

URBAN TREE INVENTORIES

Knowing where your trees are allows you to manage more effectively, justify budget needs, and plan for your future community forest.



To manage your urban forest, you must know what is in it, since the forest is composed of many different trees. Where are the trees located? What is their condition, size, and species? These are questions that can be answered by conducting an inventory, an essential tool for developing a management plan.

But an inventory is only as useful as it is up-to-date. Removals and additions of trees, maintenance and inspections, tree growth and changes to site conditions change the look of the urban forest and its management requirements over time.

There are several benefits to having an inventory:

- Liability mitigation – By tracking maintenance, complaints, site visits, tree inspections, etc., a community has a record of the management of its trees should a legal issue arise. This can show that the municipality has not been negligent and help reduce liability for damage or injury.
- Budget justification – Tree budgets can often be reduced or eliminated in the face of other financial demands. Maintaining an inventory can assist with budget planning and requests, as well as show the impact of not budgeting for planting, maintenance and removal.
- Planning – Knowing what trees comprise your urban forest can help plan for the future: planting different species, locating trees needing replacement, finding locations for large and small trees, and discovering vacant planting spots.

RELATED RESOURCES

[Conducting a Street Tree Inventory](#)

[NCUFC Street Tree Inventories](#)



DATA COLLECTION OPTIONS

There are a several ways to approach a tree inventory. Your community's resources will determine methods of data collection, the extent of data to be collected, and future use of the inventory as a management tool.

- Paper and pencil have been the traditional and comparatively inexpensive approach.
- Proprietary software, even when the consultant does not collect the data for you, can be quite expensive.
- There are some lower cost or even free programs; some that are ostensibly free but require adaptation; some that are not particularly user friendly for collecting or reporting; and one that RIDEM-DFE is making available through its Urban & Community Forestry Program.

Paper & Volunteers	the simplest, most inexpensive method of data collection	
	PROS	CONS
	Paper and pens are cheap and volunteers are virtually free.	Data entry into a spreadsheet after data collection can result in entry errors.
	This method can provide a general picture of the urban forest and its needs.	Inexperienced volunteers may not be able to identify tree species or assess tree conditions.
	It can create community support for active management.	Data may be inconsistent and unreliable for practical management uses.
		Training and managing volunteers and entering data can be time consuming.

This method is highly labor intensive to collect, monitor, and difficult to keep updated, but it can be a useful approach where you have small areas you want to assess and manage.

Proprietary software & consultants	Programs designed specifically for tree inventory data collection. May be collected by the consultant or in-house.	
	PROS	CONS
	Many inventory programs can help with management with reporting and scheduling features (e.g. service requests, maintenance activities).	Municipality staff may not be sufficiently familiar with inventories and reports to know what options will meet their needs.
	Data can be collected by experienced consulting staff, providing consistent results.	The cost of software may be too expensive for some communities.
	A consultant can provide a summary report or a management plan.	Ownership of, or access to, the data may require additional subscription costs.
	Technical support and software updates may be available for a period of time after purchase.	Staff must be trained to use the program and keep it updated.

Before selecting a software program, check the program's ease-of-use, system requirements, and technical support/training availability. Some programs may have a free trial. When getting a quote for data collection a community should have a reasonable projection of the number of miles to cover and the average number of trees per mile. Quotes for data collection are typically given on a per tree basis. Ask for references and ask those other customers how the process and the software worked for them, pros and cons.

If you also want to contract out the data collection, review what they offer and whether they provide data collection and reports, as well as the software. Determine if the consultant can deliver what your community is seeking. Ask to see an example of a summary report of the survey results and its management significance. This report should be part of an inventory, but it is not a "management" plan unless it gives specific recommendations and timelines for treatments, as well as budget information. Make sure the report or plan gives you what you need.

Be clear on how you will access the data after the inventory is complete and if there are any yearly or periodic fees for hosting your data in the cloud. Most all software includes GPS locations for development of a tree layer for the community's GIS. Many have apps and other features that allow easy updating of the data.

A USDA Forest Service compiled list of software can be found here:

<http://dem.ri.gov/programs/bnatres/forest/pdf/urban/tree-inventory2020.pdf>

Mobile Apps for Apple or Android	data collected by in-house staff, contractors, or trained interns can be a cost-effective option – internal creation, adaptable existing programs may suit a community with GIS staff and resources; low-cost programs also exist	
	PROS	CONS
	Data can be collected and uploaded directly to the cloud or to a computer via Wi-Fi.	The database must be manually updated if the community lacks equipment or connectivity.
	Internal database design is simple and inexpensive, especially if you have ArcGIS and can use Survey123.	Some database interfaces for reporting are not very user friendly, during collection or managing from the office.
	Data can be collected over time as resources and staffing allow.	
	GPS location of trees to create a GIS layer for the community.	

- Some programs or apps may be better suited for volunteers and community involvement while others may be focused on management planning and reporting.
Ask: How is the data used? Who uses it?
- Some programs or apps may provide connectivity to management programs like [i-Tree](#).
Ask: What else can I do and how easy is it to do it?
- Different options for collecting and saving data may exist and may affect cost; whether data is hosted off-site on a company server or on a municipal server or is accessible via the internet. This may also affect how data is updated.
Ask: Where is the data kept and how can I update it? Who has access to the data? What is the cost to maintain access and to update the data?
- GPS positioning can be collected within the app, although not as precisely as with a dedicated GPS unit, so a community must know its GIS abilities in order to determine or justify costs.
Ask: Are we relying on GIS layers for planning or do we have no plans to use GIS layers in the immediate future? How precise do the locations need to be for our purposes?

COLLECTING DATA

Whichever inventory method you choose, the standard information typically collected for each tree in an inventory includes:

- Species
- Diameter
- Condition
- Maintenance needs
- Location (address or GPS information)
- Growing space limitations or conflicts

Full or partial inventories can be carried out, whether due to funding limitations or management priorities: all municipal trees, only street trees, only park trees, only risk trees, specific neighborhoods or downtown areas, or boundary trees and line-of-sight, or historical/specimen trees.

Available planting space at each location throughout your inventory is also useful to collect. This data facilitates the planning for your future urban forest needs.

USING TREE INVENTORY DATA

To remain useful, inventory data must be updated with removals and planting, as well as maintenance treatments and monitoring visits. Automatic updates from the field, as work is done or observations are made, are important to keep an inventory functional to justify staff and budget needs, award contracts for necessary work, plan for future needs due to age, pests or diseases, and to include in planning and development. Inventories are the first step in managing your community's trees for the long-term.

URBAN & COMMUNITY FORESTRY PROGRAM (U&CF) Urban Forestry Inventory Program

Through a grant through the National Urban & Community Forestry Advisory Council (NUCFAC), U&CF has received access to an inventory program called AUTI – Accessible Urban Tree Inventory, developed by Forest Metrix <https://forestmetrix.com/arborist/auti/>

The access provides a no-cost inventory program with ownership of the data and no subscription fees to maintain or manage the data. There are some costs associated with the program:

- Apple IOS only – requires iPad, iPad mini or iPhone for data collection
 - If managing the inventory outside the office, iPad is recommended
 - If managing the inventory data on an office computer
 - iPad mini is sufficient
 - requires the purchase of FilePro (~\$600) to access the program and the data

The program provides easily exported tree data for GIS; user-friendly data collection interface; easy reporting and data searches; Wi-Fi field data updating; simple export into iTree for tree canopy information.

The program is available for free until 2022, through the [U&CF Grant Program](#), which can assist with the data collection costs (1:1 cost match). After that the program itself will be available through the grant program. After 2022, there will be some fees associated with maintaining the Google maps access, but U&CF is reviewing ways to address that within the U&CF Program and avoid additional costs to communities.

Look at the grant pages on the DFE website and then contact the U&CF Coordinator for further information.