MOORE TREES

Consulting Arborist

TREE INVENTORY SYSTEMS

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Do you know what you manage?

Most managers could answer how many staff they are responsible for. How many could answer how many trees they are responsible for? If you don't know what you are managing, then how can you manage?

Tree Inventory Systems have been around for many years now and their use has had a varied reception. A great deal of inventory work was done in the 1970's, but the systems used were very complicated and ran on mainframe computers that were the size of a small room (Chacalo, 2000). The next generation ran on desktop computers and now a field worker can log data on a handheld computer (Miller, 2000). The Global Positioning System (GPS) works on a system that utilizes three American Military Satellites. The receiver then trilaterates it's location, for greater precision often a forth satellite is used (Tarren,1994). With current Geographic Information Systems (GIS) and GPS systems, trees can be quantified and added to existing maps. Hazard assessments, SULE ratings and quantities can, after the initial inspection, be correlated.

One of the first computerized Tree Inventory Systems was created in 1970's. Most new technologies within the world of computing are quickly embraced, refined and used to their full capability however this does not seem the case with Tree Inventory Systems. Urban tree inventories may be more complicated than any other asset inventory (Randrup, 2000). With the subject (the tree) being a living organism and a constantly changing asset, there is no doubt that this issue makes monitoring these particular assets a difficult one. It would appear that from reading literature reviews on Tree Inventory Systems that any uncertainties that are there, are not at the software end but at the user end.

The value of trees cannot be underestimated. Trees can be planted for little or nothing compared to the expense of infrastructure, cooling and heating systems, while the return and benefits in which trees provide, are enormous. It is easy to put a dollar value on a resource that is a tradable commodity. Urban trees are notoriously difficult to value but this does not mean that urban trees have no value (Tarren, 1994). Some areas to consider are soil stabilization, storm water run-off, wildlife shelter, and reduction in heat island effect. These items are extremely hard to quantify in a dollar value but this does not reduce their importance (Tarran, 1994). Tree Inventory Systems can be used as a tool to help quantify tree population and direct resources to prioritized areas. They can also give you an indication of what the future of your tree population may deliver in terms of amenity.

Will you be using it in years to come?

In Sydney's Power House museum there is an ancient clay tablet, a few centimeters square that is 4000 years old. On this tablet there are nine lines of cuneiform script. Even though this tablet from Sumeria is 4000 years old we are still able to read it today, but more on that later….

A fair and reasonable question that may be asked is, "Will the data storage process (what we store our information on) change much in years to come?" Tree populations are not static, so the need to constantly access and update the tree data will be ongoing (Wood, 1999). 'A Guide to Tree Inventory Software' by Gene Oleg and Robert Miller in 1997 stated that several developers of Tree Inventory Software are no longer supporting their software. This is a daunting thought considering the time, effort and money which is required to build an inventory. A greater challenge that may meet the information keepers in the future is how and what they store their information on. If we think of the age of a mature oak for example, say 150 years of age, and then trace a timeline back to the year 1855. The various methods of collecting and saving data over this period are truly astounding – from paper to cards with holes punched into them, to the magnetic tape, Cinefilm, Beta, VHS, Mini DV, Hi8, Flash drives, hard drives and compact discs and now the digital age. In some cases it is difficult to find a machine to retrieve information from some of these devices listed. As you can see trying to track and record the life of a tree and what form of media to record it on could become a very complex matter.

Some people in the IT industry are concerned that data storage will continue to change. You only need to look at the past to appreciate that concern. This can cause expensive setbacks due to having to buy new software and converting past information. As far as Tree Inventory Systems are concerned this may be an issue in the future.

The right tool for the right job.

A recent inventory completed for Centennial Park in 1995 was able to highlight the aging tree population and show to the park's owners that within the next 40 years they will be facing the prospect of 7023 of a total 8755 trees, will need to be considered for repair, removal or replacement. The inventory was also able to be used in conjunction with an adaption of the Thyer Valuation Method to place a value of $94 million dollars on the parklands trees (Hoare, 2005). The ability to manage trees decades ahead is good tree management.

In 1999, two Municipalities and a resort in Northern America were able to use the International Society of Arboriculture (ISA) shade tree values in their inventories. The information was used to collect thousands of dollars from insurance carriers from hurricane damage. By having a comprehensive inventory they were able to substantiate their urban forest loss in value (Abbott, 2000).

Hong Kong Leisure and Cultural Services Department this year listed 600,000 trees in a computerized inventory system (HK Government Homepage, 2005). To try and retrieve or correlate this information if it was on paper would be almost impossibility.

What's available?

There is a broad range of hardware and software available. The two main hardware items required to create a Tree Inventory System are the handheld computer followed by the GPS unit. The cost of the data loggers which are basic hand held computers cost around $2500 Where the price can vary dramatically is in the GPS unit that attaches to the data logger. The price of a GPS unit can start from around $300 for a basic unit that will measure from10-20 metres accuracy. At the higher end of the range is a Trimble® unit that can read down to 1 metre sub accuracy. This accuracy comes at a price, and at $15,000, this device is out of reach of many companies (Johnny Appleseed, 2005).

A detailed study was conducted by Gene Oleg and Robert Miller in 1997 on several Tree Inventory Systems that exist on the market. The study was funded by the U.S Forestry Department and was the most comprehensive study I have found to-date. These systems are listed below.

CITY green™
Green Streets™
TreeKeeper for Windows. ™
TreeKeeper Junior™
TreeKeeper online™
Urban Forest Inventory System™
Urban Tree Management System™
Canopy™
Inventree™
Tree Manager for Windows™

A study was also completed on how long each tree took to log on each application. This varied from taking just under one minute to program a tree with one application and with another application took twice as long. The study also recorded the time that it took to record the data for approximately 200 trees. Timing intervals were taken on a per street basis. Street length ranged from 0.53 to 0.59kms. The mean time spent at each tree was 2.1 minutes, ranging from 1.9 to 2.2 minutes (Oleg & Miller,1997). Logging of the trees is most certainly the most time consuming part of a Tree Inventory System.

What are some disadvantages?

Some important areas to consider when implementing a Tree Inventory System are the level of customization that is required. If a system is too simple then the software will not be used to its full potential (Wood, 1999). If too complex then the software will be no more than an icon sitting on your computer screen that nobody wants to use. A frequent problem has been to include too much information (Randrup, 2000). A few key facts such as location, size, species, condition range and special management needs may be sufficient to develop a comprehensive management plan.

What are some advantages?

Although inventories represent a significant investment the information they provide can increase efficiency and reduce operating costs. Furthermore, developing a management plan based on this data can result in increased funding for other tree programs (Randrup, 2000).

Some advantages of customizing software may include tailoring to the user needs; increased efficiency through setting personal preferences and eliminating unneeded options. Some of the disadvantages in having to customize are a higher learning curve and the complexity of the program may be intimidating to some users. There may also be higher initial setting up costs **(**Oleg & Miller,1997).

Graphs can be produced which can quantify data, based on facts that is easy for the layman to understand, species diversity, age i.e. an aging tree population that will require more funding for removal and replacement in the near future.

At Woollahra Municipal Council, New South Wales, 48% of their insurance claims over a 12 month period (2004-2005) were related to trees. With these insurance details it is clear that trees are important and sometimes costly assets that need to be managed as far as insurance claims are concerned.

Conclusions

There is no doubt that Tree Inventory Systems are a specialised field. Data storage media will always change and so too will tree inventory software, but this is no reason to reject the capabilities of a Tree Inventory System. Just as a nation's census provides a snapshot of detail at a certain point in time, it is then used to help with the economic management of a country. Whether a Tree Inventory System is used regularly or sporadically, it would appear that this specialized field will be used long into the future. The only drawback is cost to implement a system and time, sometimes years (Centennial Park Study) to have the information logged. This being said, true investments take time to reveal rewards and this is certainly the case with a Tree Inventory System. This overview based on reading available articles related to Tree Inventory Systems has shown that, to effectively manage a tree population, the advantages of Tree Inventory Systems far outweigh the negatives.

As for the 4000 year old Sumerian clay block, it is a receipt. Thanks to the Archaeologists that still study this language, we know it is a receipt for five sheep, one lamb, and four grass-fed male kids to be used for a royal offering. Thankfully, we don't have to list our tree populations on clay blocks!

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