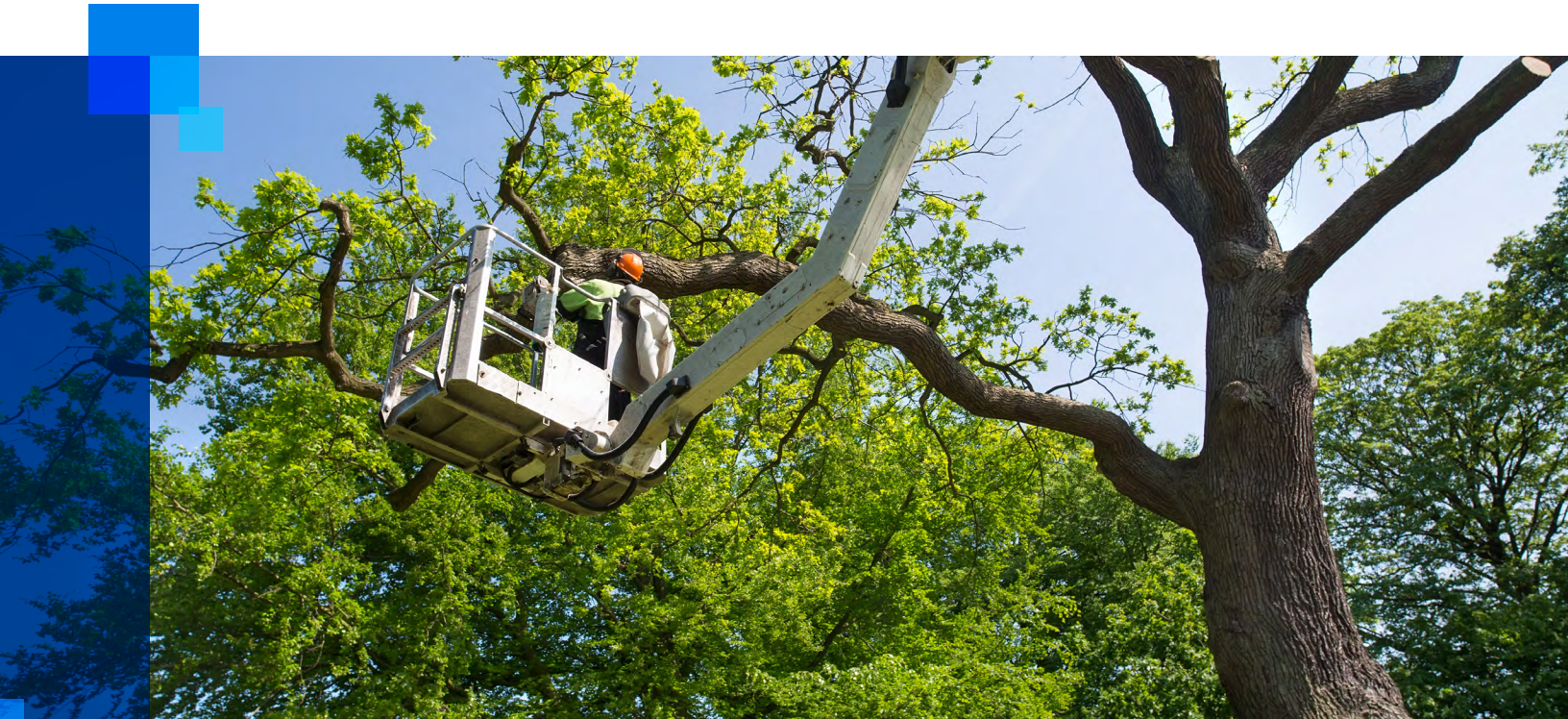


Advancing from
REACTIVE

to

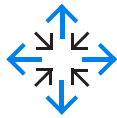
PROACTIVE
Tree Management



PlanIT Geo
developers of TreePlotter

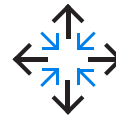
EASIER SAID THAN DONE

Many urban forestry programs would like to increase the amount of proactive tree management they do. Many more see it as an aspirational goal, but the realities of time, money, and personnel seem to confine that goal as purely hypothetical. This guide makes the case for why proactive tree management is worth pursuing and lays out a framework for how to get there. First, let's establish some definitions:



PROACTIVE TREE MANAGEMENT

Pre-planned actions coordinated and executed for a desired result, such as preventative tree maintenance or a neighborhood tree planting campaign.



REACTIVE TREE MANAGEMENT

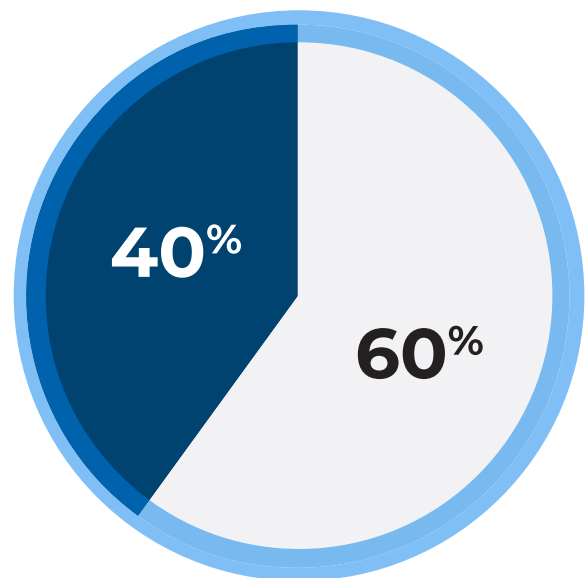
Actions completed "on-demand" because of unplanned events or community complaints, such as responding to a downed tree blocking a roadway.

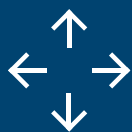
The urban environment is a difficult place to grow trees and there are heaps of unpredictable factors at play. Some reactive management will always be needed. However, taking proactive actions will shift the balance over time and shrink on-demand requests. While there is no official definition, one common qualifier of a proactive management program is to have at least 40% of operations be pre-planned.¹

THE PROACTIVE RATIO

60% reactive

40% proactive





Benefits of Proactive Management

Here are some of the reasons to build toward a proactive tree management program:



SAFETY

Tree problems are often taken care of before failure, reducing the risk to people and property.



COMMUNITY CONFIDENCE

Proactive work is often more visible to the community and complaint calls are systematically reduced.



EFFICIENCY

Get the most done with each day's available resources. Pre-planned work ensures the right crew with the right equipment is matched with the right job. Reactive work is often completed after hours and can be a significant drain on financial resources.



HEALTHIER TREES

Tree populations are healthier and live longer when structural problems are fixed faster and pests and diseases are identified earlier.



PRODUCTIVITY

Less time is spent on travel, clean up, and organisation.



SMARTER REUSE

Planned maintenance and removals make it easier to find reuse options for the brush and timber. This boosts the program's sustainability and adds a new source of income.



JUSTIFIABLE BUDGETS

Budgets based on known work requirements are more predictable and easier to advocate for.



TREE PLANTING

Tree planting is a pillar of proactive management. As tree removal occurs, a prioritised planting plan can follow. Additional planting sites can be identified and prioritised.



Proactivity in Practice

For an example of the advantage of proactive tree management, let's look at the City of Hume, a northwest suburb of Melbourne. In the early 2000s, they were cutting down around 3,000 trees per year, while planting just 400.²

“

Trees were managed reactively as individuals, planting and removal occurred without any strategic thought for the management of the urban forest.

Graham Dear, Open Space Coordinator at Hume City Council³

Reactive management was failing to protect and grow their urban forest, so a major change was needed. In 2006, they adopted the Hume Tree Management System (HTMS), which began a recurring inventory of all public trees. The city was divided into four zones, and each year one zone's trees are assessed. Certain high-risk areas (under power lines, near playgrounds, public buildings, and high use paths) are checked on an annual basis. Also recorded are potential planting sites and power line data. The effect of switching to a proactive management plan based on reliable, updated tree inventories has been profound.

During inventories, areas are flagged for further investigation for potential tree renewal. This creates an orderly process by which high-risk and problematic trees are removed and replaced, which has resulted in major reductions in line clearance pruning and reactive work requests. They are also planting more trees: 5,000 by the city and 5,000 to 10,000 from other urban development activities. Each newly planted tree is managed proactively, including:

- Establishment watering
- Mulch and weed management for the first 2-3 years
- Canopy lifting and formative pruning at years 2, 4, and 6

All work is logged and stored within the HTMS to track the program's effectiveness. This information is also valuable for budget requests, as the upcoming workload and available resources are well understood. Jason Summers, the Parks and Open Spaces manager at the time, reported at 1½ laps around the city (6 years) HTMS had advanced from being primarily a risk management tool to more focused on strategic management and forecasting of future urban forest requirements. As of 2013, the city had inventoried more than 160,000 trees.





The Transition Starts With A Tree Inventory

Imagine a transport company without any information on the condition of the trucks in their fleet. They are not even sure how many total vehicles they have. Purchases, servicing, major parts and vehicle replacement all occur without data. Without that information on their assets, there is no way they can operate efficiently. Their days are full of surprise delays and sudden breakdowns.

Trees are assets too, and managing them successfully requires having accurate information on their quantity and quality, and to get that you need to complete a tree inventory.

A tree inventory is when personnel on the ground assess trees in a defined area on a set of criteria and plot their location. They are not one size fits all operations. There are many variations in scope and execution matched to the needs and limitations of an urban forestry program.

Yes, a tree inventory is a significant undertaking, but the value of the information will be repaid for years to come as your program is empowered to take proactive actions leading to a safer, more beneficial urban forest. The cost of a tree inventory can be quite flexible, and the scope can be dialed up and down to offer the maximum information return on the capital available. Here are some of the primary considerations to plan a tree inventory that works best for your community:

WHAT TREES WILL BE INCLUDED

A full inventory will include all public trees in the community and therefore offers the truest measure of the health and needs of the urban forest. However, if the funds are not available for a full inventory there are other less comprehensive variations.

An approach growing in popularity over the last few years is the phased inventory. This is a full inventory completed in stages over several years as funds allow. Communities still get a comprehensive understanding of their tree needs but the financial burden is distributed over a longer period of time. The aforementioned City of Hume uses a four-year inventory cycle. The scope of a tree inventory can be narrowed down further to include only street trees, park trees, or trees in certain high-profile areas.

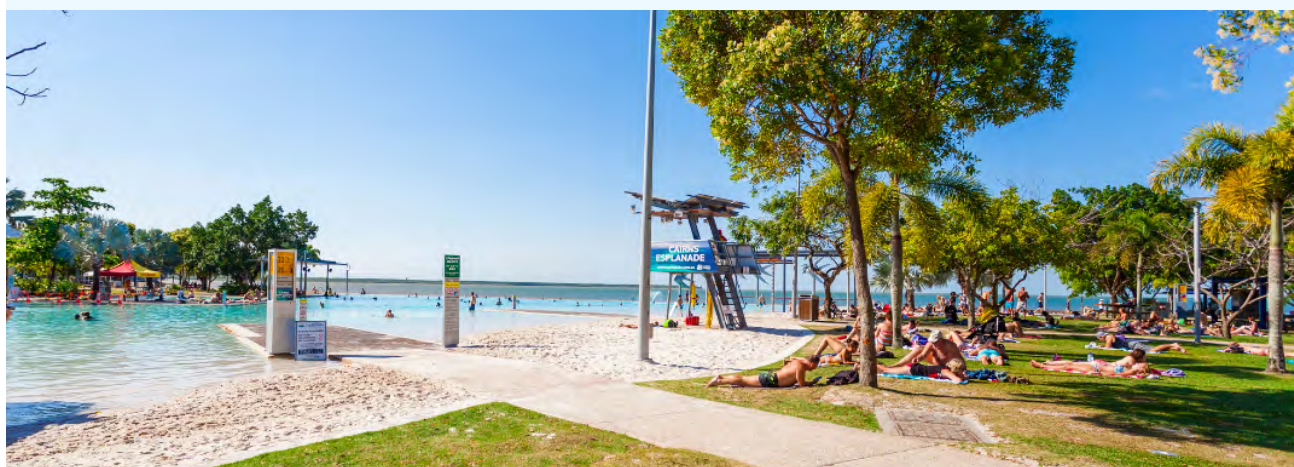


VOLUNTEERS OR PROFESSIONALS

A tree inventory can be completed by volunteers, interns, staff, or professional arborists. With training, volunteers can be a cost-effective way to get an initial inventory completed. This initial inventory information then can be leveraged for more funding for a professional arborist inventory in the future.

To capture the information needed to support proactive tree management professional arborists will need to conduct the inventory. It is more expensive than relatively free volunteers, but the information gathered is more valuable.

The Cairns Regional Council has inventoried over 30,000 trees using their arborists, contractors, and volunteers. Using [TreePlotter™ INVENTORY](#), they created a [public portal](#) where residents can interact with the collected tree data and even add new trees to the inventory. The council also developed a custom Fungi Layer allowing people to record and describe fungi they find on trees, which can be followed up on by a mycologist. This helps the council catch developing fungus clusters earlier on, and hopefully proactively treat trees before they experience serious detrimental effects. To learn more about Cairns Regional Council's tree inventory software, you can download [their case study here](#).



WHICH INFORMATION SHOULD BE GATHERED?

There are basic metrics that should be included in every urban tree inventory:



Species



Diameter at breast height



Location



Tree condition

Beyond the basics, there are many supplementary data fields that can also be included. The more data fields added, the more time the inventory will take, but also the more value it can offer. For example, inventory personnel can add maintenance recommendations, such as crown cleaning, sidewalk damage, or removal. Each recommendation can have a priority attached to it (low, medium, and high risk), which is invaluable for

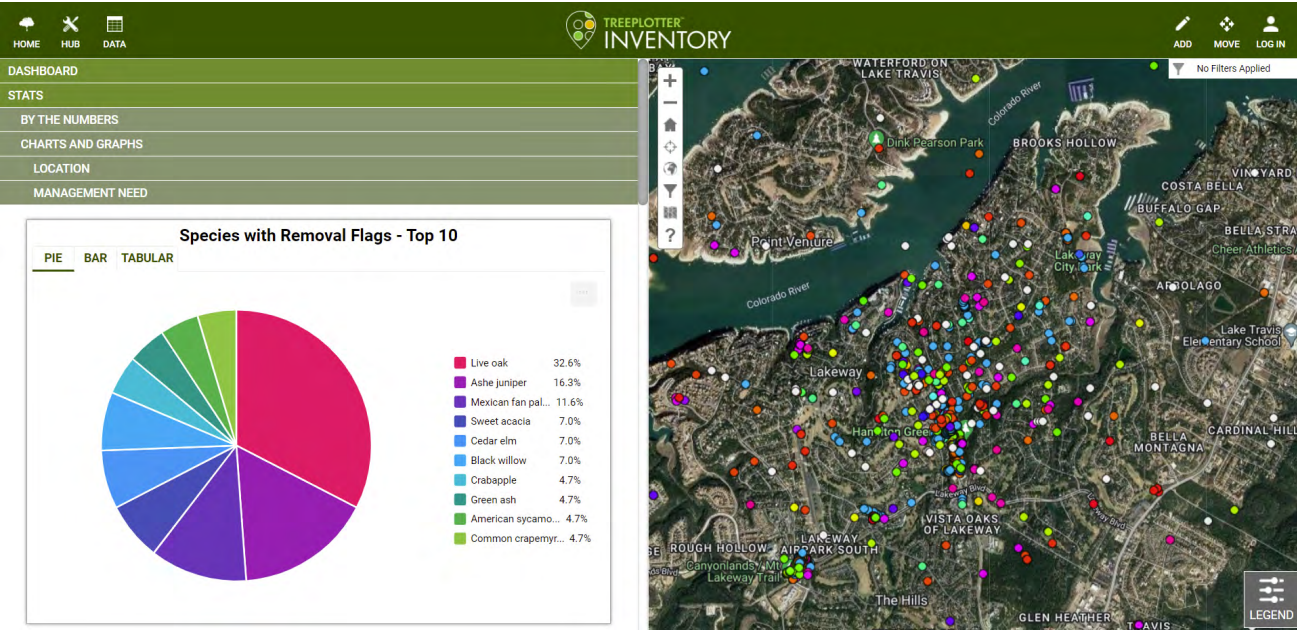
developing a proactive maintenance plan. The City of Wyndham, a southwest suburb of Melbourne, hired a [contractor](#) to complete a public tree inventory in 2020. All told, 220,000 trees were plotted, and the collected data fields included: species, location, condition, DBH, recommended works, powerline presence, and photos.

Another useful data point to capture are possible tree planting sites, meaning personnel record the location of vacant tree sites they spot while inventorying. For the highest level of detail, a Quantified Tree Risk Assessment (QTRA) or ISA Level 2 Tree Risk Assessments can be completed. This requires a qualified assessor to complete a detailed form for each tree (which can be also completed [within inventory software](#)).

ASSESSING FOR RISK

The Mitchell Shire Council inventoried over 52,000 assets in their community and assessed risk for all eligible trees. These were the results:

- (12) High Risk
- (338) Moderate Risk
- (43,694) Low Risk
- (8,024) Planting Sites or Stumps



With tree inventory software, you can then cross reference different data fields to find useful trends, such as most common removals by species.



After The Inventory, It's All About Risk Mitigation

Your public tree inventory is complete and you now have an easily searchable database of the highest risk trees in your city. The next step is to develop a maintenance plan targeting those dangerous trees first. These are often trees that present imminent hazards to the public, but instead of responding just after a tree failure, your crews can be routed methodically to work through high-risk trees during normal business hours.

Tackling tree maintenance work during regular hours will create a major reduction in program costs over time and raises the overall resilience of the urban forest. The next major storm that rolls through wreaks less tree damage because the vulnerable trees have been treated, and the clean up still required will be more manageable.

There is a balancing act to be had between efficiency and risk. As the most dangerous trees are taken care of, efficiency will become incrementally more important in your planning. Eventually, if your crews are traveling to a neighborhood to work on a few moderate-risk trees, it may be worthwhile to also include some nearby low-risk trees.





Setting Priorities Beyond Risk

Once the high and moderate risk trees have been taken care of the next steps for your proactive tree management program are less obvious. The unique characteristics of your city and urban forest will help determine what to prioritise next and you should also let the tree inventory data be your guide. The more you let the data drive your decision-making here, the better.

EFFICIENCY-DRIVEN OPERATIONS

As mentioned above, there will come a time when planning maintenance for an entire street or neighborhood, regardless of risk, is worth it from an efficiency standpoint. If low and moderate-risk trees are within a certain proximity, then they both get worked on. This planning is made much easier with a mapped tree database that can be filtered by different tree characteristics.

Tree watering should also be looked at through the efficiency lens. Yes, newly planted trees will be on your watering schedule, but what if there is a grouping of one-year-old trees nearby. Spending some additional time and water on those adjacent one-year trees will pay dividends when their survival rate improves.

THE COST OF *NOT* PROACTIVELY MAINTAINING TREES

The costs associated with tree maintenance are relatively straightforward to calculate. So are the value of tree benefits, thanks to tools like i-Tree software. What is less considered, but equally valid is the cost of *NOT* performing proactive maintenance.

“

Any post-planting maintenance performed on a tree improves its chances of survival to maturity, where benefits are greatest. The “cost” of not maintaining trees are those lost benefits.”⁵

Additionally, proactive maintenance prevents the need for expensive, on-demand maintenance down the road. Perhaps the best example of this is formative pruning. Formative pruning is an inherently low-risk operation. For a very small investment of time, you can cultivate significantly healthier mature tree populations.

The cost savings of formative pruning have been explicitly studied. Out of 348 trees included in one study, 78% showed structural defects that would necessitate formative pruning, usually codominant stems. The cost of not formative pruning per tree averaged between \$30-60 when compared to only structural pruning 20 years later.⁴

Watering is another crucial proactive activity. Studies have shown extended watering schedules for new trees, though more expensive initially, lead to savings in the long run from not having to replace dead trees.⁵ Generally, there are significant cost savings to early-establishment tree care, pest and disease management, and consistent tree planting to maintain the urban forest as a whole.

PLANTING FOR DIVERSITY

A full tree inventory offers a clear breakdown of how well your urban forest is doing in terms of species and age diversity. Do you have a disproportionate amount of one species, leaving you vulnerable to major losses from pest or disease? With this information in hand, your program develop a planting plan that will start to balance out your species distribution. A popular rule of thumb is the 10/20/30 rule, which refers to urban forests having no more than 10% of any particular species, 20% of any one genus, and 30% of any single family.



Proactive Management Is Attainable

Funding and executing a tree inventory is a significant operation, but it sets in motion the planning of a proactively managed urban forest, one that uses taxpayer dollars more efficiently and creates greater benefits for the community at large. So, how many programs actually achieve proactive tree management?

44%

Of New Zealand local governments met the 40% proactive level in a [2012 survey](#).

55%

Of United States communities met the 40% proactive level in a [2014 survey](#).

Your urban forestry program can become proactive too. It starts with completing an inventory, and with the [right software](#), all that information is readily accessible and easily updated. That information can then be adapted into a new pre-planned maintenance program that starts with risk mitigation and then evolves to focus on efficient operation and strategies that ensure more young trees make it to maturity.

To have a conversation about how tree inventory software can help your community transition to proactive management, please reach out to Ben Kenyon, TreePlotter Software Partner and Principal Consulting Arborist at Homewood Consulting, at benkenyon@homewood.com.au.

About PlanIT Geo™

Since 2012, PlanIT Geo has provided cutting-edge technology and planning services globally for urban forestry, parks management, and arboriculture. Our TreePlotter Software Suite and expert team of arborists and consultants are ready to help your program become more proactive. If you would like to know more about our urban forestry software or services, please [explore our website](#) and feel free to [send us your questions](#).

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