

— A Guide to
Street Tree Inventory Software

Chapter 1 – Introduction

- ▶ *Introduction*
- ▶ *Choosing an inventory program*
- ▶ *Evaluation procedures*
- ▶ *Developing an inventory database*

The purpose of this publication is to serve as a reference and guide for urban forestry professionals in the selection of a street tree inventory software program. The programs described include only those that are commercially available. The increasing demand for street tree inventory software follows a trend towards a more computerized society and the increasing affordability of computer systems. A tree inventory is one of the primary components of a systematic and structured management program (Ottman and Kielbaso 1976). A street tree inventory software program can be used as a tool to efficiently organize inventory data into useful information (Sacksteder and Gerhold 1979).

Publication format

This guide is organized to assist urban foresters who are considering the purchase of a tree inventory software program for the first time. Chapter 1 provides suggestions for selecting a program, describes our evaluation procedures, and discusses the implications for urban foresters who are considering developing their own inventory database. Chapter 2 includes a listing of software providers, data fields offered by each program, the level of customization offered by each program, and the time requirements for data collection and entry. Chapter 3 contains detailed descriptions of each program including program requirements, functions, operation procedures, and examples of interface layout and design.

Choosing an inventory program

It is important to make several considerations before purchasing a tree inventory software program. These can include:

1. *Identify your management goals and the data that you need to collect to satisfy these goals.*

Extraneous data along with lacking data will increase agency costs.

2. *If you have a computer system and do not plan on upgrading your system in the near future, then choose a program that will operate with the hardware and software that you are currently using.*
3. *If you need to buy a computer system or plan on upgrading your current system, the hardware requirements for that system are dependent upon the software programs that will be used on it. Your software determines what you need for hardware.*

The consequences of not considering the above are numerous, and may include the following:

- *The purchase of a program that is not satisfactory in meeting management goals.*
- *Over-expenditure on a program with more functionality than what is needed to satisfy management goals.*
- *The purchase of a computer system that does not meet software requirements.*
- *Over-expenditure on a computer system that has more functionality than what the agency needs.*
- *The purchase of a program that will not operate with the existing operating system and/or computer hardware.*
- *An excess of time and money spent during data collection and entry for extraneous data that are not needed to satisfy management goals.*
- *A lack of data that should have been collected and entered into the program in order to satisfy management goals.*

Several questions should be asked before purchasing an inventory software program, including:

- *Does the program integrate well with and work similarly to the other programs used by the agency (such as a word processor, spreadsheet, or scheduler)?*
- *Does the program store data in a common (standard) file format so that they can be used with other applications?*
- *Is the software developer keeping up with advances in computer technology (such as operating systems, hardware, and software standards)?*
- *Are software upgrades reasonably priced, and can your existing data be transferred without difficulty?*
- *Is the software developer reputable?*
- *Is the company/developer going to be around (along with their program) for the long term?*
- *Does the company provide sound and reasonably priced technical support?*

Evaluation procedures

Procedures include identifying tree inventory software providers, acquiring their software, and conducting a street tree inventory in a study area to provide a data set to be entered into each program. A Geographic Information System (GIS) map was created to accommodate programs that incorporate a GIS.

Identifying providers Most tree inventory software providers were located through a literature search (Kissinger and Casey 1996, Smiley 1989, Van Ells 1994, Wagar and Smiley 1990) and an Internet search (AltaVista, Excite, HotBot, InfoSeek, Lycos, Magellan, Yahoo). Other providers were identified by responses to an inquiry posted on the Urban Natural Resources Network (URBNRNET) list server (see *Internet* in citations) or were

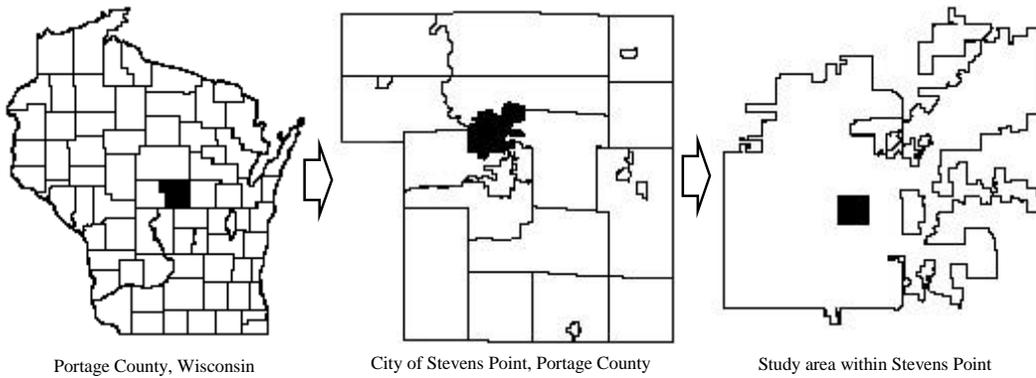


Figure 1.1: A study area was chosen within the City of Stevens Point to provide a data set that would be entered into each of the street tree inventory programs.

identified through personal communications with urban forestry professionals.

Software providers were initially contacted by mail with subsequent contacts through e-mail and by phone. Project objectives were stated and providers were asked to participate by donating a copy of their fully functional software (demonstration programs were not preferred but were accepted).

Study Area A study area was selected within the City of Stevens Point, Wisconsin to provide a street tree inventory data set (Figure 1.1). A contiguous area of approximately 25 blocks in size (0.12 mi², 0.31 km²) was identified on a color aerial photograph (leaf-off, scale ~ 1:6,600). An older residential area was chosen that had the following characteristics: the presence and absence of sidewalks and tree terraces; diversity in tree size; a

relatively high street tree stocking; and the presence of at least one cul-de-sac.

Creating a GIS map A GIS map of the study area was created in order to accommodate programs that incorporate a GIS. Features were “heads-up” digitized from an aerial photograph image in ArcView (version 3.1, developed by Environmental Systems Research Institute, Inc.) (Figure 1.2). The

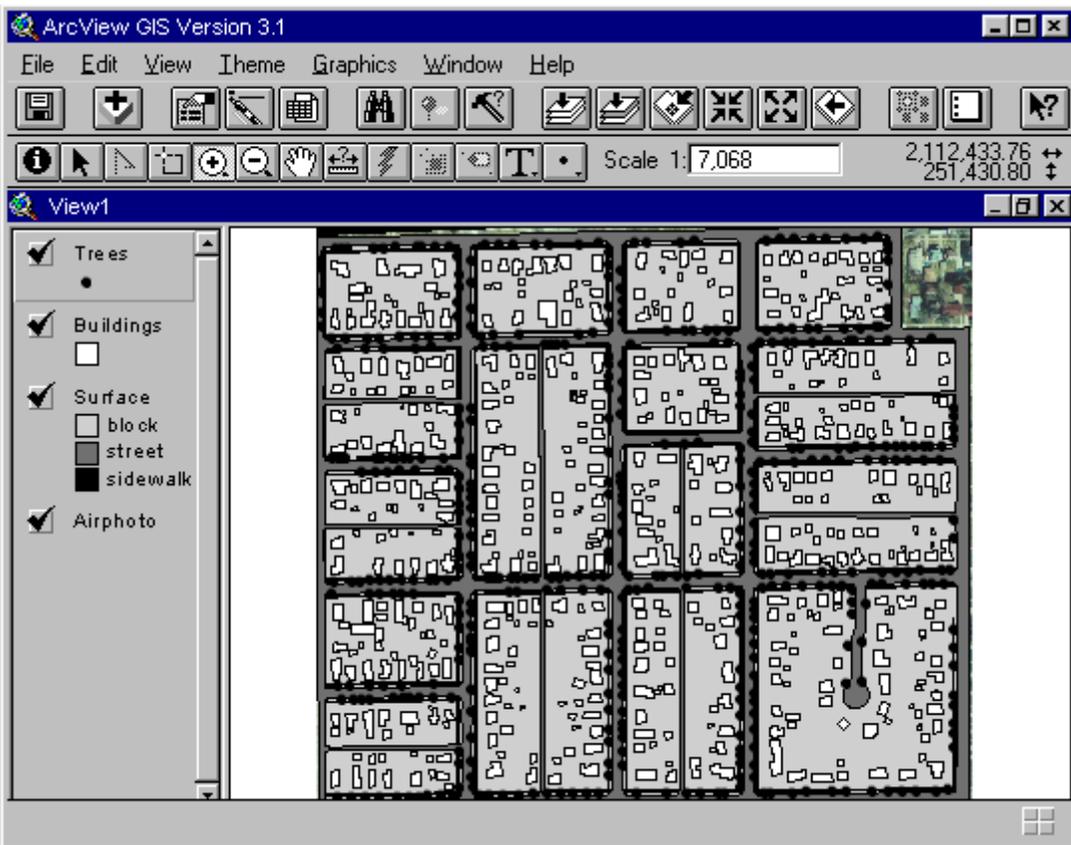


Figure 1.2: The study area was digitized in ArcView to provide a map for programs that incorporate a GIS. Digitized features include sidewalks, streets, buildings, and street trees.

heads-up digitizing process uses the system mouse to delineate features from the on-screen aerial photograph as either points, lines, or polygons. Streets, sidewalks, blocks, and buildings were digitized as polygons, and were encoded with their respective names. Street trees were digitized as points. Street tree locations were verified using aerial photographs and a stereoscope, and were again verified during data collection (described below) on an ArcView map printout.

Determining Data Fields

A composite list of data fields was developed from the acquired programs before street tree data were collected in the study area. Only required and the most common fields were considered for data collection. Fields that were not duplicated in another program were not considered for the list. The composite list is found in Chapter 2 (*Data Collection*, page 17).

Computer Systems

Table 1.1 indicates the computer systems used in this study. One computer system, a Gateway™ G6-200 running Windows NT®, was used during data entry time trials. Only Microsoft® operating systems (including MS-DOS®) were used because each of the received tree inventory programs required one of these systems.

Data Collection A Hewlett Packard Palmtop PC (200LX model) was used to record field data in a Lotus 123 spreadsheet comprising of the composite data fields. The Palmtop PC was used instead of a data entry form to accommodate programs that allow importing data files as well as using keyboard entry. Each tree site (street trees and planting spaces) was visited on one side of the street before proceeding to the other side. Planting sites were based on approximate 50 foot (15 m) spacing, and were only designated in plantable areas (areas without nearby utility poles, privately owned trees, or other obstructions that limited growing

Computer	Processor	Memory (MB)	Operating System (OS)
Gateway™ G5-166	166 MHz Pentium®	32	Windows® 95 (OSR2)
Gateway™ G6-200 ^a	200 MHz Pentium® Pro	64	Windows NT® 4.0 (SP3)
Gateway™ G6-300	300 MHz Pentium® II	64	Windows® 98

^aSystem used for data entry in all programs.

▲ *Table 1.1: The street tree inventory programs in this study were used on three operating systems: Windows® 95, 98, and NT®.*

space). Tree locations were verified and marked where necessary on an ArcView map printout. Data collection time was recorded for each street, and the total time was divided by the number of tree sites. Data were downloaded to a computer after each field visit, and were later consolidated and saved into one file using Microsoft® Excel. A more detailed description of the data that were collected, the accuracy level of that data, and the data collection methods, is in Chapter 2 under *Data Collection*.

Data Entry

Data were entered into each program from the on-screen Excel spreadsheet via the keyboard (program windows were tiled for simultaneous viewing). Data entry was timed for each program and recorded (*Data Entry Time*, page 18).

Developing an inventory database

An alternative to purchasing an inventory program is to develop your

own database, a process that requires selecting an off-the-shelf database program to use with your inventory data. Although this publication does not describe these programs, the following describes some advantages and disadvantages of this alternative.

Most common database programs generally cost less than tree inventory programs, and many of the tree inventory programs described in this publication use one of these as an underlying program (Tables 1.2, 1.3). Developing your own database gives you the flexibility to customize data fields to meet agency needs. Many of these database programs allow for the creation of a Graphical User Interface (GUI) which can make data entry, management, retrieval, and reporting more efficient. Purchasing a database program from a company such as these (Table 1.2) provides security in the future because they have a high revenue and product base, are the creators of data format standards, and are the forerunners of the developing computer technologies.

Database	Developer	Price (full)
Access 97	Microsoft	\$299.95
Approach 97	Lotus	\$99.95
DB2 2.1	IBM	\$339.95
FileMaker Pro 4.1 ^a	FileMaker	\$177.99
InfoMaker 6.0	Powersoft	\$169.95
Paradox 8	Corel	\$99.95
R:BASE ^b	R:BASE Technologies	\$500.00
Visual dBase 7.0 Pro	Inprise	\$335.95
Visual FoxPro 6.0 Pro	Microsoft	\$499.95

▲ *Table 1.2: Prices for common database programs (from PC Connection, unless noted otherwise).*

^aPrice from PC Mall

^bPrice from R:BASE Technologies

Although developing your own database does not require programming language skills, it does require a thorough knowledge of the program being used and the data that are to be used with it. The creation of a database and its GUI requires time, and the finished product needs to allow for effective and efficient program use. There will be a considerable amount of trial and error with this process, and the implementation of the database program may turn out to be unsuccessful.

Software developers indicated in this publication have a considerable amount of experience with tree inventories and database programs. Although their expertise comes at a price, it may be worth it. Many of the programs described in this publication can be customized to meet agency needs. Depending upon your available resources, the other valuable services that these firms provide, such as conducting tree inventories and writing management plans, may be of interest.

▼ *Table 1.3: Tree inventory programs, their prices, and the underlying database programs they use. Unless noted, database programs do not have to be purchased in addition to inventory programs.*

Tree inventory program	Price	Database
Canopy	\$2,600.00 ^a	FoxPro
Inventree (Kunde)	\$150.00	R:BASE
Inventree (Lehman)	\$500.00 ^b	FileMaker Pro
SilviBASE	\$1,950.00 ^c	FoxPro
TreeKeeper Jr.	\$200.00 ^d	FoxPro
TreeKeeper for Windows	\$5,000.00	FoxPro
TreeKeeper Online	\$285.00 ^e	N/A
Tree Manager for Windows	\$5,500.00 ^a	dBase
TreeMaster	\$3,500.00	Access
Trims '97	\$1,295.00	Btrieve
Urban Forest Inventory System	\$3,500.00	N/A
Urban Tree Management System-III	\$695.00	dBase
Urban Tree Management System-5000	\$100.00	dBase

^aPro-rated (base price indicated).

^bDatabase program purchased separately.

^cPrice without additional services.

^dNon-TreeCity USA

^eQuarterly rate.

N/A-underlying database program not used.