

A Community Guide to Urban Forest Inventories¹

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Too often, we tend to overlook the many benefits trees provide to urban and urbanizing communities. Properly located trees can reduce air pollution, improve water quality, lower heating and cooling costs, minimize storm water runoff, decrease soil erosion, lessen the urban heat island effect, buffer noise pollution, provide habitat for wildlife, increase property values, and contribute to the psychological and social health of communities. In general, research has shown that trees in urban and urbanizing areas can mitigate the negative effects of urban development and improve environmental quality, ecological services, and even economic prosperity. In some cases urban trees can be problematic and costly to manage. For example, pollen from certain trees may be allergenic for some people; tree roots can damage sidewalks and pipes; and trees blown over by hurricanes can damage homes and other structures. So, if the benefits are to be fully realized and the negatives (costs) are to be minimized, community leaders and homeowners must understand their tree resource.

One of the first steps in understanding these costs and benefits is to gather information about the trees in your urban forest using an urban forest inventory. While we often think about individual trees in an urban setting, collectively these trees are

known as an urban forest. This publication defines an urban forest inventory and its advantages. It also reviews some necessary considerations for conducting and funding the inventory. Finally, it provides some options that can assist you in managing your inventory.

What is it?

An urban forest inventory is a process that documents, evaluates, characterizes, and locates individual trees or groups of trees in an urbanized community. Some communities undertake an inventory for community safety and maintenance planning such as identifying and locating individual trees requiring pruning, watering, or removal. Sites for potential tree plantings and even condition of the sidewalks, utility lines and other community needs within the public right-of-way can be identified. An inventory is also used to assess and characterize large groups of trees such as the type of trees, their size, condition, and location (e.g., street trees) within a community.

The first step in deciding to do an inventory is to determine how the inventory will be used as this will help to determine what information needs to be collected. It is also important to clearly define who

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will use the inventory and who will collect the data as that will determine the amount of resources you will need to complete the project. For example, do you plan to inventory only trees that are on public right of ways or do you want information about trees on private property as well? How much information do you need? What kind of information do you need? Will the data be used by tree care professionals and managers or will other community members or city personnel need access to this data set as well?

An urban forest *inventory* can be a partial, complete, or sample inventory. A partial inventory is used when information is required for only a portion of your community's trees, such as a particular neighborhood, a park, or specific street segments with trees of particular interest. A complete inventory includes all of your community's trees and even potential planting sites. In most cases, this includes all urban forests in streets, parks, public lands, and other public right-of ways. Finally an urban forest *sample inventory* consists of collecting data from randomly selected areas throughout your community and provides a method to understand your urban forest with less effort and cost than that required for a complete inventory. Depending on the variability of your urban forest a sample street tree inventory can consist of collecting information on about 5% to 10% of all the trees in your community. This can provide an estimate of your street tree resource. However, this type of inventory will not provide individual data for every street tree in the community. Most inventories or surveys include basic information for each individual tree such as the location, tree species, size, condition, hazard potential, and necessary maintenance needs.

There are also several ways to conduct an inventory. It can be a windshield survey in which tree data are collected from a slow-moving car. This basic survey can be used in very small communities with limited budgets or it can be used to gather data for conducting a partial or complete inventory. Or an inventory can be a statistical sample of your entire urban forest with up to several hundred study plots located randomly across a large metropolitan community. Remember, there is no single correct type and way of conducting an inventory; it all depends on how the inventory will be used and who

will use it. The University of Florida Extension Service, USDA Forest Service Urban Forestry Centers, or consultants can assist you in selecting the right type of inventory. Finally, inventory data can be collected all at once or as part of an on-going process.

Advantages of having an inventory

An inventory assists communities, tree care personnel, and city planners with scheduling tree maintenance, creating a valid and true budget plan for maintenance and purchase of trees, and setting priorities for tree pruning and removal. Inventory information allows these tasks to be completed efficiently and positions community leaders to be proactive rather than reactive in managing their resource. If constituents call in to report a tree problem or with a question, personnel will be able to provide timely answers to the tree's maintenance schedule or have the ability to make field personnel aware of a potential hazard tree. Because the inventory data can provide information about the location, size, and number of trees in a given area, an inventory can be used to assess the effectiveness of tree ordinances and in tracking the loss of individual trees or groups of trees to urbanization and development. Some tree inventory software can even use your inventory data to calculate environmental and economic benefits.

Questions of liability associated with trees are often a concern of managers and communities. With an inventory, communities can generate a list and map with the location of hazard trees and their potential risk to public property and safety. This list and map could be very useful to help in emergency preparedness by helping identify trees that need to be properly maintained to reduce their risk of damage during hurricanes and high winds. Information about the urban forest before an emergency can assist in identifying potential problem areas and may be essential for planning for post-emergency restoration activities and funds. The inventory can be useful in developing an urban forest management plan and make the city more desirable for grantors when applying for grant funding to do comprehensive urban forest management.

Things to consider when doing an inventory

Communities have a couple of options for conducting the inventory. As the amount of information desired from the tree inventory increases, then the level of expertise required for the professionals conducting the inventory will also increase. A simple assessment of the number of trees and the type of tree in the right-of-way could be done by knowledgeable staff members and volunteers doing a windshield survey. A more complex survey determining the health and hazard of the trees would require the use of a certified arborist.

Software programs should be used to manage inventory data. The price of urban tree inventory *software* is variable (free to \$10,000) and will need to be included in the budget. The USDA Forest Service provides a simple and basic free-of-charge tool (<http://www.itreetools.org>) that can: track management activities and costs, assign an economic and environmental value to your tree resources with different appraisal methods, and assign actual dollar values and even prepare benefit-costs analyses to advocate your tree resource. Other private companies offer more complete, detailed, software with many more options. To learn more about some of these software packages, request a copy of the DVD/CD entitled *Proceedings from the Urban Forest Inventory Systems Symposium* (<http://www.sfrc.ufl.edu/urbanforestry>).

The cost of an inventory will be determined by the number of trees, the amount and type of data being collected on each tree, and who is doing the inventory. The community may want to think of doing an inventory in stages to accommodate funding requirements. The Florida Division of Forestry has historically offered grants to help communities pay for their inventory and software purchase through the Urban and Community Forestry Grant program. The details for applying for future grants are found at http://fl-dof.com/forest_management/cfa_urban_grants.html

If your community decides to use a forester or arborist to complete the inventory they might want to make sure they hire a trained and experienced

professional. The Florida Division of Forestry provides on their Web site a listing of consulting firms that work with forests in the state (<http://fsvd.fl-dof.com/>). With supervision by an urban forester or arborist and with some training in tree identification and measurements, volunteers or students can conduct a basic survey as well. To gain more in-depth knowledge prior to hiring a professional or to learn the steps required to do the tree inventory yourself consult the Other Sources of Information section at the end of this fact sheet.

Conclusions

An important objective of any community should be to maximize the benefits of trees and to minimize the costs in achieving these benefits. Documenting, assessing, characterizing, and locating individual trees or groups of trees in your community (i.e., an inventory) is one way of doing this. In addition, a tree inventory will assist communities in their efforts to manage their trees and provide a leveraging tool to increase budget. A tree inventory can increase a community's standing in the state because it demonstrates a commitment to understanding and caring for this valuable asset. In summary, things to consider in deciding to do an inventory are:

- How it will be used
- What information needs to be collected, and
- Who will use the inventory and collect the data?

The cost of an inventory will be determined by the number of trees, the amount and type of data being collected on each tree, and who is doing the inventory. Gathering information will help you to understand the costs and benefits of your urban forest.

Other Sources of Information

Andreu, M.G., R. Northrop, and M. H. Friedman, 2007. *Proceedings of the Urban Forest Inventory Systems Symposium DVD/CD set*, University of Florida – Plant City Campus Dec. 14, 2006.

The USDA Forest Service Northeast Center for Urban and Community Urban Forestry provides information on inventory tools for the NE US:
<http://www.umass.edu/urbantree/talks/index.html>

The International Society of Arboriculture (ISA) keeps a list of certified arborists by state.
<http://www.isa-arbor.com/findArborist/findarborist.aspx>.

Miller, R.W. 1997. *Urban Forestry: Planning and Managing Urban Greenspaces*. Prentice-Hall Inc. See chapter 6.

Bond, J. and B. Buchanan. 2006. Best Management Practices: Tree Inventories. International Society of Arboriculture.