



Resilience through canopy cover

Chair: **John Rose**, Senior Urban Forest Consultant, TreeCo2nomics

Theory:

An overview of the TDAG First Steps guides

Deanne Brettle, PhD candidate, University of Birmingham and lead author

A strategic approach to canopy cover – First Steps Part 1

Hannah Walker, Urban Forest Research Scientist, Forest Research

How accurately can we predict canopy cover projects?

What are the uncertainties and how much does accuracy matter?

– First Steps Part 2

Luke Fay, Managing Director, Treework Environmental Practice

Delivering in practice and its impact

Chris Leyland, Tree Officer, Oxford City Council

James Gregory, Tree Officer, Cornwall Council

Partners: Arboricultural Association, Institute of Chartered Foresters, Landscape Institute, Urban Design Group

POLICIES AND STRATEGIES

With thanks to all and especially David Long

SHEFFIELD TREES AND WOODLANDS STRATEGY 2018-2033 (published in December 2018):

<https://www.sheffield.gov.uk/parks-sport-recreation/trees-woodlands-strategies>

SHEFFIELD'S TREES: MEASURING THE EFFECTS AND BENEFITS OF THE URBAN FOREST' (published in January 2021):

<https://www.treeconomics.co.uk/wp-content/uploads/2020/12/Sheffield-i-Tree-Eco-report.pdf>

STREET TREE PARTNERSHIP STRATEGY' (published in July 2020):

<https://sheffieldstreettreepartnership.org/sst-strategy/>

<https://www.wildsheffield.com/getinvolved/sheffield-street-tree-partnership/>

SHEFFIELD STREET TREE STRATEGY DEVELOPMENT GROUP I-TREE ECO STRATIFIED INVENTORY REPORT' (published in March 2020):

<https://www.wildsheffield.com/wp-content/uploads/2020/03/FINAL-Sheffield-Street-Tree-Strategy-i-Tree-Eco-Inventory-Report.pdf>

THE ORIGINAL SHEFFIELD STREET TREE PARTNERSHIP WEBPAGE:

<http://web.archive.org/web/20211106223330/https://www.wildsheffield.com/getinvolved/sheffield-street-tree-partnership/>

Stirling Council has a 20% target, see page 21 <https://www.stirling.gov.uk/media/qvrfvy3z/alive-with-nature-plan-2021-45.pdf>

The Tree Council's Trees & Woodlands (including Hedgerows) Strategy Toolkit is also excellent and soon to finish and launch our county H-THaWS (Herefordshire) A Trees and Woodland Strategy Toolkit for Local Authorities

REFERENCES

First steps in Urban Tree Canopy Cover <http://epapers.bham.ac.uk/4369/>

FORESTRY COMMISSION (JULY 2019) - comment on the necessity to have a felling licence: <https://www.gov.uk/government/publications/alleged-illegal-tree-felling-investigation-report-sheffields-streets-ahead-programme>

Quote:

“a statutory ‘power’ to do something is insufficient to engage section 9(4)(b). There must be an imperative to do something, not just the option to do it.”

“However, the FC has identified a number of areas regarding the Streets Ahead programme where SCC has fallen far short of good practice. these include record keeping, engagement and consultation, tree management techniques and contract management. FC believes SCC, and other LOCAL AUTHORITIES, MUST TAKE NOTE of these lessons learnt for future operations.”

At the same time, the Forestry Commission published an operations note on highway tree management to provide an updated good practice guide for highway tree management: <https://www.gov.uk/government/publications/highway-tree-management-operations-note-51>
NB. FC with TDAG and others are developing technical drawings for street tree planting.

<https://www.carbonbrief.org/global-soil-moisture-in-permanent-decline-due-to-climate-change/>

Handbook of UK Urban Tree Allometric Equations and Size Characteristics_v1.4
<https://www.treeworks.co.uk/treework-allometry-sp/>

THE DIFFERENCE BETWEEN ACCURACY & PRECISION

A useful diagram to illustrate the difference can be found in:

Lawson, M. and Winser, G., Residential property evaluation and climate change modelling: https://web.archive.org/web/20230425045010/https://propertyriskinspection.co.uk/wp-content/uploads/2023/01/JBSAV-Vol-11-No3-_Residential-property-evaluation-and-climate-change-modelling.pdf

Where can we get more info on the calculator that Cornwall is using?
<https://cecenvironment.co.uk/news/tree-canopy-calculator/>

Emma Ferranti:

I spend my life mapping the West Midlands. If this is of interest, please let me know <https://www.wmca.org.uk/what-we-do/environment-energy/adapting-to-climate-change/climate-risk-and-adaptation-data-and-intelligence/>

The Network Rail mapping work I mentioned is also taking place in the WM, and linking in with the LNRS as much as we can

Details of the 'chat' discussion with additional references continue below.

QUESTIONS AND COMMENTS

Are there local authorities here with mandated canopy cover targets?

But I'm seeing more and more street tree planting replacing large tree's that provide proper shade to large areas and houses, to small cherries etc. Which only provide a bit of shade at the pavement level and doesn't produce the street level cooling needed

- Why do you think that is? Do you think that people are 'afraid' of large growing trees even where there is space?
 - I do think that's part of our, but I'm not part of the local council so I don't know for sure. It's frustrating as the whole feel of street lines trees are going to change and we will lose the vital cooling in the long term with the

For those of us who are not expert, how do we determine which mapping system to use and how do we assess confidence in the results?

Has anyone overlaid canopy cover mapping with surface water flow maps to show potential for dual flood reduction and tree benefits to justify expenditure?

- Emma Ferranti:
We have overlain multiple layers to understand climate risk and vulnerability assessment, but have not focussed on these two layers. Sounds like a good student project :-)
- The method uses open access dataset and is open access. Any local authority or region should be able to replicate the approach in GIS <https://doi.org/10.1016/j.cliser.2024.100521>
- TreePlotter Canopy uses multiple datasets to plan planting projects by priority indicators such as flood risk, or urban heat island etc and understand potential ecosystem benefits <https://support.treeplotter.com/knowledge-base/treeplotter-canopy-overview/>
- National Tree Map is very good - but for a large 'shire' county is expensive and the Bluesky updates can take 15-0 years to recover whole county. Also with some 10 million trees you need some serious GIS analysis software and top-notch hardware!

- It's worth checking the data collection date when you use National Tree Map data, in case you see the spring-time effects
- Blue sky is great but fails when trying to establish number of trees which needs to be backed up by ground-based inspection.
 - We used Bluesky to establish a base line, identified a hierarchy or priority areas and set ourselves a realistic target to go from 10% to 13% canopy cover on our estates by

Can 3d LiDAR data be better used to understand allometric relationships for key tree metrics

- Hannah Walker:
Terrestrial LiDAR: a three-dimensional revolution in how we look at trees - Disney - 2019
New Phytologist - Wiley Online Library

Targets made be set, but space for tree planting - are can the two align? Also at what point will the canopy cover be measured i.e. planting + x years?

Are any cities using algorithms for species recognition based on arial or street view data?

- Yes. Forest Research, for example, are part way through a Platanus mapping project, using machine learning to interpret spectral signals. There are many other examples. It has promise, but it has to be species by species at the moment, because there is so much diversity in urban forests, both in terms of tree species, and land cover (which affects the signals)

Are there any methods to calculate canopy cover that is not yet on maps/using methodologies from base up (i.e., from bottom to top) of a growing tree (say 4 years old)?

On a development site level is there a conflict between canopy cover targets and BNG requirements. Can we achieve both? I rarely see an increase in canopy cover and asking the developer to show this seems quite difficult.

- Following this...should canopy cover be linked to health and wellbeing needs of people with the importance of access to nature for people especially on housing developments or is does this emphasise the need for adopted, evidence-based tree strategies so that LPAs can provide clear requirements for development
- <https://pmc.ncbi.nlm.nih.gov/articles/PMC8603199/>

Does anyone have a link to a resource I've heard of from Forestry Commission that considers 'shoot extensions' I've heard about it but can't seem to find it

- The very old FC shoot extension publication is weakly executed and not relevant to projecting canopy cover. I have a copy, I'll email it, and highlight its flaws relating to the task in hand.

Looking for some cutting/graft wood for Lucombe Oak if anyone has any contacts or knows of any work to a true Lucombe Oak that I could obtain some stock from I'd love to hear.

jbisset@herefordshire.gov.uk

Want to plant in some Registered Parkland and for my local Tree Warden Network.

Wonder if surveys could be implemented using drones?

- Drones can be used but there are limitations around where they can be flown and the area over which they can cover. Processing the imagery and extracting the data can be time consuming. But they give much better accuracy than satellite imagery.

What are the allometric equations and can they help us in predicting carbon sequestration capacities of tree canopy?

I work for a Community Forest and we have carried out extensive mapping to understand where we could plant, where we need to prioritise planting and the value £ of this, a GIS specialist has been critical to this. We have explored the ability to achieve a 30% TCC cover by 2050, but at the already ambitious planting rate of 200ha a year for the region this would take us over 140 years to achieve this. Ambitious targets need to be understood in terms of being intergenerational. We are focusing on access to woodland, prioritising based on need as well as tree canopy cover targets.

Cape Town's leafy suburbs are losing trees to severe weather and of course the Polyphagous Shot-hole borer - this adds to the complexity of predictions

Do canopy cover assessments get confused by other types of vegetation? Can canopy cover assessments be expanded to a more comprehensive urban nature loss/gain assessment?

- Hannah Walker:
Yes, definitely. Google version for example, sometimes classifies rough grass as trees, and it's hard to tell tree versus shrub by eye without any size information in aerial imagery. GLA have done both "trees" and "green" in their latest assessment.
- Bluesky is adding additional data to NTM that covers hedgerows and shrubby vegetation to differentiate from trees. But adds to the cost.....

How does the panel view the alignment of tree canopy growth metrics with the Woodland Carbon Code in the context of geospatial data for urban forestry strategies? Specifically, to support BS 5837 Tree Surveys and new tree planting plans?

Additionally, what are your thoughts on translating these results into a dynamic 3D tree growth tool? This tool would use machine learning to identify tree canopy growth trends and improve targeted assessments.

Does the Mitigation Hierarchy need more teeth ...generally and for retention of existing trees?

James, how do you model ash dieback into this brilliant target policy approach to using planning to fix sites one at a time where you have maximum leverage cost free?

Is there anyone in this meeting working with municipal level assessments of tree canopy damage resulting from armed conflict or natural disasters? If so, our working group for NBS in post-conflict reconstruction would love to hear from you. d.brasfield@wgin.org

How do Cornwall account for new trees in private curtilages in new development and their propensity for removal?

How has canopy cover performed on large strategic sites, especially those with limited initial cover? Have you encountered conflicts with BNG where grassland is valued higher than trees and if so, how have you dealt with this?

- James Gregory:
BNG takes priority over Canopy Policy

I think there is insufficient data for different species in different regions to produce reasonably accurate models to predict future dimensions at five or ten-year intervals. I don't believe modelling is good enough to account for the many different site variables, such as altitude, exposure & nutrient availability, etc. People thought about this decades ago and precious little progress has been made.

Perhaps predicting future change over time is not necessary if existing policies encourage and promote tree retention, maintenance and planting whenever and wherever appropriate. After all, if canopy change is mapped and measured at set intervals, people will be able to monitor and assess the success of policies and plans.

- Hannah Walker:
I would support this approach. Unfortunately we seem to be adept at putting hurdles in our way to getting trees in the ground in policies and strategies (views of heritage buildings, for example). It's so good to hear from Oxford and Cambridge where they are making genuine progress.