

The National Tree Map™

An Applications Guide



Abstract

The National Tree Map™ (NTM™) is the most detailed dataset of its kind, with coverage across the whole of England, Scotland, Wales, and the Republic of Ireland. It provides a comprehensive database of location, height, and canopy/crown extent for trees 3m and taller. There is a broad scope of applications for the data, with new uses regularly being discovered. This guide details examples of how customers working in different market sectors apply the NTM™ dataset.

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NTM™ Applications

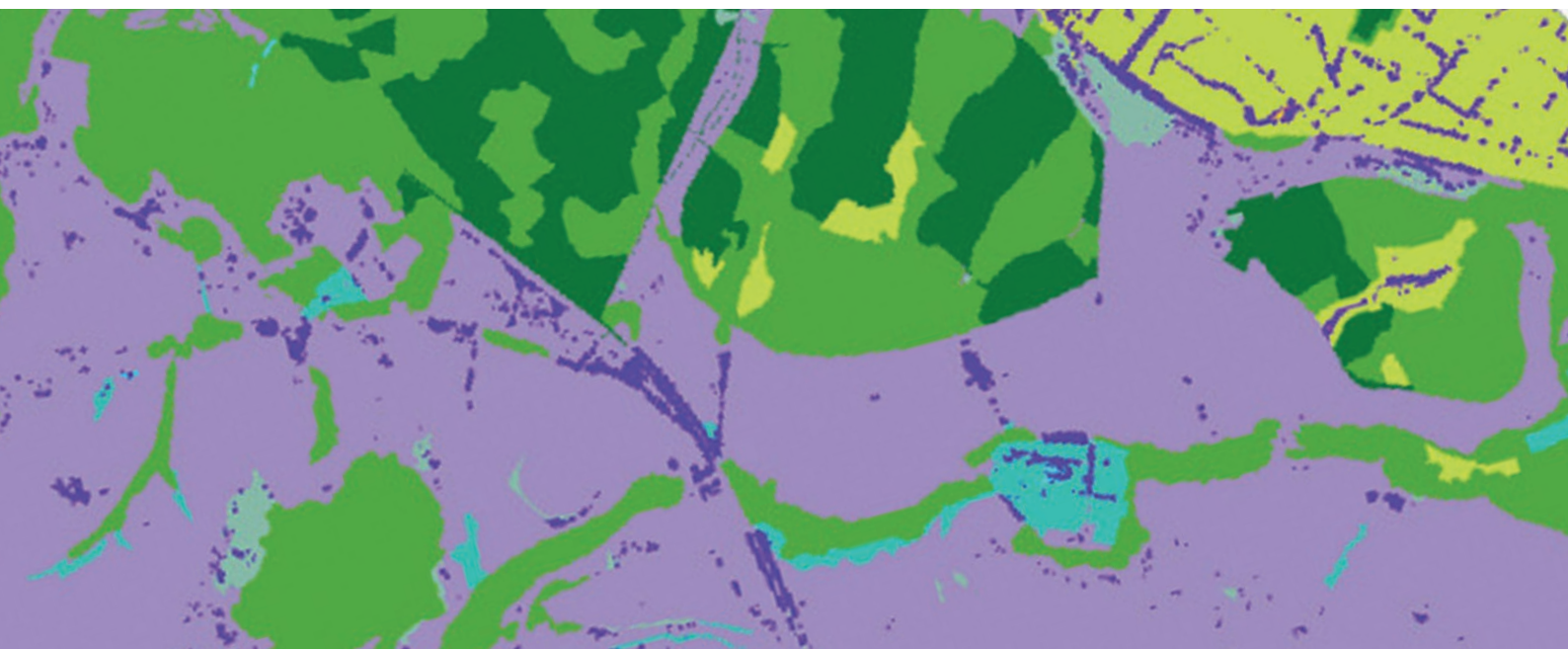
The National Tree Map™ (NTM™) is already being widely used as a tool supporting teams working in local authorities, planning, renewable energy, environment, architecture and design, insurance, utilities, forestry, and estate management. There is a broad scope of applications for the dataset with new uses regularly being discovered. Being able to access data such as location and size of trees can provide additional benefits to practitioners working in many market sectors.

Applications of NTM™ include:

- Carbon capture calculations
- Public tree stock management
- Urban forestry planning
- Insurance and risk
- Environmental modelling
- Managing tree inspections
- Identifying tree planting sites
- Asset management

The examples below not only highlight current use cases but also offer suggestions for potential applications, highlighting the versatility of the dataset.





Calculating carbon capture from trees becomes more accurate with a comprehensive dataset like NTM™. Understanding the location and size of trees, whether they stand alone, in small groups, or contribute to woodlands or forests, plays a crucial role in this process.

A project led by the United Bank of Carbon (UBoC), in collaboration with the University of Leeds and funded by the White Rose Forest, illustrates the impact of single or small groups of trees on carbon uptake figures in West and North Yorkshire. The study revealed that approximately 40% of the existing tree canopy cover in the White Rose Forest consists of lone or small groups of trees.

Traditionally, carbon capture from trees has been calculated using canopy areas of larger forests and woodlands, relying on data

from the National Forest Inventory. NTM™ revolutionises this approach by significantly expanding the available data. It stands as the only comprehensive dataset of tree canopy coverage, encompassing information about lone trees, those in small groups, as well as wooded areas.



For anyone involved in the management of trees, from Local Authority practitioners to agriculturalists and ecologists, having accurate information about tree locations is essential. Many practitioners often rely on outdated or manually compiled data, leading to potential inaccuracies. The precise knowledge of the location and size of trees can bring numerous benefits, including Tree Preservation Order management, improved planning, accurate canopy cover statistics, and even the prevention of issues like blocked drains.

Wiltshire Council is using NTM™ to significantly improve its management of trees. Initially acquired to inform a countywide tree audit, the data is now proving an invaluable resource in the day-to-day operational management of trees in parks, woodlands, close to roads, and other Council-owned land. The tree officers use NTM™ daily, and it has enabled them to

respond promptly to resident's enquiries or complaints by identifying and locating specific trees. This capability empowers them to make well-informed decisions right from their desktops.

The accessibility of NTM™ through Wiltshire Council's online GIS map portal facilitates easy viewing and querying by various teams across the Council. The data can be overlaid with additional layers such as ownership maps and maintenance records, providing a detailed and comprehensive view. This not only helps in locating specific trees but also helps determine if they fall within the Council's responsibility. Furthermore, it allows for the assessment of the size and potential impact of trees without the need for resource-intensive site visits. This approach improves efficiency and contributes to more informed and strategic tree management practices.



Understanding and closely monitoring the environment has become increasingly important as we strive to reduce carbon emissions, identify carbon capture opportunities, and enhance the natural environment. NTM™ data plays a pivotal role in modelling and managing urban greenspaces.

An extract from the NTM™ is being used to create the UK's first Urban Forest Master Plan (UFMP). A partnership led by Birmingham City Council is looking at data from multiple sources, including NTM™, to take a long-term strategic approach to urban forest management and future-proof its treescapes. Containing a consistent, action-based strategy, the UFMP has been formulated with input from stakeholders across the city including the business community and residents.

Using NTM™, Birmingham City Council can establish a baseline for their urban

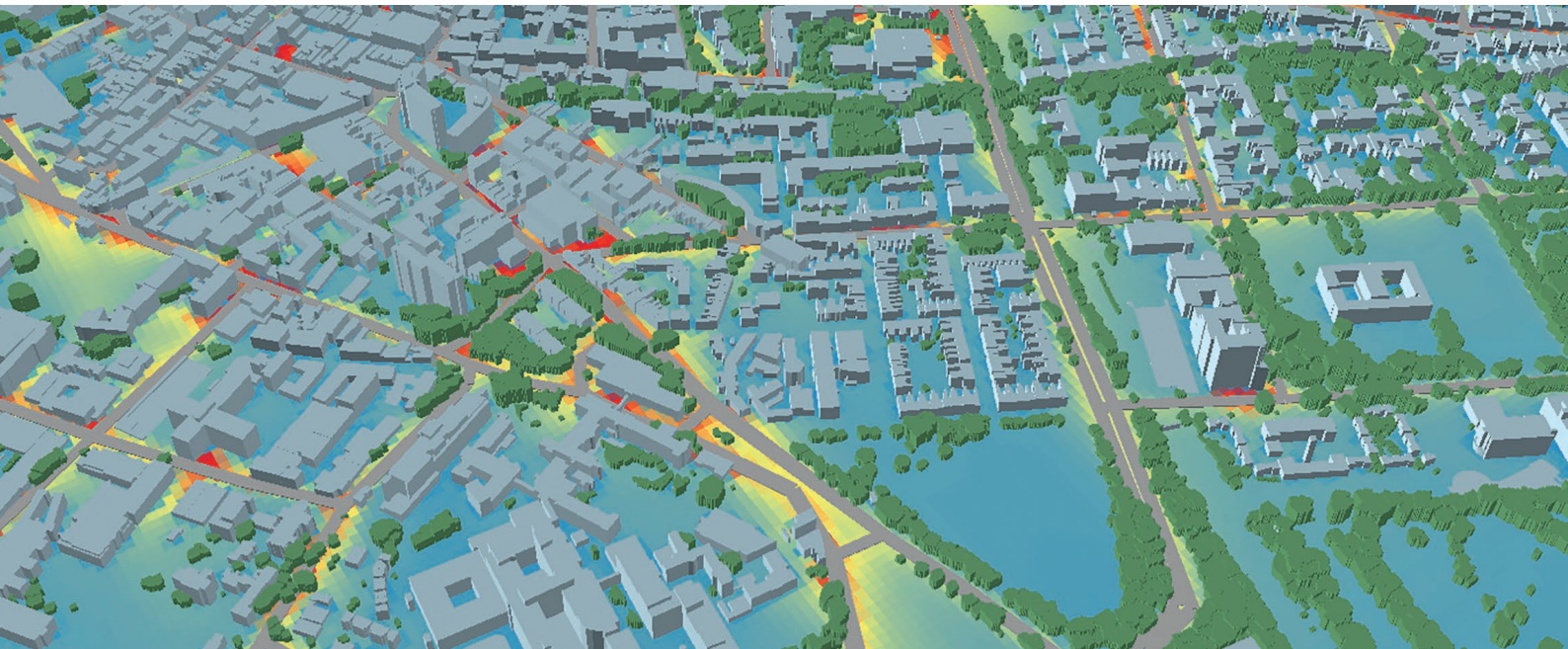
greenspaces and systematically monitor progress towards achieving equitable tree cover throughout the city. Birmingham faces unique challenges, with numerous wards ranking in the top ten percentile for deprivation and faces issues like air pollution, rising urban temperatures, and flooding. Despite these challenges, Birmingham is a two-time winner of the United Nations Tree City of the World. The city has more parks than any other in Europe, with an estimated 1 million trees. A quarter of these trees are in private ownership, and those under Council management include over 100,000 individually plotted non-highway trees, 75,000 trees along highways, and approximately 600,000 trees within woodlands. The UFMP, using NTM™ data, positions Birmingham to proactively address environmental challenges and advance sustainable urban forest management.



Building subsidence is a significant concern for the insurance industry, costing in excess of £500 million after each dry event year. Trees are implicated in 70% of reports of subsidence and heave, particularly on clay soil, with the Southeast being the most susceptible region in the UK. Trees exceeding 26 feet (8 meters) in height and sited within 33 feet (10 meters) of a property are the primary cause for concern. Mature deciduous trees have the capacity to draw up to 500,000 litres of water annually from the surrounding soil, leading to soil drying and foundation subsidence. Identifying the locations of these trees is crucial for insurance companies to effectively mitigate this risk.

WhenFresh has partnered with Bluesky to provide access to NTM™ data for insurers and other Big Data users through the UK's property 'Data Supermarket' via its

WhenFresh API. The proximity of trees to a property, coupled with its size, holds significant implications for insurers and mortgage lenders in terms of water drainage during hot, dry weather and the potential for tree roots to undermine property foundations, especially when considering the soil type in combination with these factors. This collaboration aims to provide valuable information to assess and manage the risk of building subsidence more effectively.



With the advent of Smart Cities, the modelling of our urban environment is becoming more commonplace. NTM™ provides a key component for the modelling process when it comes to understanding the relationship between buildings, trees and air flow or visual impact within urban landscapes. In certain scenarios, the impact of trees on the environment is comparable to that of buildings and roads.

NTM™ data has already proved successful after it was integrated into advanced air quality modelling software developed by a team at the University of Leicester. The NTM™ data demonstrates that the precise location of trees significantly influences the behaviour of air pollution, ranging from trapping pollutants in some situations to aiding air circulation and purification in others.

Trees can also impact other environmental factors including:

- **Noise** – trees act as natural barriers, shielding areas from noise pollution
- **Flooding** – tree root systems play a crucial role in reducing surface water rates by creating channels to the groundwater table, enhancing infiltration and helping mitigate flooding
- **Health** - not only do trees positively influence air quality but they also impact health triggering allergic reactions to tree pollen, however other studies indicate that access to trees and greenspaces significantly improves mental health.



Accurate tree location data significantly contributes to time efficiency and effective management. Precise knowledge of tree locations, and consequently, their potential impact on highways and buildings, helps to prioritise tree inspection plans. Even a small discrepancy in recording a tree's location can make a substantial difference in determining the priority for inspecting the risk it poses to infrastructure.

Leicestershire County Council is actively using NTM™ as part of its programme to enhance the safety of highways throughout the county. With responsibility for all A and B roads in Leicestershire, including busy routes like the A511 and the A606, the Council relies on NTM™ to gain insights into the county's trees along key routes.

Lucie Hoelmer, a Senior Environmental Partnership Officer at Leicestershire County

Council, emphasises the dataset's value, stating, "Knowing the height and likely size and age of trees is important as this helps us calculate the impact trees could have if they were to fall in the direction of the road. We have inspectors who are regularly checking the trees on Highway land, and they have a cycle of inspection, but the NTM™ data means we can ensure their work is prioritised by identifying where tall trees in close proximity to a highway are."

Additionally, the Council has identified further use applications for NTM™, including monitoring the county's overall tree cover. This multifaceted use of NTM™ demonstrates its versatility as a valuable tool in strategic planning and proactive management of the county's natural assets.



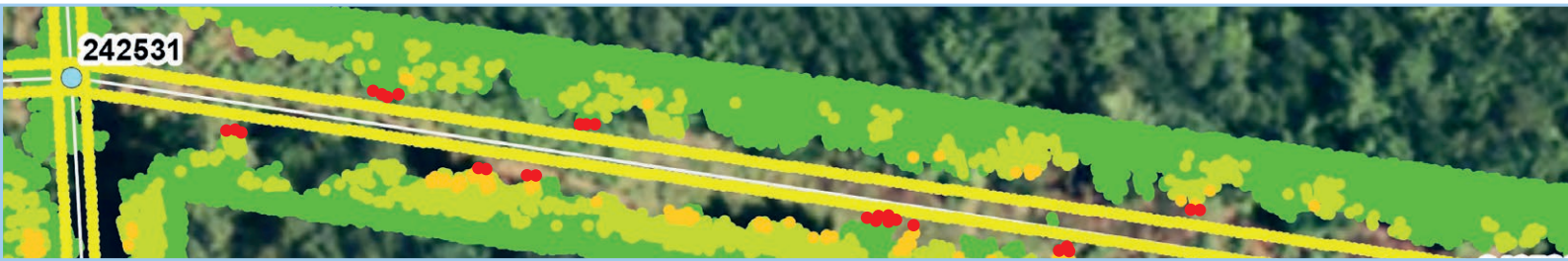
Geospatial data holds the key to understanding existing resources and identifying areas that require attention, such as locating suitable sites for tree planting. Using NTM™ data offers a modern alternative to traditional surveys, providing arboriculturists with detailed insights into the locations of existing trees without the need for extensive ground survey work. This, in turn, facilitates the planning of effective tree planting strategies.

Waterford City and County Council is using NTM™ in its efforts to benchmark current tree cover and identify suitable tree planting sites. As the council works towards becoming Ireland's first decarbonised city, NTM™ data is proving an important tool in informing policy decisions and budget allocations. Integrated into the City and County Development Plan for 2020-2028, NTM™ was

useful in calculating the percentage of tree cover across the city's 38 electoral divisions, covering an area of 42 square kilometres. Initial results revealed a current cover ranging from 2 to 21 percent, with an average of 12 percent.

To achieve a target canopy cover of 20 percent, the council used data from NTM™ alongside land use zonings from the Development Plan and land type classifications from Ordnance Survey. This comprehensive approach involves identifying suitable areas of land, such as recreational areas, open spaces, and road verges, for potential tree planting. Further analysis will consider factors like minimum planting areas and the growth potential of existing trees, contributing to a well-informed and strategic tree planting strategy in line with broader environmental goals.

Asset management



Overhead powerlines

Vegetation infringement on overhead power lines is one of the major causes of power outages in the UK. During severe weather events, falling trees can bring down or damage overhead cables. In addition, the effect of a tree brushing against a cable can also cause problems. NTM™ serves as a crucial tool for those responsible for maintaining clearance

around overhead lines, whether they are power, rail, or telecom lines. By highlighting the proximity of trees to these lines, NTM™ enables Distribution Network Operators (DNOs) to assess their network and put in place risk based cutting plans. This method of creating proactive cutting plans has been proven to save DNO's millions of pounds annually.



Railway lines

"Leaves on the line" is a common issue affecting rail lines so understanding the size and location of vegetation is of great value to railway operators in order to manage their

maintenance programme. Just like DNO's, effective targeting of maintenance crews saves considerable time and money.



Utilities

For utilities involved in the installation and maintenance of electricity, water, gas, and communication infrastructure, avoiding interference with cables and pipes is critical. Tree roots can cause substantial damage to water pipes, leading to water loss and disruptions for customers. Research conducted by Cranfield University has demonstrated that sewers are 1.4 times more likely to be damaged

if they are located in proximity to a tree and 1.8 times more likely if there are more than three trees nearby. This valuable evidence and insight into the damage caused by tree roots enable maintenance crews to target potential weak spots in infrastructure minimising major incidents. NTM™ plays a role in facilitating this initiative-taking and targeted approach to infrastructure maintenance.



Other applications

The applications of NTM™ extend beyond those highlighted above, showing the versatility of the dataset and value across various sections. Additional uses include:

- Line of sight mapping
- Ancient woodland management
- Improving biodiversity
- Tree surveying
- Flood alleviation mapping
- Urban design
- Green infrastructure planning
- Risk assessments
- Visualisation

You can find all Bluesky National Tree Map™ customer case studies on our website at bluesky-world.ie/our-work/case-studies/national-tree-map/