enforcement					High
R11 – Maintenance of publicly owned, “intensively” managed trees					Medium
R12 – Management of publicly owned natural “extensively” managed areas					Low
R13 – Tree risk management					Medium
R14 – Biosecurity					High
R15 – Urban wood and green waste utilisation					Low
R16 – Native vegetation					Low
R17 – Research and Development					Medium
R18 – Open Urban Forest data and Web-map					High

03 Targets, Priorities and Actions

R1 Tree and Woodlands Inventory

A tree and woodland inventory involves taking stock of the individual trees within the urban forest. It is time and labour intensive to compile a full tree inventory of all trees, and would be unrealistic to achieve. However, plot/sample based inventories of woodland areas, combined with existing street tree inventories would be a good place to start.

Birmingham already has several tree inventory datasets for parks and street trees, but the data collected is not uniform across the different departments.

Compiling the inventories of Birmingham's trees into a single portal or system, would be an essential starting point, to establish the structure of the urban forest, including the number of trees, diversity of species, and age distribution. This is important as a baseline from which to monitor future progress and from which to manage the tree stock.

Ideally, in time Birmingham will also know the structure of the urban forest as a whole, and also by ward across the city.



Figure 13: Public tree inventory detail by ward

Actions

1. Collate existing datasets;
2. Assess if any woodlands are inventoried or if the NFI could be used. i-Tree Eco survey data could be used as a basic baseline once it becomes available;
3. Establish a protocol to ensure there is parity with data collection methods across Birmingham;
4. Set up a GIS based public portal for tree inventory data.

Priority	Responsibility for Action	For Review:
High	1. Tree Board	April 2022 - Medium term project
	2. Tree Board (commission study)	
	3. BCC	
	4. Tree Board	

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	No inventory.	Complete or sample-based inventory of publicly owned trees.	Complete inventory of publicly owned trees and sample-based privately owned trees that is guiding management decisions.	Systematic comprehensive inventory system of entire urban forest – with information tailored to users and supported by mapping in municipality-wide GIS system.

R2 Tree Valuation and Asset Management Approach

Tree valuation is an important part of managing and promoting the urban forest. With the trees valued, local people can understand the value of trees beyond the material worth. With these figures to hand, advocating for trees becomes easier.

Capital Asset Valuation of Amenity Trees (CAVAT) was developed by the London Tree Officers Association (LTOA) and others in 2008. It is one of the principal methods of tree valuation in the UK, and aims to provide a method for managing trees as assets rather than liabilities. It can be used for individual trees or for the tree stock as a whole. Documents related to CAVAT including a user guide and the spreadsheet calculator can be viewed [here](#).

CAVAT is already used and built into policy to ensure trees are viewed positively. In Birmingham, a CAVAT valuation of the highways trees has been done, and an assessment of Birmingham's publicly owned parks and green spaces reveals that the benefits provided by these valuable natural capital assets value £11.4 billion, including £4.6 billion in health benefits.

The next step is to assess the trees in public parks across the city, and then all public trees. Whilst privately owned trees would be more difficult to assess, this information would also be useful. The i-Tree Eco data once available could also be used to establish the overall CAVAT value.

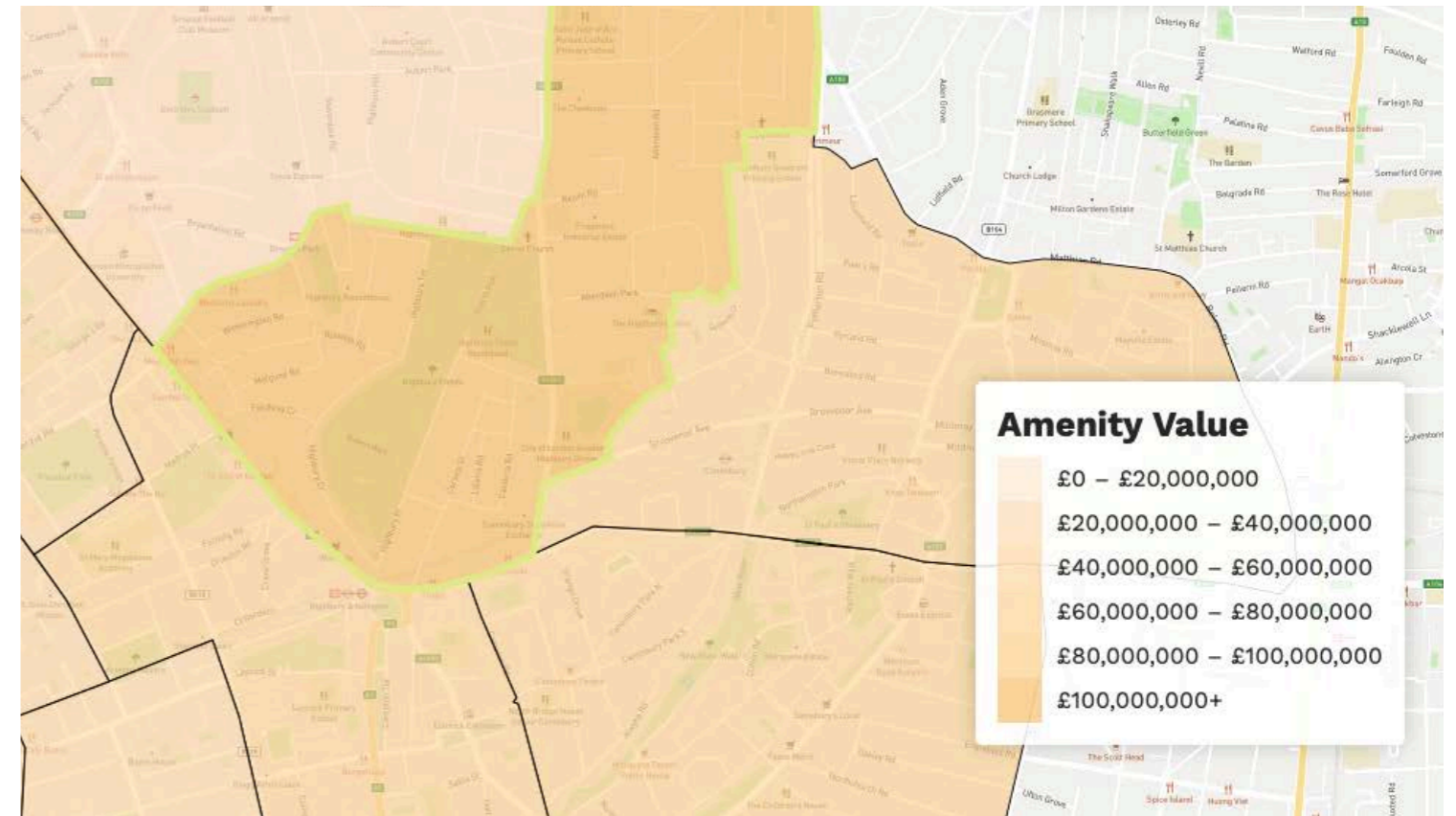


Figure 14: CAVAT data at the ward level

Sources and references:

Hölzinger, O. and Grayson, N. 2019: Birmingham Health Economic Assessment & Natural Capital Accounts: Revealing the True Value of Council-managed Parks and Greenspaces. Birmingham City Council, Birmingham.

Actions

1. Complete a park trees valuation;
2. Add this data to the Public Portal;
3. Private trees accounted for and/or a mechanism to be valued;
4. Collating data from private landowners e.g. Calthorpe Estate and add to the public portal.

Priority	Responsibility for Action	For Review:
Medium	1. BCC	April 2022 - Medium term project
	2-3. The Tree Board	
	4. The Tree Board and BCC	

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Good	Tree valuation or assessment management are in place.	Some form of tree valuation is used, at least for key projects involving public trees.	Tree valuation and asset management are implemented across the city, for most public trees.	Tree valuation and asset management are implemented for all public trees - and in some cases also private trees.

R3 Canopy Cover Assessment and Goals

Assessing canopy cover is vital, as this metric is used frequently as a figure which is clear and easy to compare with other areas. Whilst canopy cover is not a thorough study of the health and diversity and therefore overall benefit of the urban forest, it is an important aspect which should not be overlooked simply for its simplicity.

This target involves assessing the existing canopy cover in detail, and setting goals based on reasonable potential canopy cover and achievable steps to maximising cover. This leads into T1-‘Relative Tree Canopy Cover’- and would provide the necessary baseline for achieving that target. It is important that any tree canopy target is achievable within a reasonable time frame, and considered within the wider context of the Master Plan.

Birmingham has set a target of Carbon net neutrality by 2030, and this increase in canopy cover would contribute immensely. It should also be noted that tree planting does not necessarily provide an instant increase to canopy cover; in an urban setting trees are constantly being felled for any number of reasons, so insufficient planting can contribute to making up the deficit without actually increasing canopy cover.

City	London	Bristol	Plymouth	Cambridge	Torbay
Existing Canopy Cover	21% (2015)	18% (2018)	18.5% (2017)	17% (2008)	12% (2011)
2050 Target	30%	30%	20%	19%	20%

Table 2: Comparable Cities’ Canopy Cover Estimates and Goals

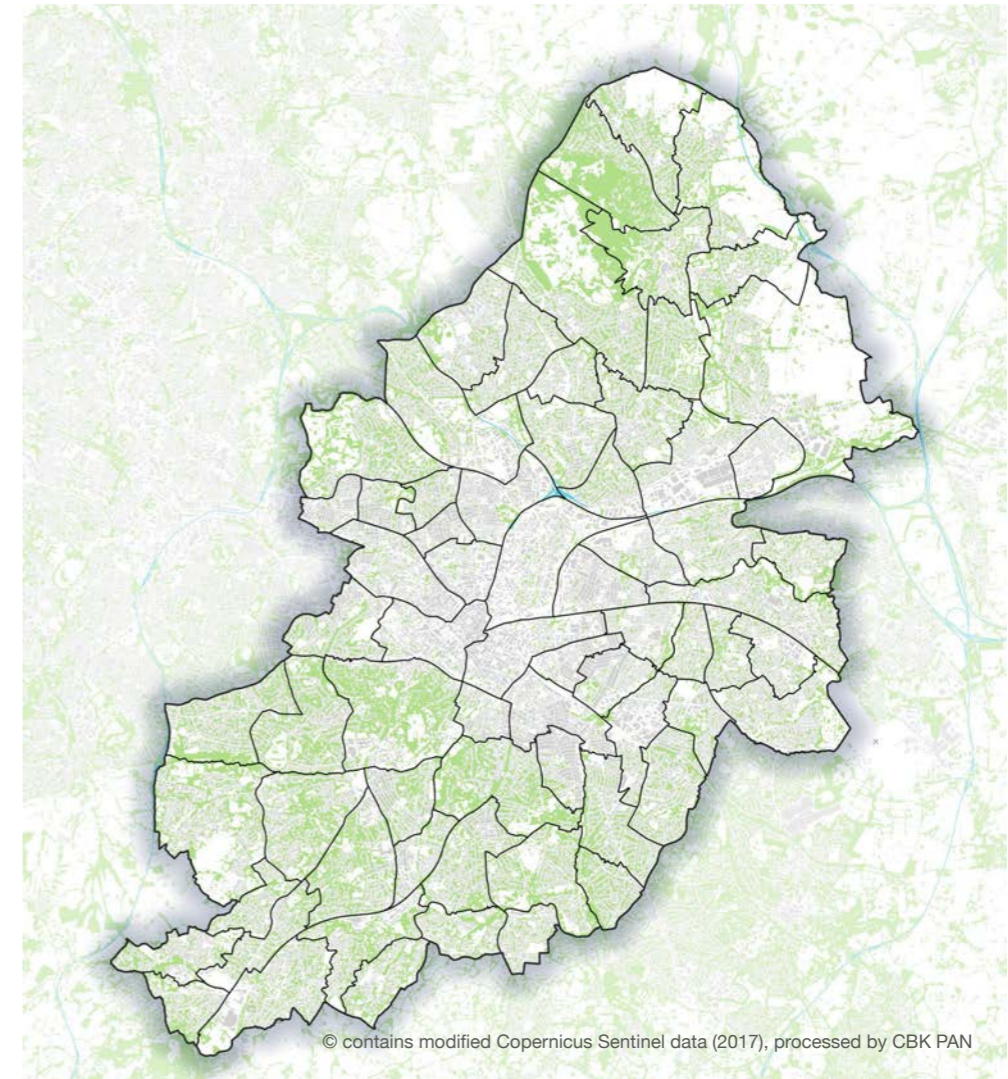


Figure 15: Tree Canopy Cover across Birmingham from National Tree Map (NTM) Satellite Data

Actions

1. Once a basic assessment has been done, then T1 canopy targets can be established and further analysis undertaken.

Priority	Responsibility for Action	For Review:
High	1. BCC	April 2022 - Medium to Long term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Low	No assessment or goals.	Low-resolution and/or point-based sampling of canopy cover using aerial photographs or satellite imagery – and limited or no goal-setting.	Complete, detailed, and spatially explicit, high-resolution Urban Tree Canopy (UTC) assessment based on enhanced data (such as LiDAR) – accompanied by comprehensive set of goals by land use and other parameters.	As described for “Good” rating – and all utilised effectively to drive urban forest policy and practice municipality-wide and at neighbourhood or smaller management level.

R4 Environmental Justice, Cultural Values and Equity

Birmingham is the UK’s most diverse city, with around 50% of the population being of ethnic minority backgrounds. The urban forest should reflect the diversity of people and cultures at a neighbourhood level, and planting and management should respect the views and values of the many different communities it serves. Birmingham’s Community Cohesion Strategy aims to progress equality in all spheres of social and economic life and empower and engage neighbourhoods.

Urban forests are connected to a range of socio-economic factors, with studies linking canopy cover to health, wealth, education, and crime. Typically, lower income areas have fewer trees, and this inequality should be addressed across Birmingham. Lack of tree canopy cover can also be linked to the level of urban intensification and lack of physical space to plant trees (low cost housing with small gardens are not always suitable for trees). Therefore utilising other aspects of the urban forest such as green walls/roofs may be a part of the solution. The benefits of trees should be made available to all people in all areas of the city. Tree planting should not always go hand in hand with new development and land repurposing, as this can lead to those with lower income becoming priced out of areas as they develop. The city must recognise that trees and green space should be a right for all people, and environmental exclusion must be avoided.

This target aims to ensure that the planting and management of the urban forest can be focussed in the areas where it will most benefit the local people, by increasing planting in the areas with the lowest canopy cover. Tree management plans in these areas should include community engagement and neighbourhood outreach to maximise the benefits of trees in the area. The multi-faceted meanings of trees to different people should be recognised.

Actions

1. Develop and monitor specific tools for assessing fair access to all;
2. Produce a ‘Tree Equity map’;
3. Ensure that new tree planting is linked to local need and involves local communities.

Priority	Responsibility for Action	For Review:
High	1-3. The Tree Board	April 2022 - Medium to long term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Low	Tree planting and outreach is not determined equitably by canopy cover or need for benefits.	Planting and outreach includes attention to low canopy neighbourhoods or areas.	Planting and outreach targets neighbourhoods with low canopy and a high need for tree benefits.	Equitable planting and outreach at the neighbourhood level is guided by strong citizen engagement in those low-canopy/high-need areas.

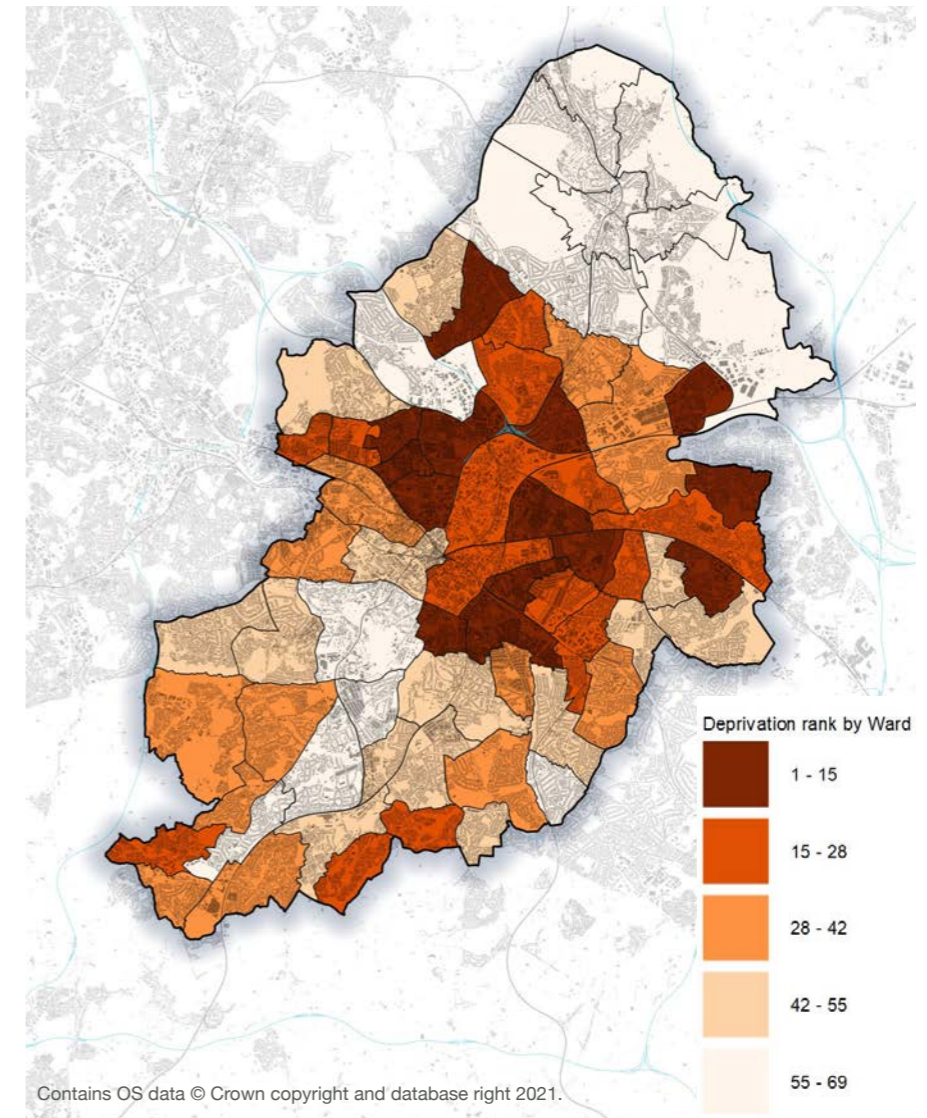


Figure 16: Indices of Multiple Deprivation Ranking by Ward (1=most deprived)

Sources and references:

BCNUEJ, 2021: Policy and Planning Tools for Urban Green Justice-Fighting displacement and gentrification and improving accessibility and inclusiveness to green amenities.

Nesbitt, L., Meitner, M.J., Sheppard, S.R. and Girling, C., 2018. The dimensions of urban green equity: A framework for analysis. *Urban forestry & urban greening*, 34, pp.240-248.

R5 Reviewing and Improving the Urban Forest Master Plan

Birmingham is taking a strategic approach to its urban forest, and engaging experts and key stakeholders to help it prepare an Urban Forest Master Plan. This UFMP is the first of its kind in the UK and follows an action based model more widely used in countries like the US and Canada. The Plan will help Birmingham set and work towards a vision for its trees that is sustainable well into the future.

The Urban Forest Master Plan outlines a vision for the development of the urban forest. It is area-specific and outlines the aspirations of all stakeholders who enjoy its benefits. It provides a long-term framework in which strategic plans can be developed. Tree-planting programmes are just one element of urban forest management, and long-term management plans are just as important. With an urban forest management plan in place, tree planting programs can be focused and strategised, as well as better guiding the achievement of a long-term vision.

With agreement on an ambitious vision, the UFMP can be divided into management periods, with goals and targets clearly outlined. A series of performance indicators are then be put into place to monitor performance and help progress towards the achievement of goals and the wider vision. It is important that progress is monitored and reviewed on a regular basis, and actions modified as necessary. This way, Birmingham can focus on the most relevant and urgent areas going forward.

The UFMP is an ongoing piece of work and this document represents the first step in a new chapter for Birmingham’s urban forest. The Tree Board will meet frequently and regularly and this plan will be subject to ongoing improvement and updating.

For each and every target within the plan further detail will be added, projects will be planned and actioned to take Birmingham towards its vision.



The Urban Forestry Master Plan is a strategic and long-term **PLAN ADOPTED!**

Columbus Urban Forest Master Plan’s dedicated [website](#) as an example

- Actions**
1. *Include ongoing review of the plan and progress towards each target as a key item at regular Tree Board meetings.*
 2. *Add the plan to a dedicated website for regular updating and ease of*

Priority	Responsibility for Action	For Review:
Medium	1-2. Tree Board with assistance from BCC	April 2022 - Medium to long term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	No plan.	Existing plan limited in scope and implementation.	Recent comprehensive plan developed and implemented for publicly owned forest resources, including trees managed intensively (or individually) and those managed extensively, as a population (e.g. trees in natural areas).	Strategic, multi-tiered plan with built-in adaptive management mechanisms developed and implemented for public and private forest resources.

03 Targets, Priorities and Actions

R6a Urban Forestry Funding

Urban forestry in Birmingham has largely been funded by Birmingham City Council, but it is important to not only secure and grow local municipal funding, but also to expand and diversify finances for urban forestry.

There are several government schemes for funding tree planting of different types, from woodland establishment to urban forestry. Most relevant currently is the Urban Tree Challenge Fund (UTCf), which opened 26 April 2021 as part of the Government's Nature for Climate Fund, supporting the planting of 44,000 large 'standard' trees over a two-year period: 2021/22 to 2022/23. The UTCf is open to anyone who wants to plant trees in urban or peri-urban areas, as long as you have full management control or consent to use the land for the duration of your agreement and your planting location is within an urban area.

Whilst funding for tree planting is readily available, funding for management and monitoring of the urban forest needs further investigation.

Private-sector funding as well as funding from one-off projects offer additional opportunities. Moreover, as a large share of Birmingham's urban forest is owned by private residents and organisations their involvement and support is also essential.

R6b Arboricultural Funding

The aim of this target is to establish sustained and sufficient funding to cover the implementation and delivery of the UFMP. Like urban forest management, arboricultural funding has mostly been centrally funded by BCC. There have been examples, however, of project-based funding that offer inspiration for the future as well. Engagement with international initiatives and good practices could also enhance future funding. The involvement of volunteers, tree wardens and the like provides another important resource for arboriculture in the city.

Some funding for arboriculture may come from planning and development, for example through the Community Infrastructure Levy, or Biodiversity Net Gain initiatives. Alternatively funding may be available via local planning policy where development results in loss of tree canopy cover and sufficient mitigation is not achievable on site, therefore trees must be planted elsewhere. This funding would likely be on an ad hoc basis for tree planting projects, rather than management.

Replacement cost values on annual tree removal can be used via i-Tree to get annual replacement values. In establishing tree planting and canopy cover goals, costings of necessary annual tree planting in soft and hard landscapes can begin. In doing so, a more accurate budget may be established which can be used to push for sufficient investment in both planting and tree management. The development of the Tree Canopy/ Equity Tool (See R4) will also allow more accurate calculation of forward costs.

Actions

1. Find a way to measure whether funding is sufficient and how it can be compared internationally;
2. Identify and review other funding sources, mechanisms.

Priority	Responsibility for Action	For Review:
High	1-2. BCC	April 2022 - Medium to long term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	Little or no dedicated funding.	Funding only for emergency, reactive management.	Funding sufficient for some proactive management based on urban forest management plan.	Sustained funding from public and private sources to fully implement comprehensive urban forest management plan.

R7 Urban Forestry Program Capacity and Staffing

Adequate staffing means there are enough staff with the correct training and experience to carry out all necessary tasks relating to the implementation and day-to-day running of the urban forestry programme. This may mean hiring new staff or arranging further training for current staff.

This includes anyone involved in the delivery of tree management and implementation, e.g., Tree Wardens and other volunteers, Tree Officers, the Tree Board, Parks and countryside staff, etc.

One of the key limiters of this target is money, therefore fully costing the UFMP and establishing a dedicated and coordinated budget is the first step. The new Tree Board should be involved in deciding on strategic investments in Birmingham's urban forest. As a vital part of the UFMP, Birmingham Tree People must also be included in budgeting. As a charity the costs to the organisation must be calculated.

Actions

1. Cost the actions from this UFMP and create budgets;
2. The Tree Board as an organisation needs overhead costs funded - this is a challenge which needs to be addressed within any budgets;
3. Create an organisational model and plan (to include in time, terms of reference and associated paperwork for filing at Companies House etc), an organogram for the Tree Board and a gap analysis of the team;
4. Create a business plan for the Tree Board;
5. Use the budgets for funding proposals to carry out the work.



Priority	Responsibility for Action	For Review:
High	1-5. BCC and the Tree Board	April 2022 - Medium to long term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	Team severely limited by lack of personnel and/or access to adequate equipment. Unable to perform adequate maintenance, let alone implement new goals.	Team limited by lack of trained staff and/or access to adequate equipment.	Team able to implement many of the goals and objectives of the urban forest master plan.	Team able to implement all of the goals and objectives of the urban forest master plan.

R8 Tree Establishment Planning and Implementation

Tree planting is more complex than most people realise; it is more than simply sticking trees in the ground. In order to ensure the trees survive, thrive and reach their full potential in cities, the right tree species must be selected, be planted in the right place, be planted for the right reasons, and planted and maintained in the right way. This way, the trees are given the best chance to survive and avoid being removed again further down the line.

Right reason- Tree planting should focus not just on quantity, but also quality. There is a big push to increase the number of trees planted, but if that is the only goal then how much good will it be when the don't survive to maturity? Birmingham want to make sure that these trees can benefit future generations by mitigating climate change, improving biodiversity, and enhancing health and well-being. With this in mind, tree management and post-planting care is vital to reaching the goals of Birmingham's UFMP.

Right place- Location is key when planting, particularly in cities where conditions can be less than ideal. Trees require space to grow, both above ground and below. Too close to a building and the tree may block light from windows or interfere with foundations causing subsidence, too close to another tree and there won't be enough root space or enough light. Power lines, drains, pavements and roads can all be adversely affected if the tree isn't given the space it needs.

Right tree- The benefits and drawbacks of different species must be considered, including site suitability, climate tolerance, size, rooting characteristics, aesthetics (canopy, leaves, flowers, etc.), ecosystem service provision, biodiversity, and more.

Right way- How the tree should be planted may vary depending on where the tree is, but all trees need the same essentials; good soil volume for root establishment; water, particularly for young trees which may struggle in hot cities; air and support to keep it upright whilst its roots establish; protection from damage, and maintenance. Hard paved impermeable surfaces present challenges which trees are not adapted to deal with, such as soil compaction, nutrient recycling and reduced water infiltration. These issues should be considered to help establish a healthy, long-lasting urban forest.

Sources and references:

<https://www.tdag.org.uk/tree-species-selection-for-green-infrastructure.html>

Actions

1. Complete a comprehensive prioritised tree planting strategy;
2. Provide tailored tree planting advice to different stakeholders (corporate, utility, community etc) on tree planting to include a list of 'preferred' species, size, planting and maintenance requirements. This could be either from existing sources eg: TDAG species selector or drafted especially for Birmingham (See R9); the document will also need to reference the Birmingham Design Guide too;
3. Set up and manage a Tree Bank.

Priority	Responsibility for Action	For Review:
High	1-3. The Tree Board with BCC	April 2022 - Medium to long term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	Little or no tree planting; tree establishment is ad hoc.	Some tree planting and establishment occurs, but with limited overall municipality-wide planning and post-planting care.	Tree planting plan is guided by municipality-wide goals, with some post-planting establishment care.	Comprehensive tree establishment plan is guided by needs derived from canopy and other assessments, maintains species and age diversity, includes both planting and young tree care, and is sufficient to make progress toward canopy cover objectives.

R9 Growing Site Suitability

This target links to the R8 target, specifically on choosing the right tree. Often trees are selected purely for their aesthetic attributes, however this can mean that the tree suffers if the site conditions have not been taken into account.

Site suitability should be investigated from the ground up, starting with soil. Urban soils are often very poor or non-existent, so it is vital to know what is there and what the tree will need before it is planted. Other site considerations include the amount of light, ie if the tree will be in permanent shade from buildings or not; the amount of impermeable service surrounding the site which would limit the amount of water infiltrating through to the roots, and the amount of space both above ground and below ground to facilitate tree growth. Once these things have been assessed, the right tree can be planted in the space.

Guidelines should be put into place for all tree planting, to ensure that trees can fulfil their maximum potential and provide the maximum benefit for the city. Any planning relating to trees should adhere to Birmingham's Design Guide, BS 8545 (Trees: from nursery to independence in the landscape) and BS 5837 (Trees in relation to design, demolition and construction). In particular, trees must be a priority in planning and development rather than an afterthought to ensure they are given enough space to mature. This should be extended for both public and private development and consistently enforced. This links to R10- 'Tree Protection Policy Development and Enforcement'.

Sources and references:

Trees & Design Action Group, 2014. *Trees in Hard Landscapes; A Guide for Delivery.*

A. Hiron & H. Sjoman, 2019. *Tree Species Selection for Green Infrastructure: A Guide for Specifiers*

Actions

1. Create local action plans.

Priority	Responsibility for Action	For Review:
High	1. BTP to coordinate local action plans for tree planting sites and assessment	April 2022 - Short to medium term project

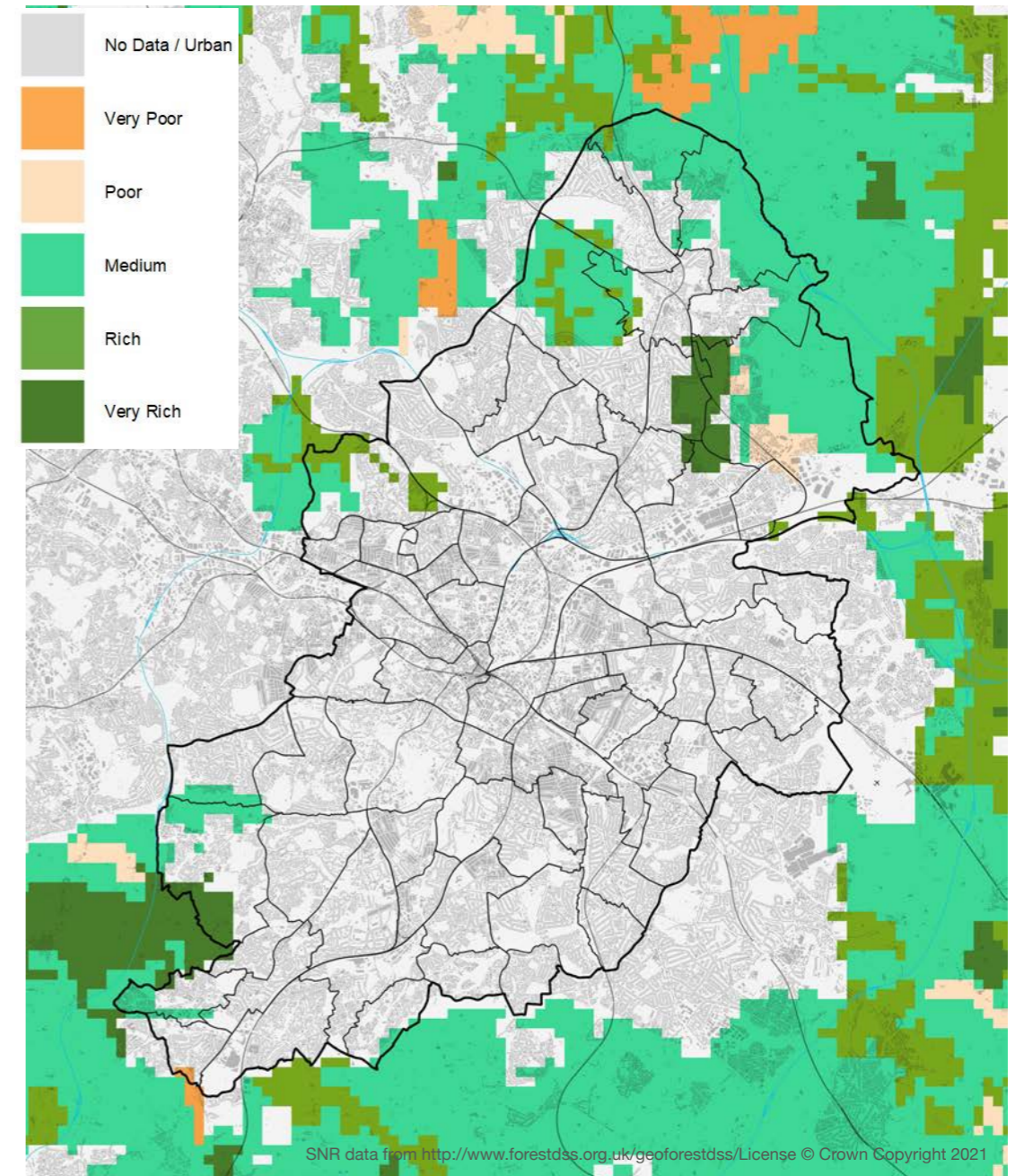


Figure 17: Soil Nutrient Regime map of Birmingham and the surrounding area. As shown, urban areas have little to no available data.

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	Trees selected and planted without consideration of site conditions.	Appropriate tree species are considered in site selection.	Municipality-wide guidelines in place for the improvement of planting site conditions and selection of suitable species.	All trees planted in sites with adequate soil quality and quantity, and with sufficient growing space and overall site conditions to achieve their genetic potential and thus provide maximum ecosystem services.

R10 Tree Protection Policy Development and Enforcement

City trees are sometimes viewed as irritating and costly, dropping leaves on lawns, causing blocked drains, and damaging foundations and pipes with their roots. They may also be considered dangerous as branches can fall without warning, particularly in winter, if they are not managed. For all these reasons and more, people may want to remove trees from public land or private properties.

Despite this, trees can and should be protected, and most councils have guidance in place; Birmingham have conservation areas and Tree Preservation Orders (TPO's). Trees may also be protected as part of planning conditions associated with planning approval. However, any TPO or CA breaches are not dealt with by the planning enforcement team but the tree officers, who are under resourced to deliver on this.

To carry out works to a tree protected by a TPO, consent from the Local Planning Authority is needed through submitting a tree works application. To carry out works to a tree in a conservation area, a six-week notice of intention must be submitted to the Local Planning Authority. This is known as a 'Section 211' notice. The Local Planning Authority can either accept the notice or make a TPO.

Polices and guidelines must be enforced in both public and private sectors. The public must be made aware of these policies to ensure they are kept up to date with the best practice guidance and ensure they know where and how to find further information before undertaking any work. [Birmingham's Local Enforcement Plan 2021](#) outlines the actions to be undertaken by the LPA and the penalties which can be enforced in the event of an infraction.

All TPOs are outlined and available to view online by visiting the BCC website: 'Find out if a tree is protected' tab or [Local View Mapping System](#).

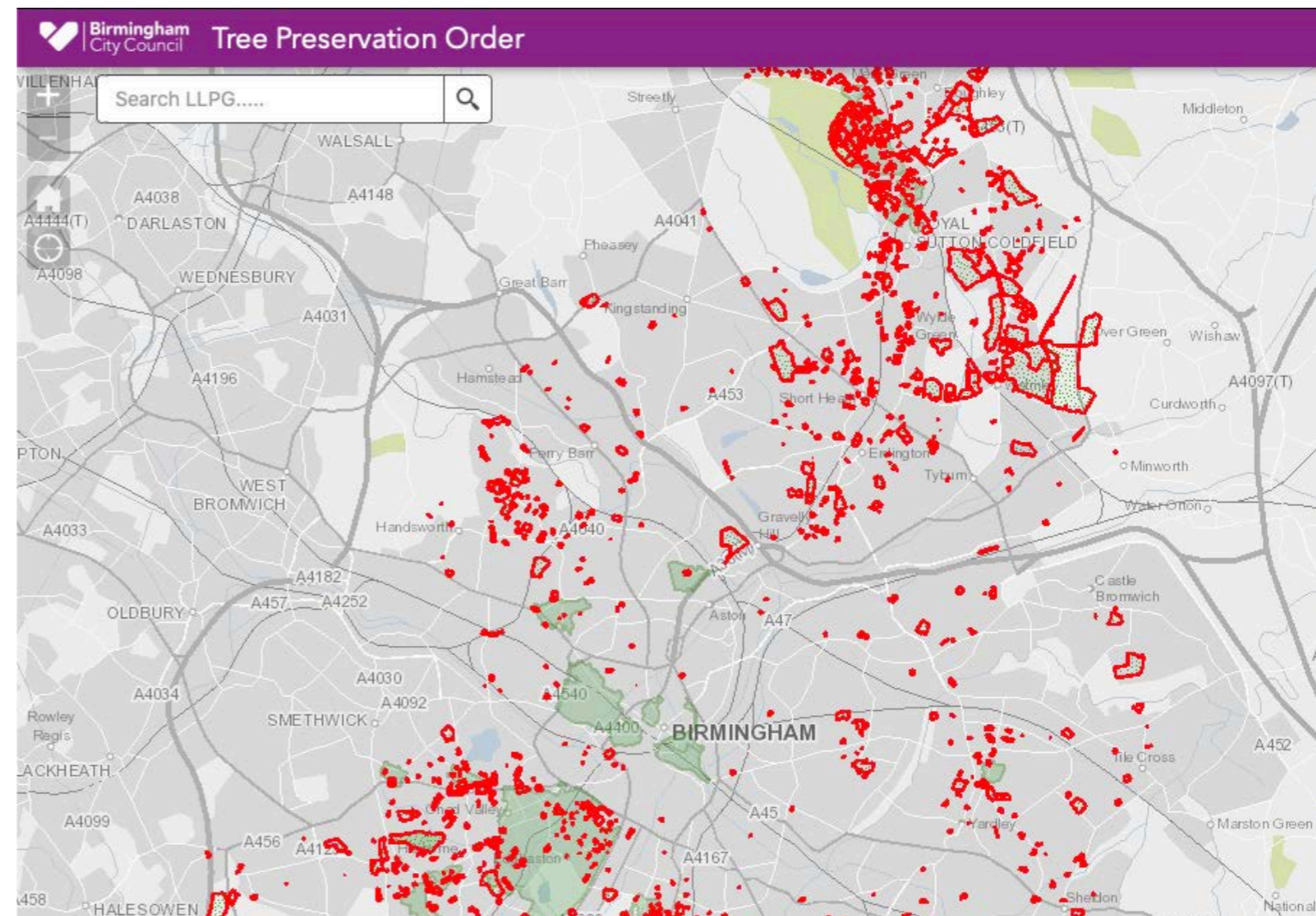


Figure 18: Birmingham's interactive online TPO map

Actions

1. *There is a need to increase the resources in this area to increase time savings, to publicise success and review and update the TPO register;*
2. *Prosecutions and awareness thereof will show that there is an effective deterrent;*
3. *NGO's and local community groups will be encouraged to also write up their own local actions with guidance.*

Priority	Responsibility for Action	For Review:
High	1-3. BCC and BTP	April 2022 - Medium to long term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	No tree protection policy.	Policies in place to protect public trees and employ industry best management practices, but inconsistently enforced.	Policies and practices in place to protect public and private trees, generally enforced.	Integrated municipality-wide policies and practices to protect public and private trees, consistently enforced and supported by significant deterrents.

R11 Maintenance of Publicly Owned, ‘Intensively’ Managed Trees

Intensively managed trees include street trees and solitary park trees, which require more care and attention due to the additional stresses and challenges of city life. In order to ensure the safety of public trees, routine maintenance must be carried out. This includes planned cyclical inspections and appropriate maintenance. Birmingham also holds inventory data for approximately 250,000 individual trees outside of woodlands.

The frequency of land use and target value are key drivers for inspection frequency, therefore an understanding of public land use may be a useful tool in establishing an inspection rota. This could help prioritise monitoring and management.

Monitoring trees could help prevent the spread of diseases, the likelihood of falling limbs, and resolve issues such as roots heaving pavements, or tree guards and stakes being left too long and causing extensive damage.

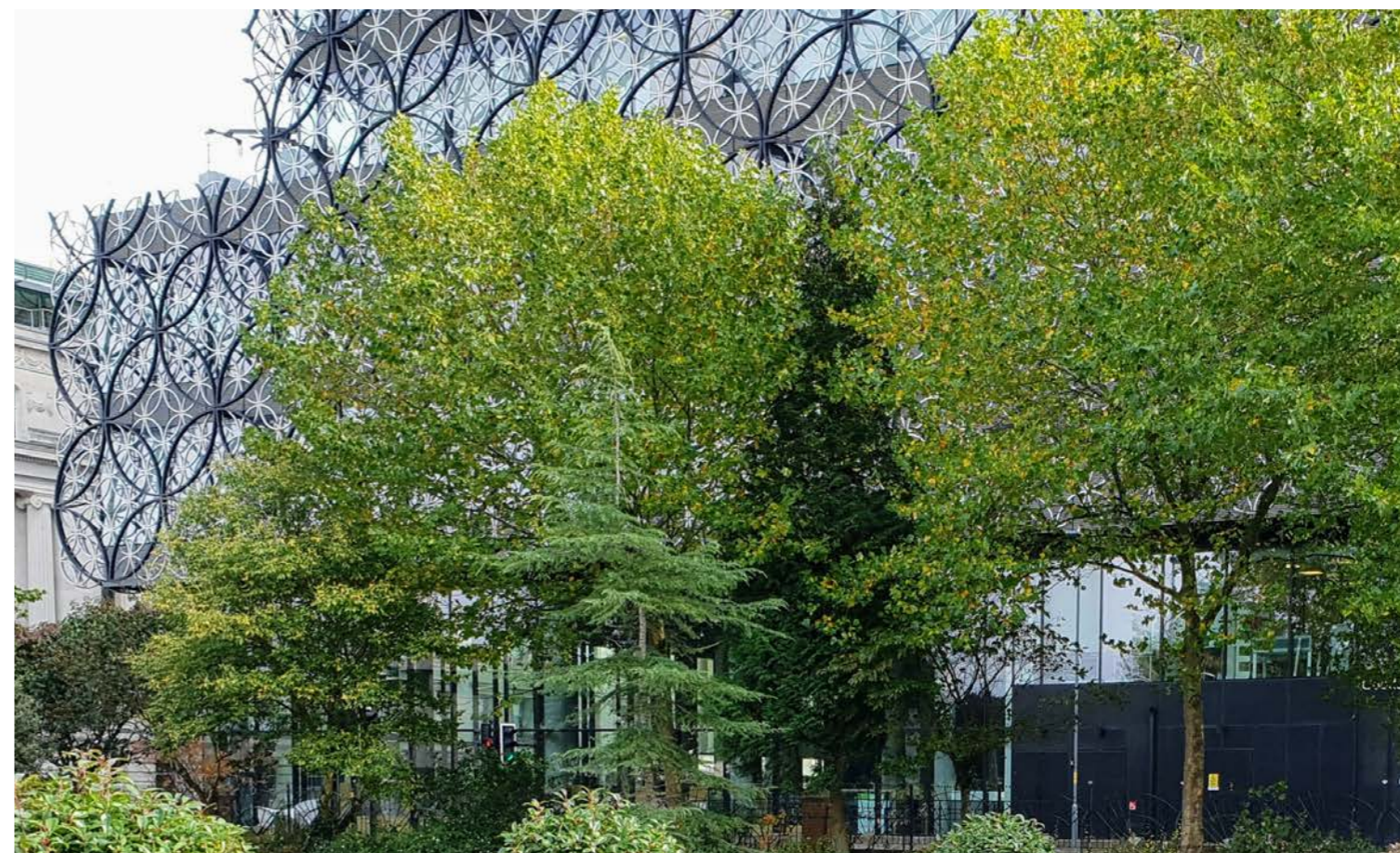


Figure 19: Trees surrounding Birmingham library

Actions

1. *Develop an overarching external audit regime for the Tree Risk Management Strategy;*
2. *Training and standardisation of tree maintenance methods;*
3. *Implement independent monitoring and auditing.*

Priority	Responsibility for Action	For Review:
Medium	1-3. BCC	April 2022 - Medium term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	No maintenance of publicly owned trees, or on a reactive basis only.	Publicly owned trees are regularly inspected and receive reactive maintenance.	Publicly owned trees are inspected and proactively maintained on a cyclical basis.	All publicly owned, intensively managed trees are routinely and thoroughly maintained on ongoing basis according to comprehensive management plan.

R12 Management of Publicly Owned ‘Extensively’ Managed Trees

Extensively managed trees are trees in parks, woodlands and other natural areas which are often allowed to grow more naturally and freely than intensively managed trees. These areas still require management to provide a healthy and diverse green space. They are often used by the public and therefore risk management is a key consideration. The frequency of land use and target value are key drivers for inspection frequency, and any inspection rota should accommodate this to prioritise monitoring and management.

A substantial and highly-valued part of Birmingham’s urban forest is found in these areas, and also here efforts should be made to develop and implement good practices, and work in close partnership with land owners, charities, and volunteers.

Monitoring trees could help prevent the spread of diseases, the likelihood of falling limbs, and resolve other issues associated with ‘unmanaged’ areas.

Actions

1. Map and identify public owned areas, and refine so that there is a constant idea of what and where public green space is;
2. Develop an overarching system for recording trees in woodlands and groups, assign a management unit to each and develop an appropriate management overarching plan (significant areas may also have an individual plan).

Priority	Responsibility for Action	For Review:
Medium	1. BCC	April 2022 - Medium term project
	2. The Tree Board	

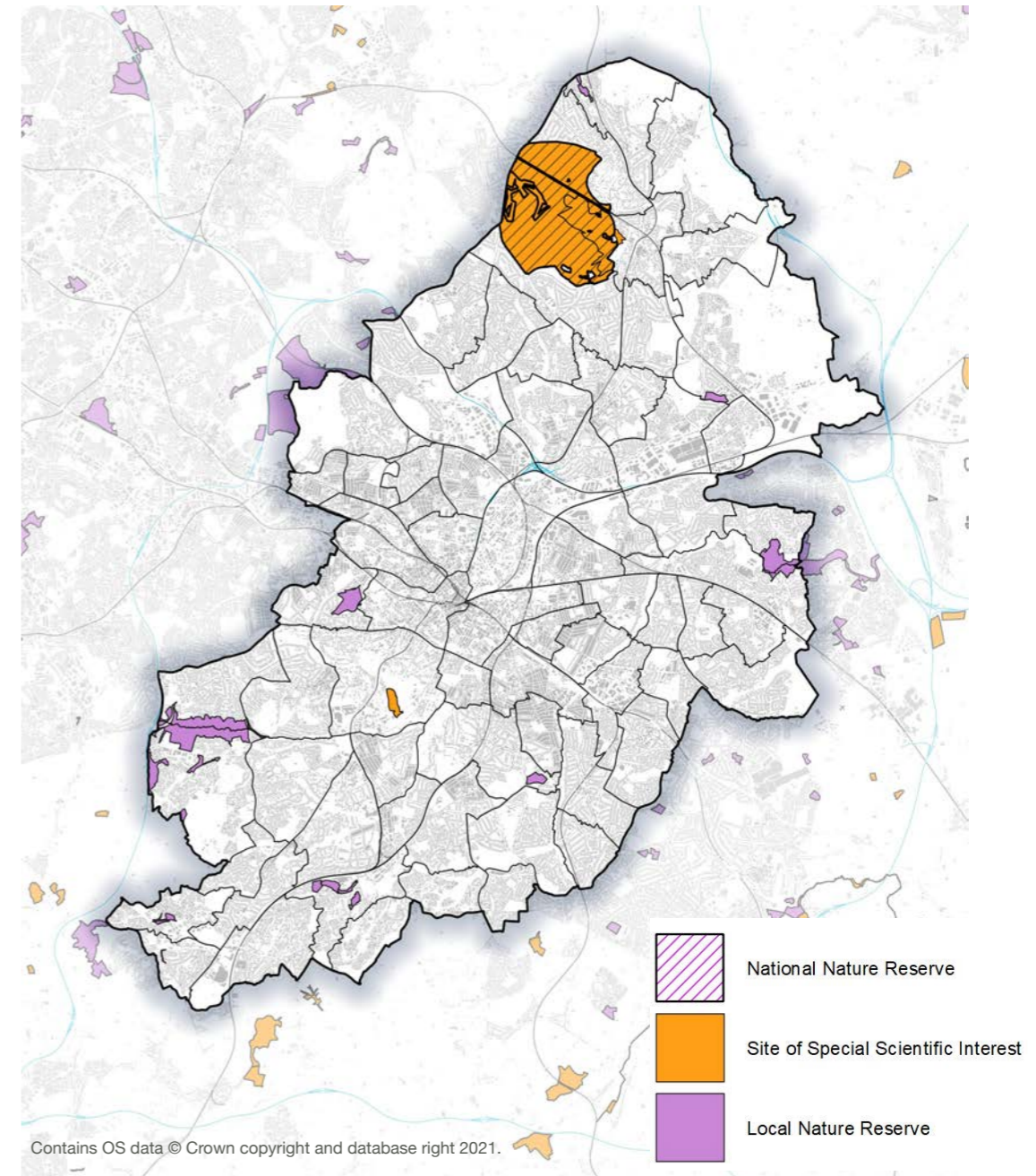


Figure 20: Map of Birmingham's Nature Reserves, SSSI's and other public areas

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	No natural areas management plans or implementation in effect.	Only reactive management efforts to facilitate public use (e.g., hazard abatement, trail maintenance).	Management plan in place for each publicly owned natural area to facilitate appropriate public use.	Management plan for each publicly owned natural area focused on sustaining and, where possible, improving overall ecological integrity (i.e., structure and function) – while facilitating appropriate public use.

R13 Tree Risk Management

Risk management is vital in an urban setting; the number of people interacting with trees on a daily basis increases the likelihood of incidents involving trees. Risks of trees include falling branches, toxic/poisonous leaves, berries seeds etc., pollen (inducing hay-fever), roots uplifting pavements (trip hazards) and pests (i.e. Oak processionary moth).

These risks must be assessed and a strategy implemented to minimise the risk to people. Naturally, one of the best ways to reduce risk is to avoid certain situations during species selection and planting. Avoid planting trees with toxic fruits in areas frequented by children and dog-walkers. Some pests can be eliminated before they become a problem using pesticides/fungicides and biological controls. Giving trees a reasonable amount of space and deep soil around the base to allow roots to spread comfortably will reduce the likelihood of upheaval.

Existing trees and new plantings should be monitored to spot these issues early and prevent any further risks developing. A system should be implemented to ensure that all trees have a routine assessment at regular intervals, and methods of risk reduction and management are well known and well executed. Zoning is a practice whereby landowners and managers define areas of land according to levels of use. This prioritises the most used areas, and contributes to a cost-effective approach to tree inspection, focusing resources where most needed. Inspection methods and frequency may vary depending on whether the management strategy is intensive or extensive.

Sources and references:

National Tree Safety Group. 2011. Common sense risk management of trees. Forestry Commission

Zone	Tree Locations	Inspection Frequency and Methods
Zone 1-High Risk	Park perimeter adjoining a major/busy highway; Park entrances; Buildings; Main/well used paths/ driveways and seating areas; Car parks; Play areas; Work yards.	Trees within this zone would be inspected on an annual basis by a local site manager or other client officer.
Zone 2-Medium Risk	Park perimeter adjoining private / residential properties; Secondary paths/desire lines/routes; Amenity and/or sports areas.	Trees within this zone would be inspected every 5 years by a local site manager or other client officer.
Zone 3- Low Risk	Lightly used areas and routes; Designated woodlands (where conditions for Zone 1 + 2 do not apply); Any other areas not mentioned above	Trees within this zone will receive no formal inspection however for trees identified by local users as potentially hazardous an inspection record will be raised in POPI. This will be followed up by an inspection from a local site manager or other client officer.

Table 3: Current Risk Zoning Criteria and Inspection frequency from Birmingham's Site Zoning - Trees Policy

Actions

1. Develop an overarching Tree Risk Management Strategy that is audited externally;
2. Management strategy to be signed up to by all tree partners (eg: Calthorpe, Keir and BVT).

Priority	Responsibility for Action	For Review:
Low	1-2. The Tree Board and BCC	April 2022 - Medium term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Good	No tree risk assessment or risk management program. Response is on a reactive basis only.	Level I (limited visual assessment) inspection and follow-up conducted periodically.	Level II (basic assessment) conducted periodically, resulting in scheduled follow-ups.	Level II (basic assessment) conducted routinely, according to defined cycle and intensive follow-up (i.e., priorities and timelines for mitigation established based on the characterisation of risk).

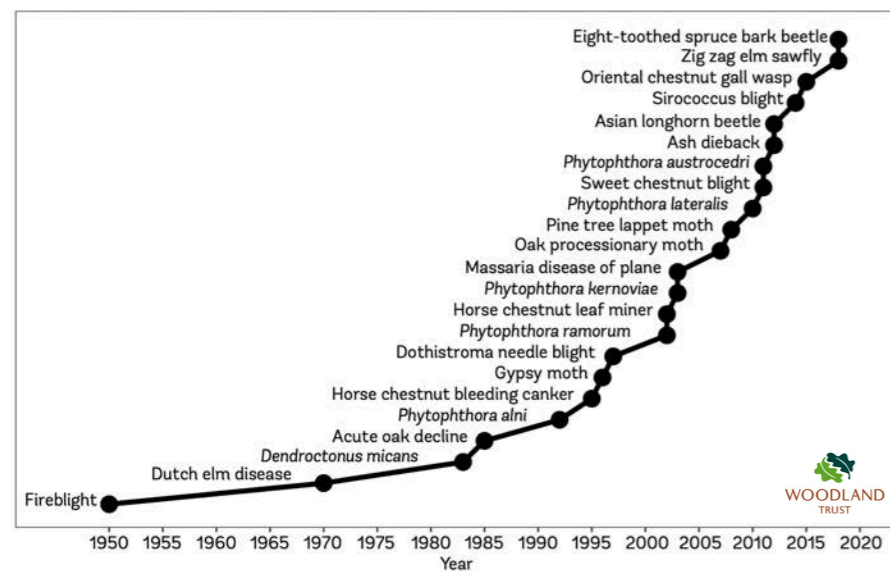
R14 Biosecurity

Biosecurity refers to the need to prevent new pests and diseases being introduced into the UK from abroad. This measure is necessary to stop the spread of potentially devastating organisms and protect forestry, agriculture and horticulture. In recent history, the introduction of Dutch Elm Disease (*Ophiostoma novo-ulmi*) decimated the English elm population, killing 20 million mature elm trees between its introduction in the late 1960's and 1980. By 1990, this figure had risen to 25 million, over 85% of the British population. Now, Ash Dieback (*Hymenoscyphus fraxineus*) is sweeping through the country and will likely kill off 80% of ash trees across the UK.

These diseases and others have had and will continue to have a profound effect on trees and woodlands in Britain. Native tree species provide a vital habitat for many other species and without them there would be a huge ecological deficit.

The importation of trees, particularly large landscape trees, from across Europe and elsewhere can increase the risk of diseases being introduced to the UK. The 'Plant Health Portal' run by Defra provides information, guidance and management strategies in relation to management and reduction of impacts from pests and diseases within the UK. Stringent importation rules are in place to attempt to mitigate this risk factor, and actions needed to protect plant health are set out in 'Protecting Plant Health - A Plant Biosecurity Strategy for Great Britain'.

Birmingham must take responsibility for the sourcing of its trees, and actively work to eliminate pests and diseases from its urban forest and prevent new diseases becoming prolific.



Sources and references:

Brasier, C.M., 1996. *New horizons in Dutch elm disease control*;

Defra, 2014; Defra, 2018. *A Green Future: Our 25 Year Plan to Improve the Environment*;

The Woodland Trust: *State of the UK's Woods and Trees 2021*.

The UK's 25 Year Environment Plan sets a biosecurity target;

'We will enhance biosecurity to protect our wildlife and livestock, and boost the resilience of plants and trees. We will do this by:

- Managing and reducing the impact of existing plant and animal diseases; lowering the risk of new ones and tackling invasive non-native species.
- Reaching the detailed goals to be set out in the Tree Health Resilience Plan of 2018.
- Ensuring strong biosecurity protection at our borders, drawing on the opportunities leaving the EU provides.
- Working with industry to reduce the impact of endemic disease.'

Actions

1. Write a Biosecurity Strategy for the urban forest;
2. Incorporate biosecurity into the SPD;
3. Support local community tree nurseries;
4. Work closely with UK tree nurseries to develop a 20 year tree supply plan based on a tree planting strategy.

Priority	Responsibility for Action	For Review:
High	1-4. BCC	April 2022 - Medium term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Low	No biosecurity strategy or actions in place for urban trees.	Some consideration of biosecurity aspects, e.g., through pest management.	Biosecurity management actions are integrated in urban forestry.	Biosecurity strategy developed and implemented, with emphasis on urban trees. Integration of this into day-to-day urban forest management.

03 Targets, Priorities and Actions

R15 Urban Wood and Green Waste Utilisation

Trees are a resource in many ways, from providing ecosystem services like carbon storage and pollution removal to bearing fruits and supporting wildlife. Often when a tree dies the branches are chipped and the bigger pieces go to landfill.

However a tree's value as a resource does not necessarily end when the tree dies or requires felling. BCC routinely process and supply wood for energy from biomass. A trial biochar manufacturing plant is also close to completion.



Figure 22: Uses of Urban Wood

Actions

1. Commission research on further urban timber and resources utilisation beyond biomass;
2. Create and present a business plan / case for UF resource utilisation.

Priority	Responsibility for Action	For Review:
Low	1-2. The Tree Board	April 2022 - Medium term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Good	No utilisation plan; wood and other green waste goes to landfill with little or no recycling and reuse.	While most green waste does not go to landfill, uses are limited to chips or mulch.	The majority of green waste is reused or recycled – for energy, products, and other purposes beyond chips or mulch.	Comprehensive plan and processes in place to utilise all green waste one way or another, to the fullest extent possible.

R16 Native Vegetation

The urban forest is a diverse place, consisting of a range of trees and plants from all over the world. Whilst diversity is key to a healthy treescape, native plants should be considered and encouraged. Native species of trees, shrubs, fungi, ferns, insects, mammals, birds and more have evolved together in the UK, each finding and filling an ecological niche in which to thrive. The balance between species in an ecosystem is delicate, and just one missing link could tip the system out of balance.

Trees provide habitats for a whole range of species. In the UK, English oak (*Quercus robur*) supports more organisms than any other tree; more than 1,000 insect species have been identified to date on oaks in central Europe, with a total of 2,300 different species relying on oak in the UK. Ash (*Fraxinus excelsior*) is frequently used as a nesting site for birds such as the redstart, nuthatch and owls, and the bark is important for certain lichen due to its pH. Without native trees, other native species may struggle to find suitable habitats and therefore suffer.

Using native species benefits British ecosystems more than other species from across the world, however their use should be carefully considered. Climate change is a serious issue as trees may struggle to adapt to such a rapidly warming climate. Larger areas of planting are more resilient, leaving individual trees, new plantings, hedgerow trees and trees on free-draining soils to be most at risk from climate change. Though native trees are preferred, the 'Right Tree, Right Place' guideline should be followed to ensure the best possible choice of tree species for urban planting, both presently and into the future.



The Woodland Trust have a list of common British [native trees](#), and an [inventory of ancient trees](#) on their website.

Sources and references:

PuRpOsE: Protect Oak Ecosystems, 2019. <https://protectouroaks.wordpress.com/work-packages/wp4/purpose-impact-event/>

<https://herbaria.plants.ox.ac.uk/bol/ancientoaksofengland/distribution>

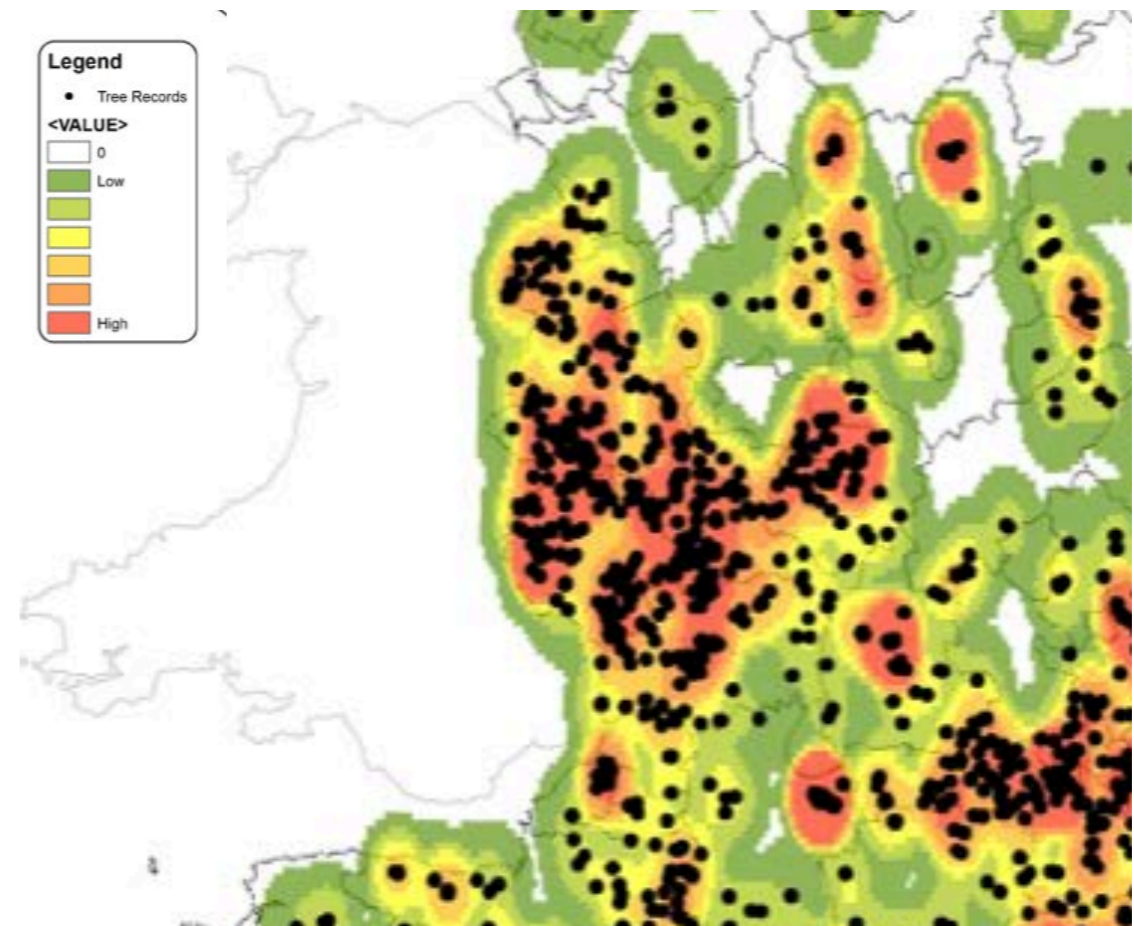


Figure 23: Distribution of ancient oak across Birmingham and the Midlands

Actions

1. Make sure native trees are considered in tree policies and local plans.

Priority	Responsibility for Action	For Review:
Low	1. The Tree Board	April 2022 - Medium term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Good	No coordinated focus on native vegetation.	Voluntary use of native species on publicly and privately owned lands; invasive species are recognised.	Use of native species is encouraged on a project-appropriate basis in all areas; invasive species are recognised and discouraged on public and private lands.	Native species are widely used on a project-appropriate basis.

R17 Research and Development

Birmingham's Urban Forest Master Plan is the first of its kind in the UK. This puts Birmingham in a unique position to coordinate research into the management of its urban forest as a whole. Developing a working relationship with strong research institutions such as the Birmingham Institute of Forest Research (BiFOR), Forest Research, Birmingham University and others is an excellent way to further improve understanding of the urban forest and its management, not just in Birmingham but across the UK.

Research institutions such as BiFor and various universities may have access to additional funding, and be able to commit more time which could help Birmingham to achieve the targets, priorities and actions set out in this action plan. They can support urban forestry in the city e.g., by engaging both researchers and students, offering the mutual benefit of developing Birmingham's urban forest in a learning lab.

In addition to this, efforts should be made to identify relevant international research that can support Birmingham's urban forestry program, for example by engaging in international networks like ISA, Tree Cities of the World, and the Biophilic Cities Network.



Actions

1. Liaise with BiFor, Universities and Forest Research joint research projects;
2. Identify work packages that could go to Masters students, PHD's, etc.

Priority	Responsibility for Action	For Review:
Medium	1-2. The Tree Board	April 2022 - Long term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Low	No coordinated focus on research.	Some coordinated focus on research, and participation in / contracting R&D on a case-by-case basis.	Frequent coordination and assigning of research and development in support of urban forestry.	Birmingham has a clearly defined agenda for research which it requires to help further its ambitions under the UFMP. It is engaged with other leading institutions on research programs.

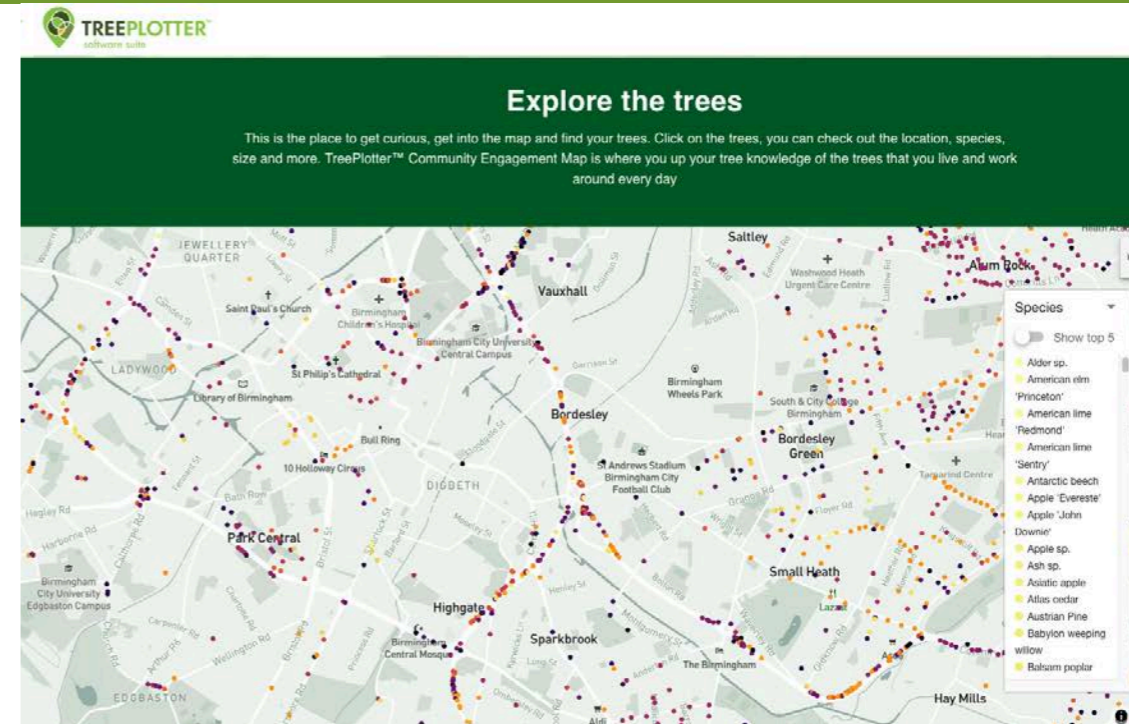
03 Targets, Priorities and Actions

R18 Open Urban Forest Data and Web-map (Management and Assessment Tools)

Management and assessment tools are fundamental and indispensable when considering a resource as vast as the urban forest. Being able to clearly see tree data would help the urban forest management team keep track of the trees, and make the public aware of them and their value.

A Web-map is an interactive tool for displaying information to the public about the urban forest, and data can be broken down by ward. They can display a range of things including tree benefits such as canopy cover, annual ecosystem benefits (avoided runoff, carbon sequestration, air pollution removal), and tree condition, to name a few. They are an excellent way to engage with the public and communicate benefits of trees.

In creating a public web-map, tree data could be easily communicated and compared. Ideally the tool will be accessible, easy to use and comprehensive for the entire urban forest of Birmingham. The data should be kept up to date with the most recent reviews of the urban forest.



Actions

1. Research and compare other Urban Forest Web-maps;
2. Assess what information should be displayed for Birmingham and collate data;
3. Proceed with building a web-map suitable for public use.

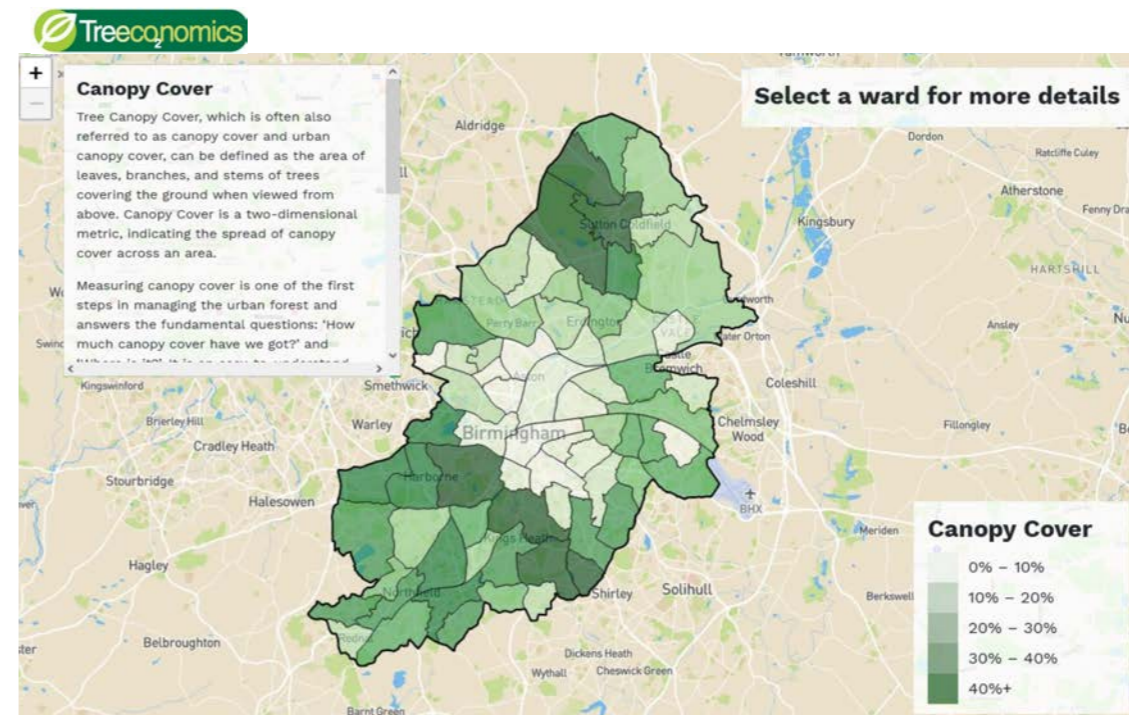


Figure 24: Web-maps for Birmingham Featuring Canopy Cover Data

Priority	Responsibility for Action	For Review:
High	1-3. The Tree Board	April 2022 - Short to medium term project

Performance level	Performance Indicators			
	Low	Moderate	Good	Optimal
Moderate	No specialist urban forest management software.	Information on some elements of the urban forest is available through a Web-map.	Large parts of the city's urban forest are presented through Web-maps.	Birmingham has a clear and openly accessible tree management portal for all tree data.

Section 4

Glossary

Acronyms**B&BC** - Birmingham and Black Country**BCC** - Birmingham City Council**BSI** - British Standards Institution**BTP** - Birmingham Tree People**BTFL** - Birmingham Trees For Life**BUFMP** - Birmingham's Urban Forest Master Plan**CAVAT** - Capital Asset Valuation for Amenity Trees**DBH** - Diameter at Breast height**ISA** - International Society of Arboriculture**LPA** - Local Planning Authority**NFI** - National Forest Inventory**NGO** - Non-Governmental Organisation**NTSG** - National Tree Safety Group**NTM** - National Tree Map**RTC** - Relative Tree Canopy**TB** - Tree Board**TPO** - Tree Preservation Order**TDAG** - Trees and Design Action Group**USDA** - United States Department of Agriculture**Glossary of terms****Arboriculture**- The selection, production, planting, maintenance, and removal of all woody plants for amenity purposes.**Biodiversity**- A measure of biological variation, whether represented by gene, species, habitats or ecosystems.**Biosecurity**- A set of precautions to reduce the risk of accidentally introducing or spreading alien invasive species, including potential pests and pathogens.**Canopy Cover**- A 2-dimensional metric quantifying the area of ground covered by tree canopy when viewed from above, where tree canopy is the collective branches and foliage of the tree.**Carbon sequestration**- Processes that remove carbon from the atmosphere.**Carbon storage** - The amount of carbon bound up in the above-ground and below-ground parts of woody vegetation.**Community forestry**- Addresses the social benefits of the urban forest: community pride, community planting and care projects, reduction of violent crimes and a sense of safety.**Conservation**- Use, management and protection of natural resources that insures use and enjoyment for future generations**Diameter, breast height (DBH)**- The diameter of a tree at around 1.5 metres above ground level.**Ecosystem Services**- The ways in which humanity relies on ecosystems for the continued provision of clean air, drinking water, an equitable climate, the productivity of agriculture, forestry and oceans, control of flooding, soil erosion, coastal erosion, carbon sequestration etc.**Ecosystem**- A unit of ecology consisting of a more or less discrete community of species, interacting with each other and their physical environment.**Environment**- The prevailing conditions which reflect the combined influence of climate, soil, topography and biology (other plants and animals) present in an area.**GIS (Geographic information system)**- A collection of computer hardware, software, and geographic data for capturing, storing, updating, manipulating, analysing and displaying all forms of geographically referenced information.**Green infrastructure (GI)**- An interconnected network of waterways, wetlands, woodlands, greenways, parks, forests, and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources and contribute to health and quality of life. Includes parks, parkways, riparian buffers, residential landscaping, street trees, rain gardens, green roofs, and window boxes.**Green roof**- A specially designed roof that incorporates plants. Depending on the structural capacity of the building, depth and type of soil, and desired maintenance. Green roofs can be planted with anything from sedums to trees.**Green space**- Any vegetated land or water within an urban area that serves as recreation or open space. This includes neighbourhood and regional parks, gardens, cemeteries, playing fields, bike and walking paths, and urban landscaping.**Greenway/green corridor**- Corridor composed of natural vegetation. Greenways can be used to create connected networks of open space that include traditional parks and natural areas.**Habitat**- Food, water, shelter and space that supports plant or animal life.**Impervious surface**- A hard surface (such as a car park or rooftop) that prevents infiltration of water into the ground, causing water to run off the surface.**Infiltration**- The downward movement of water from the land surface into the soil.**Inventory, Tree**- Gathering of accurate information on the health and diversity of the community forest which can include: listing and description of trees and planting sites.**Microclimate**- The climate of a site as modified by local site factors.

Continued...

Native Species- Species present in a defined region for a certain amount of time without having been brought by humans (cf. exotic), for instance in Britain since the English Channel was flooded around 6,000 years ago.

Non-native species- A species that due to direct or indirect human activity occurs in locations beyond its known historical or potential natural range. Refers to species from another continent, region, ecosystem, or habitat.

Pollution- Substances introduced into the environment by human actions that contaminate the environment.

Stormwater runoff- Precipitation that falls on impervious surfaces (such as roofs and roads). Because it is not absorbed by soil and vegetation, it flows into storm drains.

Subsidence- In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain clay soils dry out, sometimes due to the extraction of moisture by tree roots.

Tree Protection Order (TPO)- A legally enforceable document made by the local planning authority to protect trees and woodland in the interests of public amenity. While trees in conservation areas are automatically protected, individual trees outside these areas may be protected with a Tree Preservation Order.

Urban Forest- Trees, woody shrubs, hedges, herbaceous plants, waterways, wildlife, grasses, and other green infrastructure (including green roofs, green walls etc.) within the built environment, considered collectively over an extensive area.

Urban heat island effect- A phenomenon where air temperatures in urban areas are 2-10°F hotter than surrounding rural areas due to the high concentrations of buildings and pavement in urban areas.

