User's Manual

i-Tree Software Suite v2.1

Tools for assessing and managing
Community Forests

A cooperative initiative between:

For more information, please visit http://www.itreetools.org

i-Tree Software Suite
User's Manual

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Preface

Welcome to the User's Manual for the i-Tree Software Suite 2.1! This Manual has been written by the i-Tree Development Team and its collaborators to guide the user in i-Tree software installation, configuration, and use.

About i-Tree

i-Tree is a state-of-the-art, peer-reviewed software suite from the USDA Forest Service that provides urban and community forestry analysis and benefits assessment tools. Developed by USDA Forest Service Research, State and Private Forestry, and other cooperators, i-Tree is in the public domain and available by request through the i-Tree website (www.itreetools.org). The Forest Service, The Davey Tree Expert Company, the Society of Municipal Arborists, the National Arbor Day Foundation and the International Society of Aroriculture have entered into a Cooperative Partnership to disseminate and provide technical support and training for the suite.

This Manual applies to the 2.1 release of the i-Tree suite, whose components have been in development for ten years or more. Complete support of the software is available to the user through the User's Forum (www.forums.itreetools.org) or any of the other means listed below.

i-Tree was developed for communities of all sizes to strengthen their urban and community forest management efforts. It can be used by state forestry agencies, municipal foresters, non-profit tree advocates, commercial arborists, environmental consultants, planners, or any others interested in community forests and the environmental benefits they produce.

Suite Components

The i-Tree Software Suite 2.1 includes the following urban forest analysis tools:

- UFORE (Urban Forest Effects Model) is designed to use standardized field data from randomly located plots throughout a community, along with local hourly air pollution and meteorological data, to quantify urban forest structure, environmental effects, and value to communities.
- STRATUM (Street Tree Resource Analysis Tool for Urban forest Managers) utilizes a sample or complete tree inventory to describe tree management needs, and quantify the value of annual environmental and aesthetic benefits such as energy conservation, air quality improvement, CO_2 reduction, stormwater control, and property value increases.

In addition to the analysis programs, the Suite currently includes the following utilities:

- MCTI (Mobile Community Tree Inventory) is a basic tree inventory application that allows communities to conduct tree inventories and manage those records. Data for new or existing inventories can be collected and entered into the program using paper tally sheets or Personal Digital Assistants (PDAs).
- SDAP (Storm Damage Assessment Protocol) provides a standardized method for a community to assess widespread storm damage in a simple, credible, and efficient manner immediately after a severe storm. It is adaptable to various community types and sizes, and provides information on the time and funds needed to mitigate storm damage.
- The Species Selector (Beta) is free-standing Utility designed to help determine the most appropriate tree species for selected urban forest functions based on geographic area.

- Integrated Tree Inventory Utilities are made available to collect field data on PDAs for STRATUM/MCTI and UFORE. SDAP provides a similar tool for recording data related to the evaluation of storm damage.
- The Sample Inventory Generator automates, within a Geographic Information System (GIS), the process of drawing a random sample for UFORE, STRATUM, and SDAP projects.

Feedback

The i-Tree Development Team actively seeks feedback on any component of the project: the software suite itself, this manual, or the administrative structure set up for dissemination, delivery, training and support. Please send comments through any of the means listed on the i-Tree support page:

http://www.itreetools.org/support/

User feedback will allow these tools will continue to be updated and improved!

Disclaimer

The use of trade, firm or corporation names in this publication is solely for the information and convenience of the reader. Such use does not constitute an official endorsement or approval by the U. S. Department of Agriculture or the Forest Service of any product or service to the exclusion of others that may be suitable.

The software distributed under the label "i-Tree Software Suite v2.1" is provided without warranty of any kind. Its use is governed by the End User License Agreement (EULA) to which the user agrees before installation.

Acknowledgments

General

The components of the i-Tree software suite have been developed over the last decade by USDA Forest Service Research, State and Private Forestry, and its cooperators. Support for the release of i-Tree 2.1 has come from the USDA Forest Service and its cooperators through the i-Tree Cooperative Partnership.

Applications

UFORE Application was funded by USDA Forest Service Northeastern Research Station, the USDA State and Private Forestry's Urban and Community Forestry Program and Northeastern Area, the Davey Resource Group, and SUNY College of Environmental Science and Forestry. This application was based on the UFORE model originally conceived, designed and developed by David J. Nowak and Daniel E. Crane (USFS, NRS), and Patrick McHale (SUNY-ESF). The UFORE software was designed and developed by Daniel E. Crane and its graphical user interface (GUI) by Lianghu Tian and Mike Binkley (The Davey Institute). Many individuals contributed to the design and development process of UFORE application including Mike Binkley (The Davey Institute), Jaewon Choi (SUNY-ESF), Daniel E. Crane, Greg Ina (The Davey Institute), Robert E. Hoehn, Jerry Bond and Christopher J. Luley (Urban Forestry LLC), Pat McHale, David J. Nowak, Jack C. Stevens (USFS-NRS), Lianghu Tian, and Jeffrey T. Walton.

STRATUM was developed by a team of researchers at the USDA Forest Service, PSW Research Station's Center for Urban Forest Research in Davis, CA. The STRATUM application was conceived and developed by Greg McPherson, Scott Maco, and Jim Simpson. James Ho programmed STRATUM. The numerical models utilized by STRATUM to calculate tree benefit data are based on years of research by Drs. McPherson, Simpson, and Qingfu Xiao (UC Davis). Reference city data on tree growth and geographic variables were developed under the direction of Paula Peper, Kelaine Vargas and Shelley Gardner.

MCTI (Mobile Community Tree Inventory) was cooperatively developed by the USDA Forest Service, Northeast Center for Urban and Community Forestry, the City of Springfield, MA Parks and Recreation Department, and Bluejay Software Associates. Principal Investigators were David Bloniarz (USFS, NRS), Robert Sacks (Bluejay Software), H. Dennis Ryan (University of Massachusetts/Amherst), and Michael O'Loughlin (City of Springfield, Massachusetts). Revisions for i-Tree versions were carried out by members of The Davey Institute with input from outside reviewers.

The STRATUM/MCTI PDA Application was cooperatively developed and funded by the USDA State and Private Forestry's Urban and Community Forestry Program, USDA Forest Service Northeastern Research Station, the Pacific Southwest Research Station, Center for Urban Forest Research, Davey Resource Group, and Bluejay Software Associates. Individual contributors included Bob Sacks, Dave Bloniarz, Scott Maco, Greg McPherson, Shelley Gardner and Kelaine Vargas (USFS CUFR), and Shauna Cozad (UC Davis). The software was programmed by Bob Sacks.

The UFORE PDA Application was funded by the USDA State and Private Forestry's Urban and Community Forestry Program, USDA Forest Service Northeastern Research Station and Blue

Jay Software. This application was conceived and designed by Bob Sacks, Daniel E. Crane, David J. Nowak, and Robert E. Hoehn (USFS-NRS). The software was developed by Bob Sacks.

SDAP (Storm Damage Assessment Protocol) was cooperatively developed by the USDA Forest Service, Northeastern Area, the Northeast Center for Urban and Community Forestry, and the Davey Resource Group. Principal developers: David Bloniarz, H. Dennis Ryan, Christopher J. Luley, Justin Stratton (Davey Resource Group) and Jerry Bond.

Sample Plot Generator and **Sample Street Segment Generator** were funded by the USDA Forest Service Northeastern Research Station and Clemson University, College of Agriculture, Forestry & Life Sciences. These applications were conceived and designed by Jeffrey T. Walton, David J. Nowak, and Chris Post (Clemson Univ.). The software was developed by Donald J. Lipscomb (Clemson Univ.) with contributions from M. Sawada (Univ. Ottawa), Surja Bhandarkar (Clemson Univ.), and Ajay Madhavan (Clemson Univ.).

Species Selector was developed by David J. Nowak and his colleagues at the USDA Forest Service's Northern Research Station. The i-Tree team thanks Horticopia, Inc. (www.horticopia.com) for the use of their plant database, which helped facilitate the development of the functional tree database. The user interface was developed by Lianghu Tian and collaborators (The Davey Institute).

1. Ecosystem Analysis (UFORE)

1.1 Introduction

The Urban Forest Effects (UFORE) computer model was developed to help managers and researchers quantify urban forest structure and functions based on standard inputs of field, meteorological, and pollution data. The model currently calculates the following parameters based on local measurements:

- Urban forest structure (*e.g.,* species composition, tree cover, tree density, tree health [crown dieback; tree damage], leaf area, leaf biomass, information on shrubs and ground cover types)
- Hourly urban forest volatile organic compound emissions (emissions that contribute to ozone formation)
- Hourly pollution removal by the urban forest for ozone, sulfur dioxide, nitrogen dioxide, carbon monoxide, and particulate matter less than or equal to 10 microns
- Effect of trees on building energy use and carbon dioxide emissions
- Total carbon stored and net carbon sequestered annually by urban trees
- Insect and disease potential for gypsy moth and Asian longhorned beetle
- Exotic species composition

As UFORE programming is modular, additional modules can and are being developed.

Data that UFORE analyzes are based on a sample of an area (*e.g.,* an entire city or neighborhood). Model outputs are given for the entire population and individual trees measured.

To make the analysis easier, a large amount of data has been assembled from various sources (National Climatic Data Center, U.S. Environmental Protection Agency, etc.). Field data collection is required, but can be adjusted based on local needs and resources.

Data Requirements

The UFORE program requires various data inputs depending on the type of analysis. Typically, the user will only have to collect field data.

Field data – required for all analyses. Data collection is based on a random sample of fixed area plots. The types of variables collected can vary, but certain core variables are required (*e.g.,* species, DBH, height).

Meteorological data – hourly weather data are necessary to analyze air pollution removal by the urban forest. These data are available for most cities around the world for the years 1995-2005. Thus, data processing by UFORE will not need users to obtain weather data.

Air pollution concentration data – hourly pollution concentration data are required to analyze:

- Air pollution removal by the urban forest
- Relative ranking of species effects on air quality

These data are available for many cities in the United States for 2000, and users within the US will not be required to provide them for data processing. However, for cities

outside of the United States or for years other than 2000, users will need to obtain hourly pollution concentration data (see section 1.4.2).

1.2 Installation

NOTE: The installation of the UFORE Tree Inventory PDA Utility for field data collection is described in section 3.2.2.

UFORE is currently being recoded (from SAS System software) into a Windows® based program to allow for easy desktop use. Though it is in transition between the SAS and new C++ (Windows) code, the model is fully functional.

In i-Tree v. 2.1, the UFORE Shell is used to interact with the following components:

- Project Setup
- Plot Generator
- Data Entry and PDA Utilities
- Auto Transfer (to and from USDA Forest Service Northern Research Station in Syracuse, NY)
- Analysis, including the Written Report and Maps (beta)
- Species Selector (beta)

To install the UFORE shell:

1. Insert the i-Tree Installation CD into your CD-ROM drive.
2. Navigate to the **Get the i-Tree UFORE Application** link and click.
3. Follow Step 1 on the screen to install the i-Tree User's Manual to its default location: C:\Program Files\i-Tree\
4. Follow Step 2 on the screen to run the *setup.exe*; Follow the Setup Wizard instructions to complete the installation.

1.3 Getting Started

1.3.1 Sampling Method and Data Collection

To perform a UFORE analysis, six steps must be completed:

Step 1. Determine study area
Step 2. Determine sampling type
Step 3. Decide what data need to be collected (*i.e.,* what do you want to know about your urban forest?)
Step 4. Locate field plots
Step 5. Collect field data
Step 6. Analyze field data

Step 1. Determining the Study Area

The first question that must be answered is "What are the limits of the study area?" Is the analysis for a neighborhood, a street tree population, an entire city, etc.? The boundaries of the study area must be determined prior to analysis.

Step 2. Determining the Sampling Type

Various sampling schemes can be used to locate field plots within a study area. The following schemes are available as options in the Sample Plot Generator (see section 3.4.2):

- Random – plots are laid randomly throughout the study area

- Grid – plots are laid on a fixed grid (equidistance between plots) throughout the study area
- Randomized grid – plots are laid randomly within grid cells that are spaced evenly throughout the study area.
- Stratified random – study area is pre-stratified to smaller units (*e.g.*, land use types). Sample points are then randomly located within each strata.

It is recommended that users use the randomized grid approach to sampling, as this approach spaces the plots throughout the study in a randomized fashion, provides a good means to monitor future changes within the study area, and allows for post-stratification.

Pre-stratification and Post-stratification

For some studies, stratifying (sub-dividing) the study area into smaller units can aid in understanding the variation and differences within the study area. For example, the city area may be stratified into land-use classes or neighborhoods.

Pre-stratification

With pre-stratification, the study area is divided into smaller units (*e.g.*, land uses) prior to distributing the plots. The number of plots in each stratum is based on which areas are believed to have the greatest variability or are of greatest interest. Often the majority of the plots is distributed within residential and forest /vacant land uses, as these areas often have the greatest density of trees. Each stratum should contain a minimum of 10 plots.

Pre-stratification is often best if the study is a one-time only study (plots will not be revisited in the future), as pre-stratification can often reduce overall variance more than post-stratification. However, the disadvantages of pre-stratification are 1) analysis of remeasurements of plots in future can be more difficult as strata can change through time, and 2) stratification is limited mainly to the pre-stratification selection (i.e., multiple stratifications are easier with post-stratification using the random, grid or randomized grid plot distribution).

Post-stratification

With post-stratification, the plots can be stratified after the data are collected and can be stratified in many ways (*e.g.*, one can stratify by land use or community districts). The stratification does not need to be predetermined prior to the sampling. All three sampling schemes listed above can be post-stratified.

If the study area is to be stratified, the boundaries of these strata need to be known. A common way of obtaining land use information and boundaries for stratification is to use GIS maps that often already exist within a city. Also, National Land Characterization Data (NLCD) can be used for stratification (http://www.mrlc.gov/mrlc2k_nlcd.asp). The number of strata used in a UFORE project is typically between 5 and 10 (for an analysis with 200 total plots). Too many strata can lead to analysis problems, as too few plots may fall in some strata. If more strata are needed, more plots may be required to meet desired precision standards.

The number of plots to be sampled also needs to be determined. As the number of plots increases, the standard error decreases and one can be more confident in the estimate

for the population. However, as the number of plots increases, so does the time and cost of field data collection.

As a general rule, 200 plots (1/10 acre) in a stratified random sample in a city will yield a standard error of about 10% for an estimate for the entire city (*e.g.,* number of trees in the city). With the first 100 plots, the standard error drops more rapidly than with the second 100 plots, but standard error it continues to drop with increased sample size. A crew of two people can typically measure 200 plots within one summer for a city with about 20% tree cover. Actual number of plots measured varies based on many factors, including size of city (increased drive time between plots) and tree cover (the more trees in a city, the more time is spent measuring trees).

Step 3. Determining the Data Collection Needs

There are many variables that can be collected in the field, and each variable collected adds to the cost of the project. Thus, deciding which variables to collect is an important decision. The following is a list of data types that can be collected. For each data type, a decision must be made if these data are important for the analysis.

Long-Term Data

Permanent reference data (see sections 1.7 and 1.7.4) can be collected so that changes can be assessed in the future using the same plots.

They are also needed to conduct periodic inspections required by the Quality Assurance (QA) Plan (see Appendix C).

Ground Cover Types

Ground cover data (see section 1.7.2) are used to estimate the amount and distribution of various ground cover types in the study area.

Shrub Data

Shrub data (see section 1.7.3) are used to estimate pollution removal and VOC emissions by shrubs.

Tree Data

The following are the core variables that are required and used in most UFORE analyses. Items listed in parenthesis reveal if data are used for structural (S) or functional analyses (*i.e.,* air pollution removal [A], carbon storage/sequestration [C], VOC emissions [V], energy conservation [E], pollen index [P]) within the UFORE program.

- Tree species (all)
- DBH (S, C)
- Height to base of live crown (S, A, V, P)
- Total tree height (all)
- Crown width (S, A, V, P)
- Crown light exposure (S, C)
- Percent canopy missing (S, A, V, P)
- Crown dieback (S, C, E)
- Distance and direction to nearby building (E)

(See section 1.7.4 for more details.)

Step 4. Locating Field Plots

If the random plots were created in a GIS, whether using the Sample Plot Generator (see section 3.4.2) or another method, the plot shapefile can be overlaid on digital aerial photos of the study area to aid crews in locating plots on the ground. If digital photos are not available, the plots can be located on a digital land use or road map.

Various plot sizes can be used. Previous analyses have typically used 1/10 acre (0.04 hectare) circular plots.

Plot size	Plot radius
1/75 ac	13.6 ft
1/24 ac	24.0 ft
1/10 ac	37.2 ft
1/6 ac	48.1 ft

If a plot cannot be accessed, an alternate plot within the same land use or Multi-Resolution Land Characteristics (MLRC) Class should be selected. For grid sampling schemes, the plot should be located in the same grid and land use as the non-accessible plot.

Step 5. Collecting Field Data

Data can be collected on PDAs using the UFORE Tree Inventory PDA Utility (see section 3.2.2), or on paper forms (see Appendix E) using the UFORE Shell (see section 1.4.3) for data entry.

Step 6. Analyzing Field Data

Whether using PDAs or paper forms, the field data eventually reside in an Access database known as the Field Input Database. This database is sent through the UFORE Shell to the Forest Service in Syracuse for analysis (see section 1.4.3), and results will be returned to the user within 2-6 weeks. The results will be imported automatically into the Shell for viewing tables, graphs, maps and the report.

Summary

Before beginning data collection, the following questions must be answered:

1. Are the data to be remeasured in the future? Yes No
2. Are data to be collected on ground cover types? Yes No
3. Are data to be collected on shrubs? Yes No
4. For trees, for which of the following targets of analysis should data be collected?
   - Forest structure
   - Air pollution removal
   - Carbon storage/sequestration
   - Volatile organic compound emissions
   - Building energy effects

The following additional data are needed for sampling:

1. Digital boundary of study area (*e.g.,* vector GIS file of city boundary).
2. Digital boundaries of individual strata (*e.g.,* digital land use maps). These are optional, but needed if data are to be post-stratified into smaller units (*e.g.,* land use types).
3. Total number of plots to be sampled.

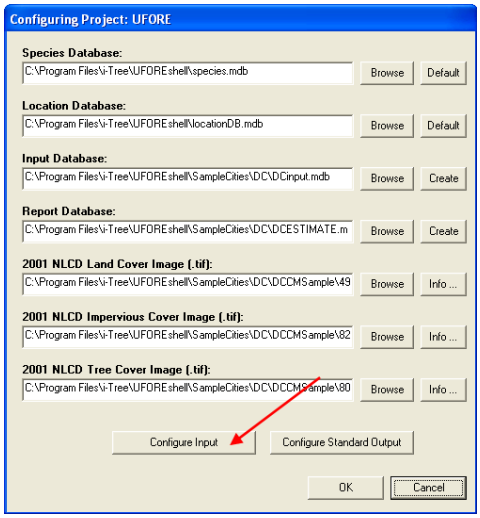
1.3.2 Opening the Sample UFORE Project

In order that the new user may become used to the functionality and capability of the UFORE shell, a sample project has been supplied with the application. Open the UFORE shell by clicking **Start → (All) Programs → i-Tree → UFORE Shell**. From the **File** menu, select **Open DC Sample Project**. Explore the project using the workspace functions as described below in section 1.3.6.

1.3.3 Creating a New UFORE Project

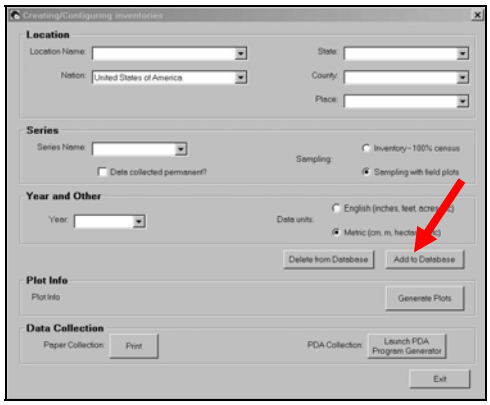
1. Open the UFORE shell by clicking **Start → (All) Programs → i-Tree → UFORE Shell**.
2. From the **File** menu, select **New Project**. Browse to the location where you want to save the file, name it as you want (it will automatically be given the file extension of *.U4), and click **OK**.
3. A dialogue box (Configure Project: UFORE) will pop up asking you for the location of four databases required by the program and three optional images used for mapping results:
   - Species
   - Location
   - Input
   - Report
   - Land Cover Image
   - Impervious Cover Image
   - Tree Cover Image

   The first two will be automatically entered. Supply a name for your Input and Report databases (*e.g.*, [StudyAreaName]_[Year]_Input and [StudyAreaName]_[Year]_Report), then navigate to the location where you want to store them and click **OK**. The UFORE shell then creates and stores the correct tables for the project. The NLCD image file locations are used for mapping results are optional (see Section 1.5.2)

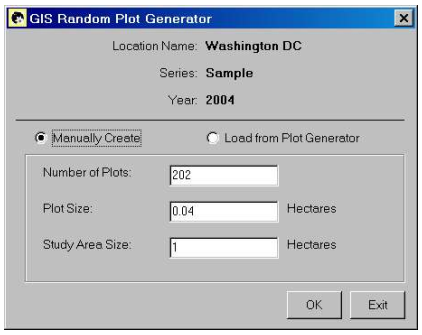


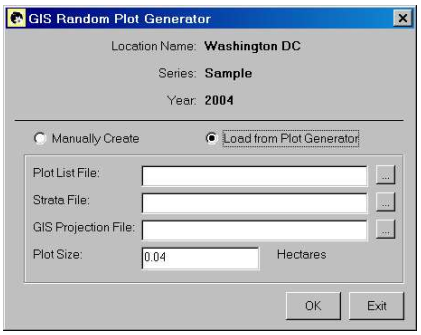
4. Once all four tables and three image files (optional) have been located and/or created, click on **Configure Input**.
5. A new dialogue box (Creating/Configuring inventories) opens. Here you will fill in information specific to the project, create your random plots, and set up data collection materials.
   - Fill in the Location, Series and Year and Other boxes, referring to the guidelines in section 1.3.1. (Series is used to identify the exact nature of the project, *e.g.*, "ParkTrees" or "City," to separate if where necessary from other UFORE projects done at the same time in the same place.) When you finished, click **Add to Database**.

> **NOTE: If community that includes your study area extends across more than one county, you may have to try all relevant county names before the community name appears in the menu.**



- To set up your random plots, click on **Generate Plots**. The dialogue box that pops up offers you a choice of manual or automated (recommended) methods. Each choice is associated with its own input screen below the radio buttons. Section 1.3.1 contains guidance on the number and size of random UFORE plots.





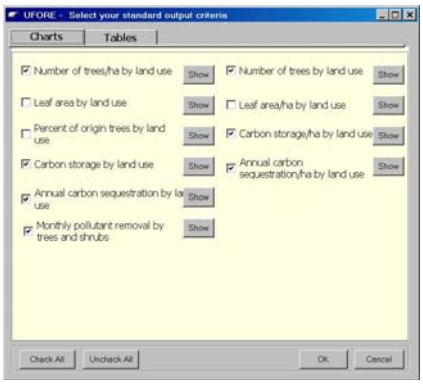
  - **Manually Create**. Fill in the number and size of plots you would like to have in your study domain, and the size of the study domain, and the shell will create the necessary files automatically. No stratification is possible using manual plot creation. You must then locate these random plots on a photo or map using a valid random selection procedure (see section 3.4.2 for details).
  - **Load from Plot Generator**. Browse to the location of the three files that you saved after creating your sample plots with the UFORE Plot Generator (see section 3.4.2), or with a GIS (see Appendix C: Manual Generation of Plot Location Files for PDA), and click **OK**. By default, the plot list file is named *Points_Report.doc* and the strata file *Strata_Area_Report.doc*. The GIS projection file will carry the name you gave the project with the extension **.prj*. Finally, fill in the plot size (*e.g.*, 0.1 acres) that you used.

NOTE: A legacy plot generator exists written for ArcView 3.x, but it is not supported by i-Tree. It can be downloaded from the Resource/Learning Center of the i-Tree website: http://www.itreetools.org. Follow the directions in the accompanying README file, then use the Manually Create button to insert the plot information into the shell.

6. After you have created the random UFORE plots with either method, your final step is to create the field data collection materials you will need. You can choose to collect data on paper forms or on PDAs.
   - **Paper forms**: click on the **Print** button next to Paper Collection. These forms are also in the i-Tree User's Manual.

- **PDAs**: click on **Launch PDA Program Generator**. This action requires that you have already installed the Tree Inventory PDA Utility for UFORE (see section 3.2) from the i-Tree CD. The UFORE PDA Utility will pop up with the project information you have already entered in the shell. You will use the Utility to set up data collection forms for field use following the directions in section 3.2.2.

7. Click **EXIT** to leave the Creating/Configuring Inventories dialogue box. You are returned to the Configuring Project: UFORE dialogue box.
8. The final step is to configure the standard output that will be shown in the UFORE shell when the results have been loaded.
   - In the Configuring Project: UFORE dialogue box, click on **Configure Standard Output**. A dialogue box pops up entitled UFORE – Select your standard output criteria. You will see tabs for Charts and Tables.



   - By default, all available charts and tables will be checked for inclusion under Results in the UFORE shell. Eliminate any you do not want by unchecking the box to the left of the title. If you are unsure what the title refers to, click **Show** to see the actual item. You can alter these choices later by returning to this screen through the menu bar: **File → Update Project**.
   - When you have finished making your choices, click **OK** to return to the Configuring Project: UFORE dialogue box.
9. Click **OK** to exit the Configuring Project: UFORE dialogue box and return to the UFORE shell main screen. You are now ready to proceed to data collection.

1.3.4 Opening an Existing UFORE Project

1. Open the UFORE shell by clicking **Start → (All) Programs → i-Tree → UFORE Shell**.
2. From the **File** menu, select **Open Project**.
3. Browse to find the project you are seeking, highlight it and click **OK**.
4. The project will open in the **UFORE** shell.

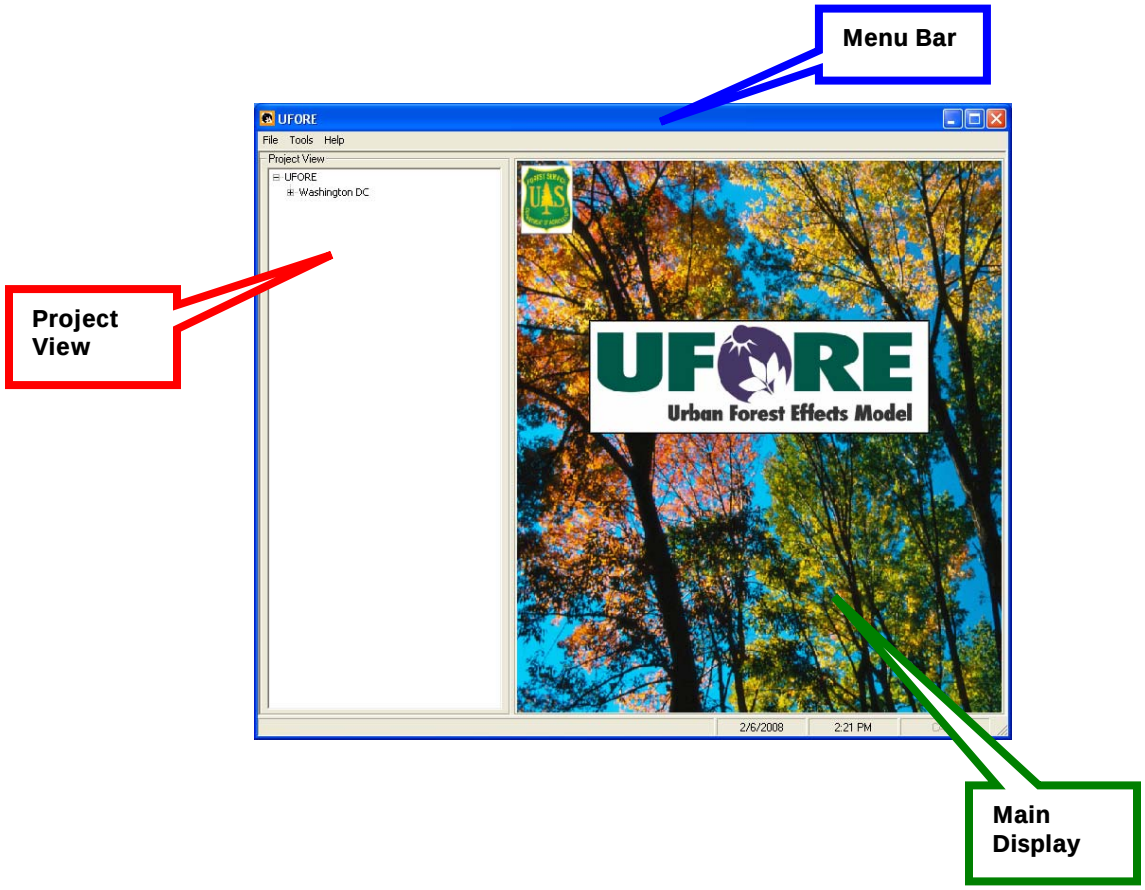
1.3.5 Updating an Existing UFORE Project

NOTE: If you have already started data collection, avoid making any changes to the project that would affect the quality or integrity of the data.

1. Open the UFORE shell by clicking **Start → (All) Programs → i-Tree → UFORE Shell**.
2. Open an existing project as described above.

3. From the **File** menu, select **Update Project**. (This action is unavailable if no project is open.)
4. The dialogue box you worked with when creating the project (Configuring Project: UFORE) will open. Make any changes to the database selections and/or locations.
5. Click on **Configure Input**, and make any changes desired in the dialogue box **Creating/Configuring inventories**. Click **EXIT** and then **OK** to finish.
6. If you are using PDAs for data collection and have already loaded data collection programs on the handhelds, you will have to regenerate the data collection programs when your changes are complete in order to update their configuration. Click on **Launch PDA Program Generator**, make any changes necessary, and regenerate the data collection forms. It is recommended that you manually remove the old forms from the PDAs before carrying out an ActiveSync® session to place the updated forms on the PDAs.

1.3.6 Understanding the UFORE Work Area



Menu bar

File – this menu item contains the following submenu items. Their function is indicated clearly by their name.

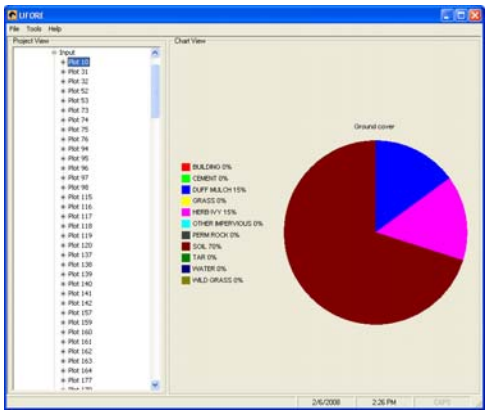
- New Project
- Open Project
- Open DC Sample Project
- Update Project
- Save Project
- Save Project As
- Close Project
- Exit

Tools – the following tools are available.

- Enter or Edit Field Data – Brings up a form for entering or editing field data (**Edit Plot**). In the plot information box at the top, click on the **PlotID** you want to edit, and then edit the plot data as required. To add a plot, click **Add Plot** and enter the new **PlotID** number for which you wish to enter data; then fill in in the boxes from the field sheets. **Save Edits** frequently as you procede. Click **Exit** when you are done.
- Plot Generator – see section 1.3.3.
- PDA Utility – see section 1.3.3.
- Species Selector (Beta) – see section 3.5.
- Send Data to Forest Service for Processing – see section 1.4.3.
- Load Data from Forest Service for Reporting – see section 1.4.3.
- Show/Print Paper Collection Form – Brings up the paper data collection forms for viewing and printing.

Help – the following menu items can be found:

- Help – Clicking this item will launch the i-Tree User's Manual, where you can use the hyperlinked Table of Contents to quickly navigate to your topic of interest.
- Species Codes – Clicking this item will launch a search dialogue box. Type in the species code you want, then click the binoculars icon.You will then see the genus, species and common name associated with that code. The information appears automatically if you select the species code from the drop-down menu.
- itreetools.org – Get support.
- About – Displays a graphic showing developers and cooperators for this application.
- Check For Updates – Check for the availability of updated versions of i-Tree programs currently installed on your computer.
- Report A Bug – an online utility for reporting a technical bug and tracking its resolution.



Project View

This area on the left of the UFORE shell workspace displays the currently loaded project in tree structure form. Clicking on the boxed plus sign to the left of any entry will expand the submenu below it; once expanded, the sign changes to a boxed minus sign, which you can

click to collapse the submenu again. When expanded to the plot level (field data), it will look something like the image to the right, which shows data from the sample project that accompanies the application.

When the processed data have been loaded into the shell, clicking the **Results** submenu will allow you to view, export and print the charts and tables (see section 1.5) associated with the project that you selected during configuration.

Main Display

Whatever is selected in the Table of Contents is displayed in this area, along with the relevant function buttons.

1.4 Data Operations

1.4.1 Minimum Field Data Requirements

This section summarizes the minimum data that need to be collected to run a UFORE analysis.

- Plot ID
- Measurement units (Metric/English)
- Actual land use
- Plot tree cover (%)
- Tree species
- DBH
- DBH measurement height (if not at 4.5 feet)
- Total height
- Height to live top
- Height to crown base
- Crown width
- Percent canopy missing
- Dieback
- CLE – crown light exposure
- D# – direction to building (needed for energy conservation only)
- S# – shortest distance to the building (needed for energy conservation only)

1.4.2 Air Pollution Data

Air pollution data are not required from the user if the field data are collected in the United States. However, if the data were collected elsewhere, hourly air pollution data should be submitted in a Microsoft® Excel format. The column names and data reported should be as follows:

Column	Name of Column	Description
A	**Year**	**The year the data were recorded**
B	**Month**	**The month the data were recorded (1-12)**
C	**Spname**[1]	**Name of pollutant**
D	**Cityname**[2]	**The name of the city where the pollution monitor is located**

E	**Addr**[3]	**The address of the pollution monitor**
F	**Units**	**1 indicates µg/m^3** **7 indicates ppm**
G	**Quantity**	**The concentration of the pollutant in ppm for CO, NO2, O3, SO2; and in µg/m^3 for PM10**
H	**Day**[4]	**The day the data were recorded (1-31)**
I	**Hour**	**The hour the data were recorded (1-24)**

[1]**Spname** must be CO, NO2, O3, PM10, SO2.
[2]**Cityname** and **Addr** are both strings, and it does not matter what is located there.
[3]**Addr** cannot exceed 5 characters, including spaces.
[4]**Day** would need to be labeled 1-31 even if no Day 31 existed in the month. Quantity would be recorded as a period(.).

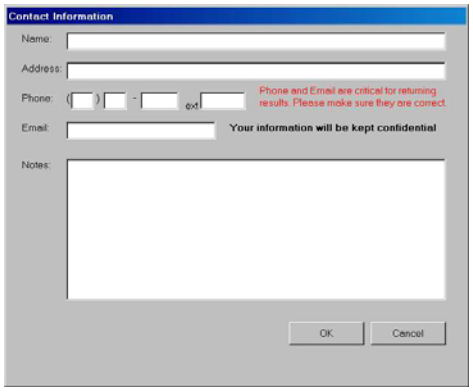
1.4.3 Automatic Data Transfer

NOTE: This section describes data transfer between the user and the processing program on a computer at the USDA Forest Service Northeaster Research Station in Syracuse. Local data transfer between the PDA and the Desktop PC is described in section 3.2.2.

Uploading Field Data

Once field data have been collected, they need to be entered into the shell and sent for processing.

1. Data entry procedures vary by data collection method:
   - **Paper Forms**
     - Click **Tools → Enter or Edit Data**. A data entry form opens.
     - Enter the data for each plot, matching the data entry form with the paper form.
   - **PDAs**
     - Data are automatically uploaded into the correct database location when the handhelds are synched with the desktop utility.
     - See details in section 3.2.2.
2. When data entry is complete, click on the menu **Tools → Send Data to Forest Service for Processing**. A dialogue box entitled Contact Information opens. Fill in the boxes, being particularly careful with your email address. Add any comments you feel are important to understanding your project data.



3. When you have filled in and checked all information, click on **OK**. Your contact information will be attached to your project file and uploaded automatically to a server, notifying the USDA Forest Service Research Unit in Syracuse that your data are ready for processing.

Downloading Results

1. When your data have been processed, you will be notified by email that the results are ready to download. A file name for the results will be supplied in the email that you will need.
2. Open the UFORE shell, and then open your project. On the menu bar, click **Tools** → **Load Data from Forest Service for Reporting**.
3. A dialogue box entitled File opens:

4. Fill in the name of the file from the email notification you received. The recommended method is to copy the file name from the email, then paste it into this dialogue box so that the file name is accurate.
5. Click **OK**. The UFORE shell will automatically download your results from the server and place them in the correct database location on your computer.

1.5 Reporting Results

1.5.1 General

The UFORE shell makes the results that you selected during the configuration of the project available as charts, tables, maps or written report. Once your field data have been processed and returned to you via the AutoTransfer module, navigate through the tree structure in the Project View window panel to Results.

Clicking on the boxed plus sign to expand the Results entry will reveal entries for Charts, Tables and Maps. Each of these in turn can be expanded to view the list of available items.

Standard Charts Available

- Number of trees by land use
- Tree density by land use
- Leaf surface by land use
- Leaf area density by land use
- Origin of live trees, percent by land use
- Carbon storage by land use
- Carbon storage density by land use
- Annual carbon sequestration by land use
- Annual carbon sequestration density by land use
- Monthly pollutant removal by trees and shrubs

Standard Tables Available

- Percent of tree species population by land use and DBH
- Percent of tree species population by DBH
- Percent of condition for trees by land use
- Percent of DBH and condition classes for trees by land use
- Percent of trees by condition class
- Origin of live trees, percent by land use
- Susceptibility of trees to Gypsy Moth by land use
- Susceptibility of trees to Asian Longhorned Beetle by land use
- Percent of predicted land use in actual land use
- Species richness, Shannon/Wiener Diversity Index
- Percent ground cover by land use
- Total estimates for trees by species
- Total estimates for trees by land use
- Leaf area and biomass for trees by DBH and land use
- Leaf area and biomass for shrubs by land use
- Leaf area and biomass for trees and shrubs by land use
- Per area estimates for trees
- Energy effects from trees

Printing Results

When the contents of the Main Display can be printed, you will see a **Print Preview** button in the upper left hand corner. Click on that button, then click the **printer icon**.

Exporting Results

In the upper left hand corner of any chart or table viewed in the Main Display, click on the button **Data Export**. Select whether you want comma delimted text (*.txt) or Excel spreadsheet (*.xls), click **OK**, then choose a location to store the file and click **Save**.

1.5.2 Maps (Beta)

Overview

The **Maps (Beta)** option listed under UFORE results allows you to spatially visualize select UFORE calculations in conjunction with the 2001 National Land Cover Dataset (NLCD) as distributed by the Multi-Resolution Land Characteristics Consortium (MRLC www.mrlc.gov). It is a simple tool that allows you to map several basic urban forest data without having access to GIS software and skills.

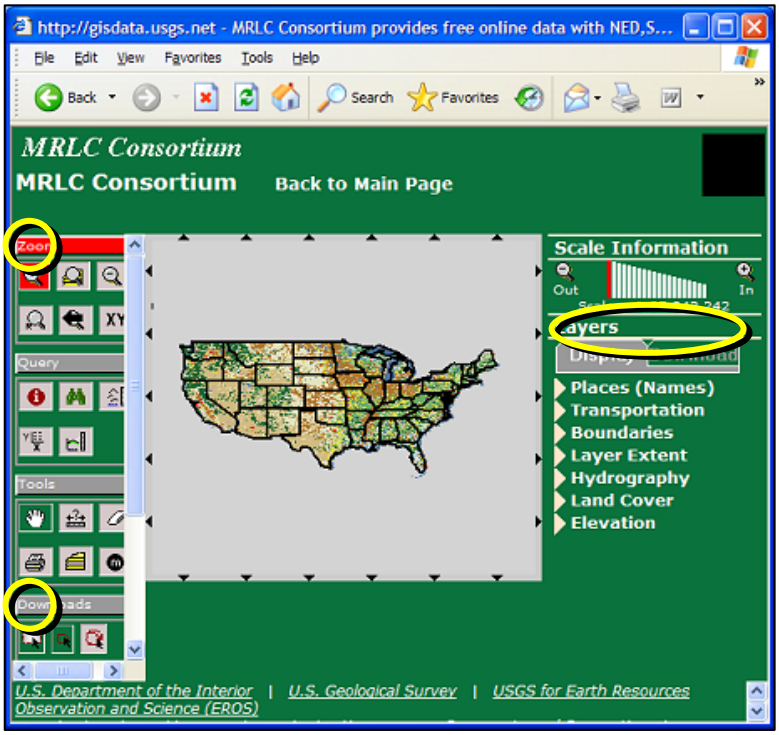
NLCD are distributed primarily as three types of imagery: 1) Land Cover, 2) Percent Impervious Cover, and 3) Percent Tree Canopy. These images are derived from Landsat satellite imagery at a 30 meter resolution where each image pixel is 30 m x 30 m. The reflected light, or spectral response of ground features is captured by the satellite and subsequently processed and analyzed to extract meaningful information. Land cover image pixels are classified as one of twenty-one categories such as open water, highly developed, deciduous forest, etc. (see Appendix A). Tree Canopy and Impervious Cover image pixels are rated from 0 to 100 percent. A given image pixel might therefore be classified as Medium Intensity Development land cover, with 25% tree canopy, and 30% impervious cover.

NLCD Data Artifact Warning — Two pertinent limitations to the data should be noted: 1) thin, linear features such as bridges can be overwhelmed by the spectral response of the surrounding surface material, particularly water. In some cases this will produce data artifacts where portions of a bridge span may not register as impervious cover. 2) Impervious cover and Tree Canopy are not necessarily mutually exclusive as Tree Canopy may exist over top of Impervious Cover. You should be aware that both of these limitations will impact subsequent map calculations and thus display.

NLCD Datasets

NLCD data can be freely obtained through the interactive MRLC Consortium Viewer offered at this website: http://gisdata.usgs.net/website/MRLC/. Please review the User Instructions before using this online mapping service. Response time of the viewer depends on the user's internet connection speed.

MRLC Consortium Viewer



Instructions for Obtaining NLCD Data

Use of the UFORE Maps function is reliant on NLCD Land Cover datasets. Follow the steps below to obtain and download the three required layers:

1. Once the Viewer is launched, use the Zoom tool to focus tightly upon your study area.

2. Use Display Layers listed to the right of the map window to refine your extent based upon known landmarks.

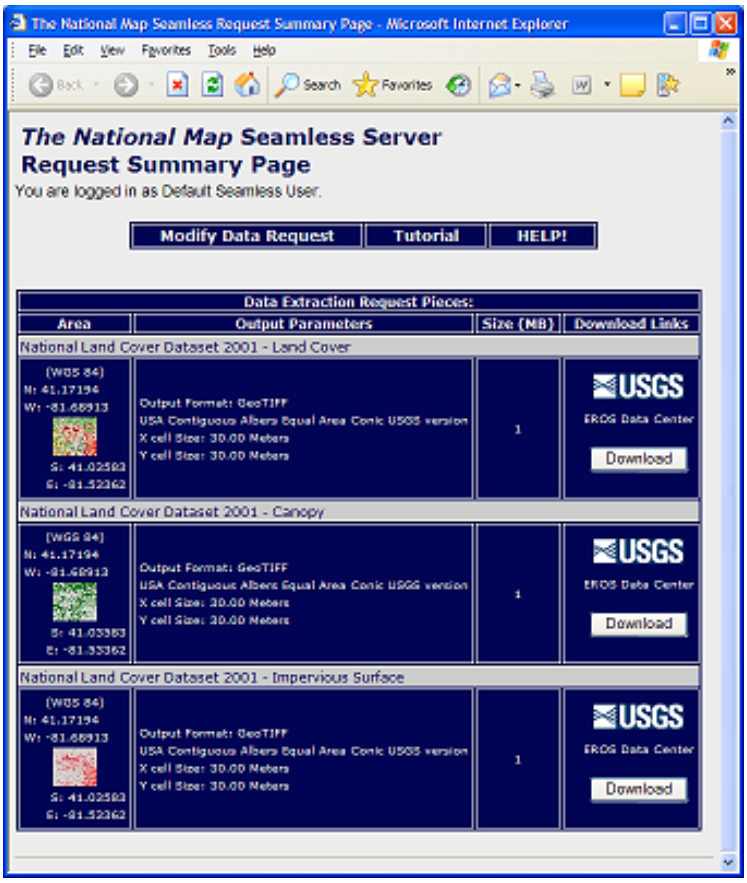
3. Once the study area has been accurately focused upon, use the Download Layers tab and select only these layers:
   a. NLCD 2001 Land Cover
   b. NLCD 2001 Canopy (Tree Cover)
   c. NLCD 2001 Impervious Surface

4. Use the rectangular Download tool from the toolbar group to the left of the map to define the final download area on the map.

> Note: do not drag the tool beyond the map edges as it causes a reset of the viewer.

5. The download process starts after using the Download tool. **Make sure that all three datasets are present in the download window as the three images must be downloaded at the same time with the exact same extents.**

*All 3 images **must** be downloaded **simultaneously***



6. Finally, select a location to save the three images. Navigate to said location and unzip/extract the images.
7. Using the **Configure Project** dialogue box (see Section 1.3.3), browse to the saved location on your computer for each of the three NLCD cover images.

Data Operations

General

Where appropriate, UFORE results are mapped directly to the NLCD image pixels through the use of the three NLCD images. First, user-assigned UFORE land cover designations are matched to the NLCD land cover designations. Next, UFORE-specific calculations are performed upon each image pixel using appropriate UFORE-derived values for a given land cover class and also by incorporating NLCD tree canopy and NLCD impervious cover image pixel percentages where appropriate. Finally, the NLCD imagery is re-colored to reflect the results of the calculations.

Land Cover classes and associated UFORE values are used in calculations pertaining to Carbon Storage, Carbon Sequestration, Tree Structural Value, and Tree Density. Pollution Removal calculations use a city-wide UFORE value in conjunction with NLCD Tree Canopy and reflect an aggregate of five pollutants: CO, NO_2, SO_2, O_3, and PM10. Tree Available Space and Tree Percent Canopy Stocking utilize NLCD Tree Canopy and Impervious Cover.

You are strongly advised to define your UFORE land cover categories from the outset of a UFORE project to match those of the 2001 NLCD classification system (see Appendix A). This will provide the best match-up between them at the later, results stage of a UFORE project. A **Cross-Walk** matching tool is provided for this purpose (see below). Users with their own classification systems can also make use of the **Cross-Walk** tool to relate to the appropriate NLCD classes. However, it should be noted that:

Land Classification Warning – if strata (e.g., land use classes) in UFORE analysis are not NLCD land cover classes, then the extrapolation of effects to the cover maps will be approximations based on the assumptions that the average results from the UFORE strata per unit canopy fit the NLCD classes as assigned by the user.

In addition, with regard to tree canopy, it should be noted that:

Canopy Cover Note – as canopy cover from the NLCD maps likely differs somewhat from the canopy cover estimates from UFORE, the total effects as illustrated by the maps will be off proportional to the differences in the cover estimates. For example, if NLCD estimates 20% tree cover in a strata, and UFORE estimates 40%, then the total estimate as portrayed on the map will be underestimated by 50% (20/40).

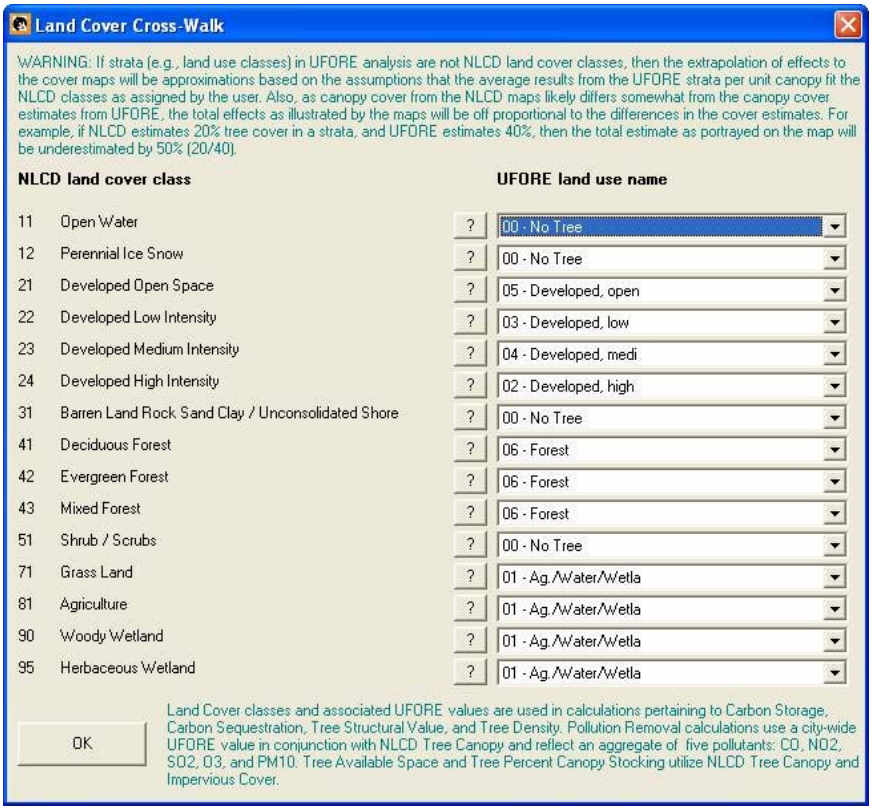
Land Cover Cross-Walk

Before using the **Map (Beta)** results tool, the user is required to match their UFORE land cover classification categories to the nearest, most appropriate

NLCD land cover class. This is accomplished with a matching tool called the **Land Cover Cross-Walk**.

To open the Cross-Walk tool:

- Launch the UFORE shell by clicking **Start → (All) Programs → i-Tree → UFORE Shell**
- Open your project.
- From the **Project View** window of the UFORE Shell, navigate to **Results → Maps (Beta)**



NLCD land cover classification categories are listed on the left. User-designated UFORE land cover classification categories are listed on the right via drop down boxes. You must match each of your land cover to the most appropriate NLCD category. User-designated UFORE land cover categories may be matched to appropriate NLCD land cover categories more than once. For example: you might designate your "Forest" class as a match to each of the three NLCD Forest classes (Deciduous Forest, Evergreen Forest, and Mixed Forest).

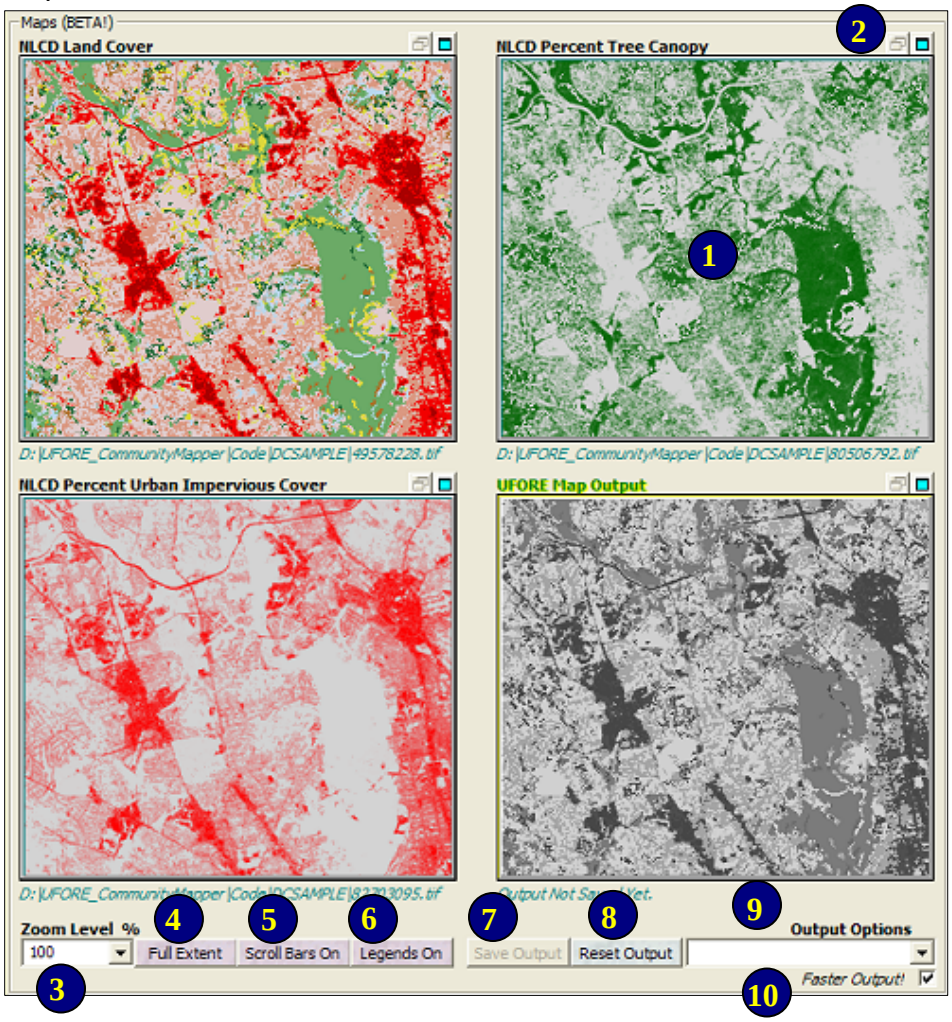
Land Cover Match Up Warning – it is important to appropriately match land cover categories in this step. Subsequent map calculations performed on the NLCD image data are inherently dependent upon this step. Inappropriate match-ups between categories will skew the output image results.

The match-ups assigned by the user are stored in the software and do not need to be accessed again unless desired.

Map Controls

The map results window consists of four sub-windows that display the users downloaded NLCD Land Cover, Tree Canopy, Impervious Cover imagery, as well as the chosen map result or **Output**. The windows pan and zoom in unison. The Outputs can be saved as a TIFF images and brought into common GIS programs for further mapping, or inserted into Word Processing documents, etc.

Map Results Window



The following 10 controls can be used to operate the Maps (Beta) results window:

1. **Imagery Window** – click and drag with mouse to pan the images
2. **Maximize / Restore Image Window** – enlarge a single window
3. **Zoom Level of Image Windows** – select from dropdown or enter value
4. **Full Extent** – zoom to full extent of map images
5. **Scroll Bars** – image window scrolling; toggle on or off
6. **Legends** – map legends; toggle on or off
7. **Save Output** – once processing is complete, select a location to save the Output image
8. **Reset Output** – clear the processing selection and reset the Output image

9. **Output Options** – select the desired output result
10. **Faster Output** – by default the Output image is turned off during processing for faster processing. Un-checking this box results in a real-time update of the Output image at a much slower pace.

Usage Notes

a) Output processing time is system dependent. On slower machines, processing may take several minutes.
b) Output processing progress is shown by a progress bar at the bottom of the screen. Occasionally, this progress bar will appear to stall due to other system activity on your computer. You should NOT exit the program at this point. Instead, wait a few more minutes for the processing to complete.
c) The three NLCD datasets (land cover, tree canopy, impervious cover) MUST be downloaded at the same time so they have the exact same extents. If these images are downloaded separately they will not align correctly and all subsequent Output processing will be invalidated.

1.5.3 Written Report

When you click on the **Written Report** link, a written summary report (approx. 15 pages) of your UFORE results will be automatically generated. An initial dialogue box will prompt you to enter your city's human population. It can be obtained from the US Census Bureau at http://www.census.gov/popest/cities/.

The Written Report can be viewed in the Shell, or click the export button for a copy in *.pdf or *.rtf format.

1.6 Troubleshooting

Questions about this application should be directed to i-Tree Support through any of the means listed on the i-Tree website (http://www.itreetools.org/support).

1.7 Data Collection

NOTE: This section concerns field data collection only. For other data required by UFORE, see section 1.3.

Plot Establishment

NOTE: Methods given are based on a 1/10 acre, circular plot.

1. Locate plot center in field from plot location given on aerial photograph and/or map.
2. Get permission to access property (if necessary, *e.g.,* from resident). If unable to access plot, select an alternate plot (see section 1.3.2). If you have a list of alternate plots, select the first plot from the list for that land use. Do not skip around; go in sequence.
3. At plot center of permanent plots, establish references to permanent fixtures (direction and distance to object), and GPS coordinates if available. Identify location (*e.g.,* address if available, front or back yard, etc.). If plot is the middle of the forest, write specific directions (distance and direction) to plot center, and use degree decimal coordinates provided by the Sample Plot Generator. At the plot, record two

witness trees and mark direction and distance to witness trees from plot center. Try to select unique species or DBH with respect to other trees on the plot.

4. Determine plot boundaries. Plot radius is 37.2 ft. If on slope, measure slope with clinometer and adjust plot width accordingly. Adjusted plot width, or limiting distance, can be read from the following table:

Slope %	5	10	12	15	17	20	22	25	27	30
Slope Angle	2.9°	5.7°	6.8°	8.5°	9.7°	11.3°	12.4°	14.0°	15.1°	16.7°
Limiting Distance 1/6 ac	48.2′	48.3′	48.4′	48.6′	48.8′	49.1′	49.3′	49.6′	49.8′	50.2′
Limiting Distance 1/10 ac	37.2′	37.4′	37.5′	37.6′	37.7′	37.9′	38.1′	38.3′	38.5′	38.8′

5. If plot center falls on a building or other surface (such as a body of water) where the center point cannot be accessed, the plot is not to be moved. Distance to plot center from the edge of the obstruction should be measured from the aerial photograph or estimated in the field. The boundary of the plot should be determined on the ground in the plot area that is not obstructed (Appendix C).

Shrub vs. Tree

Any woody vegetation (tree or shrub species) with a DBH ≥ 1 inch is considered to be a tree, for measurement purposes. If DBH does not equal one inch, then the plant is considered a shrub. If woody plant does not reach 12 inches in height, then that plant is considered herbaceous ground cover.

Data Collection

NOTE: See Appendix E for UFORE paper forms.

* = required variable for UFORE
** = required variable for permanent plots
*** = required variable for water quality and quantity information

1.7.1 Plot Information

NOTE: Although not required for non-permanent plots, the establishment of reference objects and measurement of distance and direction to trees from plot center is strongly recommended. Without reference objects it will be very difficult to relocate plots in the future. The inability to relocate plots prohibits Quality Assurance (QA) checks on data collected and the ability to assess forest change.

- **Plot ID*** - plot number. Must be a unique identifier. Will be generated by Plot Selector Program. When using paper data collection forms **PLOT ID** will be repeated twice: on the first form at the top of the page and also in the top left corner of the Tree data collection form.
- **Plot address**** - additional notes will be useful if plot is located in area where there are no street numbers (vacant land, parks, industrial areas, etc.).
- **Date** (Confirm and/or correct date when logging in to PDA UFORE program).
- **Crew** – list first and last initials of each crew member.
- **Photo #** - (not required) photo number then roll/card ID if photos are taken. In PDA program, enter in box labeled **Photo**.
- **Plot Contact Info** - if available, record contact person's name and phone number. For residential land uses, do not ask for this information. However, if name is on

mailbox, record it. Owner/renter status is useful if it comes up in conversation. Include in Comment section when using PDA.

- **Reference objects**** - identify/describe the object(s) that will assist in locating plot center for future remeasurements and Quality Assurance (QA) checks. If using PDA, select from list of common Reference Objects in drop-down box or identify in Comment section. Identify at least 1 landmark visible when standing at plot center. Although just one is required, two are recommended, especially when plot center is difficult to locate or identify. They do not have to be located on the plot. Try to use objects that are likely to be present 5 to 15 years from now (*e.g.,* stop signs, telephone poles, permanent structures, sidewalks/driveways). If plot falls in forested area and there are no man-made or permanent objects within sight, select two unique or "witness" trees (striking species or DBH) that you expect to be present on the plot for a reasonable period of time. Photo(s) of reference objects are helpful if plot center is difficult to determine. Be very specific (*e.g.,* telephone pole 5 ft from left edge of driveway, facing the house). If plot center can't be accessed (on roof, center of highway, etc.), determine distance to plot center from photo or estimates in the field. Direction to object from plot center can be determined by taking the bearing from the reference object to plot center and adding or subtracting 180 degrees (value must fall between 1 and 360 degrees.) One of the reference objects should be used as a Tree Measurement Point (TMP). Make notation that plot center could not be accessed and fill in **TMP** information.
- **Distance to object**** (in feet or meters, to nearest $1/10^{th}$)
- **Direction to object**** (in degrees)
- **Tree measurement point (TMP) **** - if plot center falls on a building or other surface (such as highway) where plot center cannot be accessed, the plot is not to be moved. All distances and directions to trees are to be measured and recorded from a building corner or other fixed point. Under Reference Objects section, note which Ref. Object was used as TMP. If using PDA note in Comment field if the Reference Object is used as TMP (See Appendix C for further instructions).
- **Measurement Units* (M/E) -** Metric (m/cm), English (ft/in). This variable notes the type of measurement used for all variables that require ft/m or in/cm measurements. Paper form users record M or E; PDA users do not.
- **Percent measured*** - refers to the amount of the plot that the field crew is able to access and measure (either with direct measurements or from estimation). This allows for data collection for a partial plot. For example, if 10% of the plot is obscured from view behind a building or a tall stockade fence on land that you could not get permission to access, you would report **% Measured** as 90%. (Safety issues may also be a factor in accessing portions of the plot.) However, if you could look over a fence and estimate tree, shrub and ground covers and estimate DBH and other measurements for trees present on plot behind the fence, **% Measured** would be 100%. When using the PDA, uncheck the default value that DBH was measured in the STEMS screen, and include a note that you could not physically access the entire plot.
- **Actual land use*** - actual land use as determined by the crew on the ground (*i.e.,* not necessarily the land use noted from land use maps).

Land Use	Code	Land Use	Code
Residential	R	Vacant	V
Multi Family Residential	M	Institutional	I
Comm / Ind	C	Transportation	T
Park	P	Utility	U
Cemetery	E	Water / wetland	W
Golf Course	G	Other	O
Agriculture	A		

Definitions/Clarifying Points: how the land is being used, not necessarily the same as ownership of the land.

- **Residential** - One- to four-family freestanding structures.

  NOTE: A block of attached one- to four-family structures would be considered Multi-family Residential. A residential complex consisting of many separate one- to four-family structures and related greenspace would be considered Multi-family Residential as well.

- **Multi-family Residential** - structures containing greater than four residential units.

  NOTE: College/institutional dormitories would be classed as Institutional.

- **Commercial/Industrial** - include outdoor storage/staging areas as well as parking lots in downtown areas that are not connected with any institutional or residential use
- **Park** - can contain undeveloped (un-maintained) as well as developed portions
- **Cemetery** - may contain small areas of undeveloped (un-maintained) areas
- **Golf Course** - self-explanatory
- **Agriculture** - cropland, pasture, orchards, vineyards, nurseries, farmsteads and related buildings, feed lots, rangeland, timberland/plantations that show evidence of management activity for a specific crop or tree production
- **Vacant** - land has no apparent use; boarded up buildings and vacant structures are classified as the original designated use of the structure
- **Institutional** - schools, hospitals/medical complexes, colleges, religious buildings, government buildings, etc.

  NOTE: If parcel contains large un-maintained areas, possibly for expansion or other reasons, treat the area as Vacant. However, small forested islands in a maintained landscape would be considered as Institutional.

- **Transportation** - includes limited access roadways and related greenspace (such as interstate highways with on and off ramps; sometimes fenced); railroad stations, tracks, and yards; shipyards; airports; etc. If plot center falls on any other type of road, or associated median strip, plot is classified according to nearest adjacent land use.
- **Utility** - includes power generating facilities, sewage treatment facilities, covered and uncovered reservoirs, empty stormwater runoff/flood control channels/conduits.
- **Water/Wetland** - wide streams, rivers, lakes, and other water bodies (both natural and man-made). Small pools and fountains would be classified as adjacent land use.
- **Other** – land use does not fall in one of the categories listed above. Please avoid using this designation as it provides very little useful information for the model. Clarify with comments in Notes.

NOTE: *Mixed-use buildings* – land use is determined according to the dominant use, *i.e.*, the use that receives the majority of the foot traffic. It might not always occupy the majority of space in the building. For example, a building with commercial use of the first floor and apartments on upper floors would be classified as *Commercial/Industrial*.

- **Percent in*** - proportion of the plot that is in the land use as determined by the field crew. For most plots, this number will be 100%. However, some plots will fall on a border between two or more land uses. For example, 40% of the plot area might be residential and 60% vacant. When working on the residential area, **Percent in** would equal 40%; when working on the vacant area, **Percent in** would equal 60%. Land use differences must be clearly identifiable on the plot. There must be a clear change in human use of the land, not just its cover or ownership. All plot data (% tree cover, % shrub cover, % plantable space, ground cover percentages and shrub data) will be collected **once** for the entire 1/10th plot. Tree data will be recorded separately for each land use encountered. If using PDA, you must select the land use before entering tree data. If using paper forms, record appropriate land use code in each tree record.

The following plot information is recorded once for the entire 1/10th acre plot, even if the plot has more than one land use (split plots):

- **Plot Tree Cover (%)*** - the amount of tree canopies covering the plot. When looking upward from within the plot, one will either see tree canopies or open sky areas between the canopies. This datum is the proportion of the sky that is obscured by tree crowns within the plot and will range from 0 to 100%. Tree cover can come from trees located outside the plot; so plots not containing trees could have tree cover. Record 0%, 100% or mid-points of 5% intervals (3, 8, 13, 18, etc.).
- **Plot Shrub Cover (%)*** - percent of the plot area covered by shrub canopies. Don't double-count multiple layers of shrubs. Look down from above. Record 0%, 100% or mid-points of 5% intervals (3, 8, 13, 18, etc.).
- **Plantable space (%)** - percent of the plot area that is plantable for trees (*i.e.,* plantable soil that is not filled with tree canopies above or other overhead restrictions) and tree planting/establishment would not be prohibited due to land use (*e.g.,* footpath, baseball field, etc.). Planting underneath utility wires is permitted. Record 0%, 100% or mid-points of 5% intervals (3, 8, 13, 18, etc.).
  ***HINT: A more accurate measurement can be obtained by using the sum of the following **Ground Covers** as a starting point to evaluate **Plantable Space**: soil, duff/mulch, herb/ivy, maintained grass and unmaintained grass (see following section 1.7.2).

1.7.2 Ground Cover Information

NOTE: This information is required for UFORE.

Within the plot, various materials will cover the ground (trees and shrubs are considered separately; tree stems as a ground cover are ignored). The crew should note what proportion of the plot ground area is covered by the following materials:

Collection Medium		***Comments***
PDA	***Paper***	
01 – Building	%BLDG	
02 – Cement	%CMNT	
03 – Tar	%TAR	Blacktop/asphalt
04 – Rock	%ROCK	Pervious rock surfaces such as gravel, brick, or flagstone walkways or patios (without mortar). Sand in playgrounds or added as topping to existing soil. Large solid rock outcrops would be listed as Cement.
05 – Bare soil	%SOIL	Includes naturally occurring sand
06 - Duff/mulch	%DUFF/MULCH	
07 – Herbs	%HERB/IVY	Herbaceous ground cover, exclusive of grass, including agricultural crops
08 – Grass	%MAIN.GRASS	
09 – Unmaintained grass	%UNMAIN.GRASS	
10 – Water	%H2O	Includes pools

If data collectors using PDAs see additional ground cover categories on the pull-down menu, they should check with Project Manager for definitions as needed.

Record to nearest 5% unless cover is minimal. If trace amount present, 1, 2, 3%, etc. is acceptable. The sum of these proportions above must add to 100% per plot.

NOTE: Ground cover information is recorded once for the entire plot, even if the plot has more than one land use (split plots).

Use the following chart as a guide when estimating one and five percent increments of cover. (Some examples for comparison: queen size mattress covers 35 sq. ft., standard; full size [4-door] Sport Utility Vehicle [SUV] covers 90 sq. ft.).

Plot Size	$1/16^{th}$ acre		$1/10^{th}$ acre		$1/24^{th}$ acre		$1/75^{th}$ acre	
Plot Radius (ft.)	48.1		37.2		24.0		13.6	
1% Plot Area (sq. ft.)	73	5′ radius	43	3.5′ radius	18	2.4′ radius	6	1.4′ radius
5% Plot Area (sq. ft.)	363	11′ radius	217	8′ radius	90	5′ radius	29	3′ radius

1.7.3 Shrub Information

Shrub information can be used to estimate pollution removal by shrubs. A tree with DBH < 1 inch is considered a shrub.

NOTE: Shrub information is recorded once for the entire plot, even if the plot has more than one land use (split plots).

A certain proportion of the plot may be occupied by shrubs (*e.g.,* shrub cover may be 30%). If shrubs are present on the plot, this section of data collection focuses just on the shrub area. Thus, the shrub area (30% of the plot in this example) is the only area where data are collected. The following data are recorded for the each shrub species

group of similar height (*i.e.,* many shrubs of the same species and height can be combined for the shrub estimate).

Record a maximum of twelve shrub groups. If there are more than twelve, record measurements for the first eleven then lump the remaining shrubs into the twelfth group. Record the predominant species and averages for **Height** and **% Missing** for the final group.

- **Species** - if not known, note genus (see the Resource/Learning Center of the i-Tree website, http://www.itreetools.org, for PDF and Excel spreadsheet of species code list). The plant must be identified to its genus at a minimum; if genus is not known, then procure a sample to be identified at a later date.
- **Height** - height (to nearest 1/10th of ft/m) of the shrub mass for the species.

NOTE: Height of shrub masses of the same species will likely vary across the plot. An average height may be used and different shrub masses grouped together where variation in heights is relatively small.

- **Percent Area** - of the total ground area of all shrubs on the plot, record the percent of that ground area occupied by this species/height combination. Total of all **Percent Area** values recorded on the plot must equal 100%. Where there are two or more layers of shrubs, record the **Percent Area** of the entire tallest shrub mass, but only the area of the shorter shrub mass that is not shaded (overtopped) by the taller shrub.

NOTE: Visualize the area of the shrub masses from a birds-eye view, and report the percent of the shrub masses as seen from above.

- **Percent Shrub Mass Missing** - of the volume (height x ground area) of this species/height combination, record the percent of the volume that is missing, i.e., not occupied by leaves. The shrub mass leaves are assumed to start at the ground. This category allows field crew to account for voids in vegetation and inaccuracies of simple height x area estimates (*e.g.*, height of mass might not be uniform). Allow for natural arrangement or spacing of leaves; however, the field crews should investigate the interior of the shrub mass to better estimate the missing portions. In the past, crews have underestimated the mass missing by not accounting for the interior (this only applies to shrub masses). Intent of this variable is to adjust height and area measurements to reveal actual volume of leaves. Record 0%, 100% or mid-points of 5% intervals (3, 8, 13, 18, etc.).

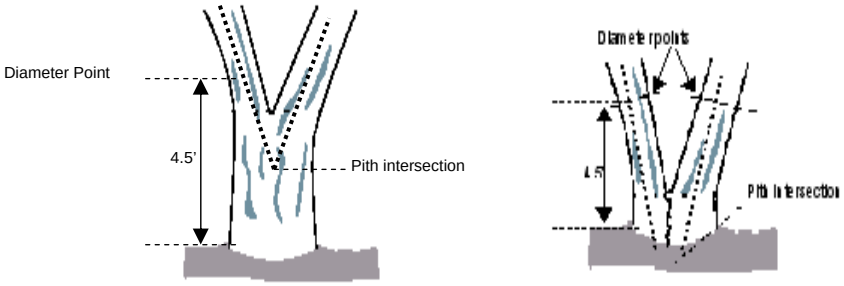
1.7.4 Tree Information

Data collection for living and dead trees starts with the farthest tree to the north and then proceeds in a clockwise direction.

NOTE: Flagging or chalking each tree as it is measured will help keep track of trees once they are measured and prevent missing or double-entering a tree. Do not leave permanent marks (paint or scribe marks) on trees when tally is completed.

If any sprouts of a tree are not attached to the main stem (*e.g.,* root sprouts) and the sprout DBH reaches tree dimensions, then the sprout is recorded as a separate tree. For each tree within the plot with greater than ½ of its stem in the plot and DBH ≥ 1 inch, the following data are recorded:

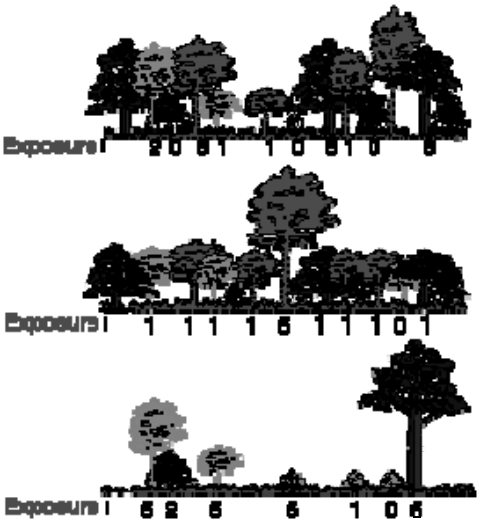
- **TREE ID** - unique tree number. Start at 1 and assign sequentially. PDA will assign tree ID automatically.
- **DR**** - direction from plot center to the tree (living or dead) in compass degrees/azimuths (*e.g.,* North = 360°; East = 90°; South = 180°). (This variable should be collected for remeasurement of permanent plots and Quality Assurance checks of non-permanent plots.) If plot center is inaccessible, *i.e.,* on top of building or in highway, measure direction from **tree measurement point (TMP)**. (See instructions in Appendix C.) ** Make sure that TMP info is recorded in Reference Object sections of paper forms or on PDA.**
- **DS**** - closest distance from plot center to outside of trunk at DBH, measured parallel to ground (living or dead) and to whole unit. For heavily wooded plots, increased accuracy is required to relocate trees. (This variable should be collected for all plots: remeasurement of permanent plots and Quality Assurance checks of non-permanent plots.) If plot center is inaccessible, *i.e.,* on top of building or in highway, measure distance from **tree measurement point (TMP)** (See instructions in Appendix C). ** Make sure that TMP info is recorded in Reference Object sections of paper forms or on PDA.**
- **SPECIES*** - if species is not known, take and number a sample, record in notebook as Plot # XXX unknown #1, etc. If using PDA, record as UNKN#1, UNKN#2, etc. Every time that same unknown is encountered on the plot, it will be recorded with the same number. Sequentially number unknowns in notebook and try to identify later. The number of each unknown is unique to the species. After samples have been identified at the office, go back to and enter correct species code on paper form or in PDA. If after all references guides have been checked, identification of individual species is still difficult (*e.g.,* due to hybridization) or individual species is not known, then record genus if possible. (See the Resource/Learning Center of the i-Tree website,http://www.itreetools.org, for PDF and Excel spreadsheet of species code list if not using PDA UFORE program.) For dead trees, when species or genus cannot be determined, record as Hardwood or Softwood.
- **LAND USE*** - record code of land use in which tree is located. (See section 1.7.1 Plot Information for list of codes if not using PDA.)
- **DBH*** - diameter of each living and dead tree at breast height (4.5 ft) on the uphill side of tree, to the nearest 1/10th in. or cm. (see Appendix C).
  Forked (multi-stemmed) tree - if the point of pith separation (see illustration below) is above ground, the plant is considered to be one tree. Measure each DBH separately up to six measurements. **If the tree has more than six stems greater than one inch at breast height, lower measurement height to one foot above the ground and record the diameter of up to six stems.** Enter "1.0 ft." in the DBH Measurement Height field. **If there are more than six stems greater than one inch at a height of one foot above the ground, record the six largest living stems and drop out any of the smaller and/or dead stems.** (If none of the stems is greater than one inch/2.5cm, it is considered a shrub.) If the pith union is below ground, each stem is considered a separate tree (included bark down to ground line is a good indicator that pith union is below ground).



- **DBH MEASUREMENT HEIGHT** – Height of measurement of diameter is recorded *only if diameter is not measured at 4.5 feet*. Record height as 1 ft. for trees multi-forked (>six 1 inch stems) at DBH. Record actual height (to nearest 1/10th of measurement unit) where diameter was taken for trees with irregularities at DBH (see Appendix C).
- **TOTAL TREE HEIGHT*** - height to top (alive or dead) of tree measured in ft. or m. *Tree height must be recorded for all trees, including dead trees.* For downed living trees or severely leaning trees, height is considered the distance along the main stem from ground to tree top (record to nearest ft. or m.) (see Appendix C).
- **HEIGHT TO LIVE TOP** – this height will be the same as total tree height unless the tree has leaves and top portion of the crown is dead. This variable cannot be greater than total tree height, but can have a lower value (record to nearest ft. or meter). On the rare occasion that Height to Live Top is less than Total Tree Height, place a diagonal line or slash through the Total Tree Height space on the paper form and enter Total Tree Height first, then record Height to Live Top. (For dead tree PDA has a default value of -1.)
- **HEIGHT TO CROWN BASE***-- height to base of live crown measured to closest ft or m. (Record dead trees as 0. PDA has a default value of -1.)
- **CROWN WIDTH*** - crown width measured in ft or m. Crown width is recorded by two measurements: N-S (North-South) and E-W (East-West) widths, or as safety considerations or physical obstructions allow. Dead trees always have a crown width of 0. If tree is downed or leaning, take width measurements perpendicular to the tree bole (record to nearest ft. or meter). (PDA has a default value of -1.)
- **PERCENT CANOPY MISSING*** - Percent of the crown volume that is **not** occupied by leaves. Within the "typical crown outline," estimate the percent foliage that is absent (subtract missing areas due to pruning, dieback, defoliation, uneven crown, or dwarf or sparse leaves). The typical crown outline is defined as a symmetrical silhouette created by the live crown width, total height, and height to base of live crown measurements. It is assumed to be symmetrical around the center point of the measured width of the tree and filled with leaves as if it were a healthy tree in excellent condition. This measure estimates the percent of leaf mass that is absent in the outline as compared to a healthy tree with a full symmetrical crown. Do not include normal interior crown voids due to leaf shading. Take into account the natural crown shape for the particular species. Two perpendicular measures of missing leaf mass are made and the average result is recorded. Record 0%, 100% or mid-points of 5% intervals (3,8,13,18, etc.) (see Appendix C). (Record as 100% for dead trees. PDA has a fixed value of 100.)

NOTE: Be sure to base Percent Missing measurement on the existing crown that you have measured. A third of the crown may have been removed for power line clearance or the canopy could be very lopsided due to presence of a neighboring tree. However, the crown that remains could have a 0% missing value, if the existing crown is very full.

- **DIEBACK*** - Percent crown dieback in crown area. This dieback does not include normal/natural branch dieback/pruning due to crown competition/shading in the lower portion of the crown. However, branch dieback on side(s) and top of crown area due to shading from a building or another tree would be included. Record 0%, 100% or mid-points of 5% intervals (3, 8, 13, 18, etc.) (record as 100% for dead trees) (see Appendix C). (PDA has a fixed value of 100%.)
- **% IMP***** - Percent of land area beneath entire tree canopy's drip line that is impervious. If tree crown crosses out of plot boundary, entire area beneath tree is still estimated. Record 0%, 100% or mid-points of 5% intervals (3, 8, 13, 18, etc.).
- **% SHRUB***** - Percent of land area beneath canopy drip line that is occupied by shrubs. If tree crown crosses out of plot boundary, entire area beneath tree is still estimated. Record 0%, 100% or mid-points of 5% intervals (3, 8, 13, 18, etc.).
- **CLE*** - Crown Light Exposure: Number of sides of the tree receiving sunlight from above. Top of tree is counted as one side. Divide the crown vertically into four equal sides. Count the number of sides that would receive direct light if the sun were directly above the tree. The top of the tree counts as an additional side (Figure 1). For dead tree, PDA has a default value of -1.



Crown Light Exposure

NOTE: 1/3 of the live crown must be receiving full light in order for a side to qualify. A sliver of a side receiving light does not qualify.

Record value of 0 to 5 based on codes in the following table.

Crown Light Exposure Codes

Code	Definition
0	The tree receives no full light because it is shaded by trees, vines, or other vegetation
1	The tree receives full light from the top or 1 side
2	The tree receives full light from the top and 1 side (or 2 sides without the top)
3	The tree receives full light from the top and 2 sides (or 3 sides without the top)
4	The tree receives full light from the top and 3 sides
5	The tree receives full light from the top and 4 sides

- **D#*** - Direction *to* building. (Noted as **Direction** on PDA.) For trees (>= 20 ft. tall) that are located within 60 ft. of space-conditioned residential buildings that are 3 stories (2 stories & attic) or less in height, record the direction (azimuth) *to* the closest part of the building. This should be noted in degrees. For multi-family dwellings, treat all the units in the building as a single building. Buildings the tree affects do *not* have to be located on the plot. The energy analyses are currently set to run for typical building types and climate zones of the United States.

NOTE: Some trees may be within 60 feet of more than one building; in this case, record additional data to D2 and S2 for second building, D3 / S3 for third building, etc. Paper form users are limited to the three closest buildings per tree. PDA will accept unlimited number of buildings.

- **S**#*- shortest distance to the building measured in ft. or m. (Noted as **Distance** on PDA.) Measure to closest wall or to corner of bldg (for tree planted on corner) (Record to nearest ft. or meter).
- **TREE SITE** - record **S** if a street tree, otherwise **N** (default on PDA).
- **Tree Status** - In i-Tree 2.1, there is only a single possible value for this field: record "O" (initial sample), the default on the PDA.

SUMMARY NOTE FOR DEAD TREES: Record DR, DS, Species (if known, UNKN if unknown), DBH, Total Height, Height to Crown Base (record as 0), Crown Width (record as 0), and Dieback (record as 100). (If using PDA, Canopy Missing and Dieback will have fixed values of 100. Ht. to Live Top, Ht to Crown Base, Crown Widths and CLE have default values of -1.)

2. Street Tree Analysis (STRATUM)

2.1 Introduction

STRATUM (Street Tree Resource Analysis Tool for Urban-Forest Managers) is an easy-to-use, computer-based tool that enables any community to assess its street tree resource. The assessment will assist communities to foster support for their program, secure funding, and provide baseline data to improve management of the urban forest. STRATUM calculates the following aspects of the street tree resource:

- **Structure** (*e.g.,* species composition, age distribution, canopy cover)
- **Function** (environmental and aesthetic benefits)
- **Value** (annual monetary value of benefits and costs)
- **Management Needs** (*e.g.,* recommended maintenance, stocking levels, tree conflicts)

Reports can be produced for the entire city, for management zones, or by tree type and species. STRATUM uses regional tree growth models and either regional default costs and benefits or local ones where they are available.

Whether you have a sample or full inventory of your community's street trees, STRATUM will provide you with quantifiable justification for your tree program, whether you want to preserve existing trees or increase your budget. You will be able to answer the most important question related to your tree program: *Do the accrued benefits of street trees outweigh their management costs?*

STRATUM quantifies the following benefits:

- Energy conservation
- Air quality improvement
- Carbon dioxide reduction
- Stormwater runoff reduction
- Property value increase

In addition, STRATUM will help you:

- Improve the return on your investment dollar by determining which tree species maximize canopy cover and provide the benefits that are important to your community.
- Determine the management needs of your urban forest to maintain and improve the trees' health.
- Leverage investment from partners for such things as carbon credits or energy conservation.
- Gain public support by demonstrating the value of trees to the quality of life in your community.
- Perform economic evaluations of tree performance using annual budget and expenditure data.
- Assess costs of management - rather than benefits alone - to provide a platform for strategic planning.

Designed to be flexible and adaptive, STRATUM is not GIS-based and requires only basic

inventory data. STRATUM data collection protocols can be used for communities interested in conducting a sample or full street tree inventory. In addition, STRATUM can accept and analyze data from any existing street tree inventory provided species and trunk diameter data are present. The inventory must be formatted according to STRATUM protocols.

State-of-the-art research provides the scientific foundation for STRATUM's economic reports. Data on the benefits and costs of maintaining street trees come from extensive field research and laboratory modeling for each of 16 national climate regions.

Put simply, STRATUM can assist you in developing policy, setting priorities, and making decisions about your urban forest.

NOTE: STRATUM research and development are ongoing; not all regions have been completed. In the current version of STRATUM, the following climate zones are available: North, Pacific Northwest, Temperate interior West, Interior West, Southwest Desert, Inland Valleys, Inland Empire, Southern California Coast, Northern California Coast, Northeast, Midwest, Lower Midwest, South, Coastal Plain and Tropical. See Appendix D for more information.

2.2 Installation

2.2.1 System Requirements

STRATUM was designed to run on Windows® based operating systems. Minimum software required for operation includes Microsoft® Access 2000, Excel 2000, Microsoft® Data Access Component (MDAC) version 2.6, and .NET 1.0 (MDAC and .NET are included on the i-Tree CD). Adobe® PDF Reader 6.0 or better and Microsoft® Word 2000 or better provide additional utility in reporting.

2.2.2 Hardware Requirements

If you received STRATUM on a CD, your computer needs a CD-ROM drive to install the program. Additionally, your computer must have the following components:

1. Pentium or compatible 450 MHz or faster processor
2. A minimum of 128 MB of available RAM
3. A hard drive with at least 50 MB of free space

2.2.3 Installing STRATUM

NOTE: If you are upgrading from a previous version of STRATUM, you must uninstall the previous version first. See Uninstalling STRATUM.

Installing and running STRATUM successfully will require four installed components: 1) the i-Tree User's Manual (contains complete installation instructions); 2) Microsoft Data Access 2.6 or greater; 3) Microsoft .NET framework version 1.1; and 4) the STRATUM application. Follow the steps below, using default settings (recommended), to install each component. Administrative privileges may be required for correct installation.

To install STRATUM:

1. Insert the i-Tree CD into CD_ROM drive. Navigate to the **Get the i-Tree STRATUM Application** link and click.
2. Follow Step 1 on screen to install the i-Tree User's Manual to its default location; this will function as the STRATUM Help menu.
3. Follow Step 2 on screen if your computer does not have Microsoft .NET framework version 1.1.
4. Follow Step 3 on screen if your computer does not have Microsoft Data Access 2.6 or greater.
5. Follow Step 4 on screen to install the STRATUM application. Use the **Next**, **Back**, or **Cancel** buttons to navigate through the following dialogue boxes:
   - Welcome to the STRATUM Setup Wizard
   - Select Installation Folder (use default location C:\Program Files\i-Tree\)
   - Confirm Installation
   - Installing STRATUM
   - Installation Complete

   NOTE: If Microsoft's *.NET platform 1.0 or greater is not installed on your PC, you will get an error and need to install this component from the Install CD (*dotnetfix.exe*) (Step 2). If the STRATUM Installer detects Data Access Component (MDAC) version 2.6 is not installed on your system, the setup program will indicate you must install *MDAC_TYP.EXE* first before STRATUM can be run properly. *MDAC_TYP.EXE* is included on the i-Tree Installation CD (Step 3).
6. Restart your computer and check the installation. Click **Start → (All) Programs → i-Tree**, and then select **STRATUM**. Confirm that you have installed version 3.3 by selecting **About** from the Help menu.
7. If you cannot access the program, check that the system requirements have been met and repeat the installation procedures to verify that STRATUM was correctly installed.

To uninstall STRATUM:

1. Click **Start → Settings → Control Panel**.
2. Select **Add/Remove Programs**.
3. Select **STRATUM** and click the **Remove** button.

2.3 Getting Started

2.3.1 Choosing an Inventory Method and Formatting Data

Before beginning a STRATUM project, you will need to choose the type of inventory data to analyze. STRATUM allows you to select from the following:

1. Existing street tree inventory
2. Sample street tree inventory
3. Full street tree inventory

An existing street tree inventory will need to be formatted according to STRATUM requirements (Appendix D). If you choose to carry out a sample or a full inventory of the trees in your city, you may wish to use the recommended STRATUM data collection protocols (section 2.7). Additionally, if you are conducting a new inventory, you may choose to use the i-Tree PDA utility (section 3.2.1) to assist you in data collection. In

this case, your data will already be properly formatted for use in STRATUM. This is the file *i-Tree_Grand_Database.mdb*, located by default at C:\Program Files\i-Tree\. Regardless of the method you use, as long as you end up with an Access table that meets the requirements, you will be able to analyze your inventory using STRATUM.

2.3.2 Opening the Sample STRATUM Project

In order that the new user may become used to the functionality and capability of the STRATUM, a sample project has been supplied with the application. Open STRATUM by clicking **Start → (All) Programs → i-Tree → STRATUM**. From the **File** menu, select **Open Sample Project**. Explore the project using the workspace functions as described below in section 2.3.5.

2.3.3 Creating a New STRATUM Project

Once you've formatted your data for STRATUM, you are ready to import your full or sample inventory into STRATUM and define basic project and inventory information. To create a new project:

1. Open the STRATUM program by clicking **Start → (All) Programs → i-Tree** and select **STRATUM**.
2. From the **File** menu, select **New Project** or click on the 🗋 **icon** on the toolbar.
3. Under the **Project Info** tab, if your inventory has been organized in the STRATUM data format, select the button next to this option. If you are importing a Sample Inventory, check that box. If your inventory is a Complete Inventory, leave the box unchecked. If your inventory has been collected using the STRATUM/MCTI Tree Inventory PDA Utility, select the **i-Tree Data Format** option.
4. Click the **Import** button to browse and locate your database (for i-Tree databases, the default location is C:\Program Files\i-Tree\i-Tree_Grand_Database.mdb) and click **Open**. Click **Next** to move to the next window.
5. In the Inventory Info window, if you are using an i-Tree database, select the project you wish to work with. If you are using a STRATUM-formatted database, select whether DBH (diameter at breast height or 4.5 ft. above the ground) was recorded by measurement or by class. If your inventory has tree DBH to the nearest inch/cm or finer, you have by measurement data; if your DBH data were recorded as single numbers that represent a size range (*e.g.*, 1 = 0–6 inches), your DBH is by class.
6. If you chose by measurement in the step above, select whether the measurements were made as inches or centimeters. If you chose by class in the step above, select whether your classes are defined in inches or centimeters. You will define the classes at a later stage.
7. If Management Zones were included in your inventory, indicate whether they were recorded as Name (alphanumeric) or Numeric entries. If Zone information was not recorded, choose Numeric.
8. Use the pull-down **Climate Region** menu to select your city's STRATUM climate region based on your location. Click **View Map** to determine the region in which your city is located.

NOTE: STRATUM research and development are ongoing; not all regions have been completed. In the current version of STRATUM, the following climate zones are available: North, Pacific Northwest, Temperate interior West, Interior West, Southwest Desert, Inland Valleys, Inland Empire, Southern California Coast, Northern California Coast, Northeast, Midwest, Lower Midwest, South, Coastal Plain and Tropical. See Appendix D for more information.

9. Click **Finish** to import your inventory and load project settings for your project.

NOTE: STRATUM will not permit you to exit the New Project dialogue if all inventory and project information has not been provided. Under these circumstances, STRATUM will prompt you for the needed information.

10. If your inventory is a sample inventory, after you have exited the New Project dialogue box, you will be immediately directed to a window where you can enter the number of street segments for each zone of your city. STRATUM will combine this information with the number of street segments that were actually sampled to extrapolate to the actual population and calculate standard errors for the data. Enter the total number of street segments for each management zone. If management zones have not been designated, enter the total number of street segments under Zone 1. Click the **OK** button to finish the dialogue.
11. If Unmatched Species Codes warning appears, see Define Species for instructions. You can carry out the necessary species matching at this point or at any time later.
12. Be sure to save your project, either by clicking the 🖫 **icon** or by choosing **Save Project** from the **File** menu.

2.3.4 Opening an Existing STRATUM Project

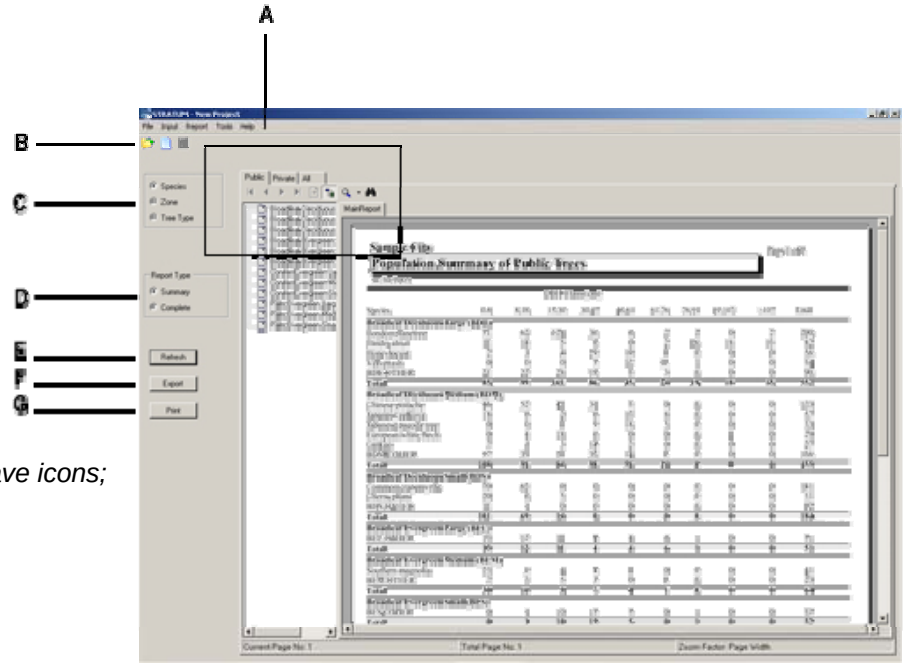
Existing, saved STRATUM projects (any file with a *.proj extension) are opened from the STRATUM application:

1. From the **File** menu, select **Open Project** or click the 🗁 **icon**.
2. Browse to the location where you saved your project (it will have a *.proj extension) or type the path and file name.
3. Click the **Open** button.

NOTE: If you have moved your Access file since you created your STRATUM project, an error message will appear and ask you to choose the correct file path. Simply click OK. Then, in the pop-up window, browse to the new location of the Access file and click Open.

2.3.5 Understanding the STRATUM Work Area

Before you begin working with STRATUM, it will be helpful to learn your way around the project work area. The STRATUM window is easy to navigate and has many functions in common with other software programs. The parts of the work area are outlined below.



A) Menu Bar
B) Open, New, and Save icons;
C) Report structure;
D) Report type;
E) Refresh;
F) Export;
G) Print

Menu Bar:

File – this menu item contains the following submenu items. Their function is indicated clearly by their name:

- Open Project
- Open Sample Project
- New Project
- Export Reports
- Save Project
- Save Project As
- Print
- Exit

Input – the following input categories are available:

- Define City & Costs
- Define Species
- Define Inventory

Reports – the following report categories are available:

- Benefit-Cost Analysis
- Resource Structural Analysis
- Replacement Value

Tools – the following tools are available:

- Options – switch between common/scientific botanical names and English/metric unit conversions.
- Work with PDA – launches PDA Utility

Help – the following menu items can be found:

- Help – Clicking this item will launch the i-Tree User's Manual, where you can use the hyperlinked Table of Contents to quickly navigate to your topic of interest.
- About – Displays a graphic showing application version and credits. application.
- Check For Updates – Check for the availability of updated versions of i-Tree programs currently installed on your computer.
- Report A Bug – an online utility for reporting a technical bug and tracking its resolution.

Icons: open a project, start a new project, or save the project you are working on.

Report structure: allows you to specify whether the information in the presented report is organized by species, zone, or tree type.

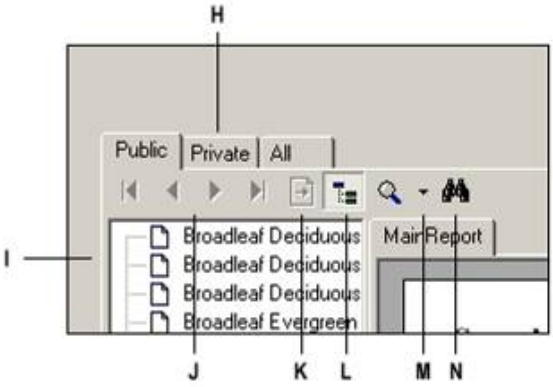
Report type: a dynamic option that varies depending on the selected report. Allows you to select among several options for displaying the results, including between summary and complete reports, or among the different benefits.

Refresh: click to refresh report after changing display choices.

Export: export displayed report in several formats.

Print: print displayed report.

H) Population subset;
I) Navigation pane;
J) Page navigation;
K) Go To;
L) Toggle navigation pane;
M) Zoom;
N) Find



Population subset: displays reports for public trees, private trees, or all trees combined.

Navigation pane: move between sections of reports by clicking subheading (not available for all reports).

Page navigation: arrows move forward or backward through pages of the selected report or to move directly to the beginning or end.

Go To: enter a page in the selected report to move to it directly.

Toggle navigation pane: open or close the navigation pane.

Zoom: drop-down menu allows you to increase or decrease the size of the report as it is displayed on the screen.

Find: enter text in dialogue box to search for occurences in displayed report.

2.4 Data Operations

Once a project has been created in STRATUM, you must give the STRATUM program additional information to describe and define your community, species information for species not included in STRATUM, and your inventory parameters. These data are entered using the Input menu.

2.4.1 Define City and Costs

Though optional, City and Costs inputs allow you to make the most of STRATUM's reporting features. For example, if you do not enter street tree program expenditures, benefit information will be reported, but the ratio of benefits to costs cannot be calculated. The more information (inputs) you enter, the more information STRATUM will return in the form of reports.

Define City

This feature allows you to provide information about your city that will be used to report per capita values for benefits and costs and canopy cover reports. Additionally, the name you enter under City Name appears at the top of each report.

Use the following procedure to enter city inputs:

1. From the **Input** menu, select **Define City & Costs** and navigate to **Define City**.
2. In the Define City dialogue box enter the following items:
   - **City Name** - enter your city's name here to include it at the top of each report.
   - **Total Municipal Budget ($)** - enter a dollar value for your city's total municipal budget to allow STRATUM to calculate and report the percentage of the budget spent on street trees.
   - **Population** - enter the total population of your city to calculate and report per capita values for benefits and costs.
   - **Total Land Area (sq mi)** - enter the total land area (in whole square miles) of your city to calculate the percentage of total land area covered by street tree canopy.
   - **Average Street Width (ft)** - enter the average street width in your city (a whole number, in feet) to calculate street tree canopy cover over street surface area.
   - **Average Sidewalk Width (ft)** - enter the average sidewalk width (a whole number, in feet) to calculate street tree canopy cover over sidewalk surface area.
   - **Total Linear Miles of Street (mi)** - enter the total linear miles of street in your city to calculate street tree canopy cover over street surface area. Only whole numbers are accepted.
3. Click **OK** to finish and exit the Define City dialogue.

Define Costs

This feature allows you to define annual costs associated with managing your city's street tree resource. Any or no costs can be defined in this dialogue box - STRATUM will run regardless. However, the Benefit–Cost Ratio reported will reflect only the costs entered here. Because benefits are reported as annual sums, citywide costs associated with street tree management should also be annual values. Do not forget to include

costs associated with street trees that may come from other departments' budgets, such as sidewalk repair costs or litigation fees.

Use the following procedure to enter Costs inputs:

1. From the **Input** menu, select **Define City** and then navigate to **Define Costs**.
2. Within the Define Costs dialogue, click on the Public and Private tabs to enter program costs for either of the populations. The All tab automatically adds the two tabs together.
3. When finished, press the **OK** button.

Define Benefit Prices

This feature allows the user to define local prices in order for STRATUM to calculate tree benefits. Default values are based on prices that are typical for the region you selected when you imported the project. You can change the values here if you have more specific information.

2.4.2 Define Species

STRATUM is loaded with an extensive species list for each climate zone. However, most users will find that after importing an inventory into STRATUM, several species codes will not be recognized and are denoted as **Unmatched**. STRATUM will alert you with the Species Code pop-up dialogue if it discovers species codes that are unmatched; press **OK** to let STRATUM know that you understand that unmatched species codes are present and to take you to the Define Species dialogue box - a feature that allows you to define tree species not found in STRATUM's database.

NOTE: If you have a large number of unmatched species codes, you may find it easiest to change your species codes in your database to match those that are included with STRATUM. A list of installed species codes and their respective species for each climate zone can be found in Appendix D.

Unmatched Tree Species Codes

For each climate region, STRATUM recognizes the 200 most prevalent species. However, many other species may be included in your city's street tree inventory or you may have used different codes. Where STRATUM identifies unrecognized species in the imported inventory, it prompts the user to define the species by entering a common name and scientific name, and by matching the new species with the most closely allied species (Species Value Assignment).

Use the following procedure to define unmatched tree species:

1. If you are not already at the **Define Species** dialogue box, from the **Input** menu, select **Define Species**.
2. Click **OK** to acknowledge that there are unmatched species codes, if prompted.
3. In the scroll-down box labeled **Unmatched Species Codes Requiring Species Value Assignments**, click on a **species code**; this species is now active.
4. Type the scientific name in the **Scientific Name** box.
5. Type the common name in the **Common Name** box.

NOTE: Avoid, if possible, giving two species codes the same common or scientific names. Because the underlying calculations are carried out according to species codes and not names, STRATUM will report on two species with different codes, but the same name, as if they were different. Instead, if two species codes really do refer to the same species, change the species codes to match, either by changing your inventory or with Define Tree Inventory by Records in STRATUM.

6. Using the pull-down Species Value Assignment menu, match the active species that you are defining with the most closely allied species from the list, using either the scientific name or the common name. Take into consideration mature size, tree type, form, and family and genus relationships. Where direct matching to a species proves difficult, you can opt to select from the Tree Types (*e.g.,* Broadleaf Deciduous Large, Conifer Evergreen Small, etc.).
7. Click **Apply** at any time to apply your changes to the project.
8. Click **OK** to apply your changes and leave the Define Species window.
9. Or click **Cancel** to cancel any changes you have made and leave the Define Species window.
10. Using the **File** menu, select **Save Project** to save the changes.

Similarly, you can check the accuracy of any Species Value Assignment and make any adjustments necessary by clicking on a species code in the **Inventory Species Code List** and making any desired changes. Click **OK** and then save the project.

NOTE: If a tree species is left undefined, STRATUM will not include this species in calculating resource structure or annual benefits. Therefore, to account for the full extent of the tree resource, you must define each unmatched species.

Unmatched Non-Tree Species Codes

In many inventories, non-tree information is collected using a **species code** to define the data. For example the code **EPSTL** might denote an empty planting site for a large tree, or **STUMP**, to denote a potential planting site where a tree stump exists. These are Non-tree species codes and must be defined in STRATUM if reports on their numbers are desired.

Use the following procedure to define unmatched **Non-tree** species:

1. Click the **Non-tree...** button to enter the Define Non-tree Species Codes dialogue.
2. From the **Inventory Species Codes to Exclude from Reports** list, double click on each **non-tree** species to enter it into the Non-tree Reports frame.
3. From the **Species Code Selection** window in the **Non-tree Reports** frame, double-click on each **Non-tree** species that you would like STRATUM to include in stocking reports.
4. For each **Non-tree** code selected, enter a short description in the Description box.
5. Use the **Tree Size** menu to select whether the code is associated with **Large**, **Medium**, or **Small** trees. Select **Undefined** if tree size is not known or is not associated with the code.
6. Click **OK** to close the Define Non-Tree Species Codes dialogue or **Cancel** to close the dialogue without saving your changes.
7. Click **OK** to exit the Define Species dialogue box.
8. Using the **File** menu, select **Save Project** to save the changes.

2.4.3 Define Inventory

STRATUM is designed to be compatible with nearly all street tree inventories, whether they follow STRATUM default data collection protocols, city-specific protocols, or a combination of the two. The Define Inventory inputs allow you to define your inventory data fields, define aspects of your sample inventory, edit inventory records, and name management zones. Define Inventory is accessed through the Input menu.

Define Tree Inventory by Data Fields

STRATUM allows you to specify the definition and range of some data fields in the Define Inventory Data Fields dialogue boxes. The following data fields can be adapted:

DBH classes	Conflicts
Condition	Rename zones
Location	Sample
Land Use	Other
Maintenance	

For each field in the imported inventory that contains data, you must define associated classes. Defaults may be used where STRATUM inventory data collection protocols were used (check **Use Defaults** box), or up to 10 numerical classes and descriptors may be entered to tailor STRATUM to your needs.

For instance, STRATUM default options for condition include four classes from dead/dying to good. You may wish to be more exact in your condition classifications and define ten categories. STRATUM default options for sidewalk conflict range from 1 for sidewalks that are heaved by less than ¾ inch to 4 for more than 3 inches of heave. Your community might have different standards; these can be entered here.

NOTE: If you have imported your data in the i-Tree Data Format, following an inventory where data was collected using the STRATUM/MCTI PDA Utility, it is not necessary to define the fields, this was done during the configuration step of the PDA Utility set-up. You may, however, wish to use this dialogue to Define Sample or Rename Zones; see below.

Define Sample - if you carried out a sample inventory, you already entered the total number of street segments in your city when you started a new project. You may edit your entry if necessary. This option is available in the **Sample** tab under the **Define Inventory** menu. Enter the total number of street segments for each management zone. If management zones have not been designated, enter the total number of street segments under Zone 1. Click the **OK** button to finish the dialogue.

Rename Zones – this feature allows you to enter names for management zones if zones in your inventory were entered by number. Enter a description in the **Name of the Zone** window adjacent to each Management Zone number. If this optional procedure is not followed, reports will display general notation (*i.e.,* Zone 1, Zone 2…). You must either rename all zones or none. When finished, press the **OK** button to exit the dialogue. Remember to save your work by selecting **Save Project** from the **File** menu.

Define Tree Inventory by Records

This feature allows you to browse the imported inventory to look for, and correct, anomalies in the Access tables, as well as delete and add trees to the inventory without first making changes to the Access file and then re-importing the data. Use the following procedure to change inventory records within the STRATUM application:

1. From the **Input** menu, select **Define Inventory** by **Records**. A table of all records appears. They can be sorted by TreeID or any other category by clicking on the column header.
2. Changes to individual fields can be entered directly in the table.
3. Individual records can be deleted by clicking in the far left column of the record to be deleted and pressing **DELETE** on the keyboard.
4. To add a record, scroll to the bottom of the table and enter the data following the format you defined in the Define Tree Inventory by Data Fields input dialogue.
5. When finished, click the **Save to DB** button to change the Access database STRATUM Inventory permanently. If you would like the changes to be temporary and function only during the current session, click **OK**. Click **Cancel** to cancel all changes and close the window.

NOTE: If you decide later to make your temporary changes permanent, simply return to this dialogue box and click Save to DB.

2.5 Reporting Results

STRATUM analyzes the structure of the street tree resource and the related benefits and costs. Three kinds of Benefit–Cost Analyses and fourteen kinds of Resource Structural Analyses are available under the Report menu.

Within each report, there are a number of options for viewing. Each report can be broken down for public, private, or all (public and private) trees by selecting the appropriate tab. Additionally, some reports can be organized by species, zone, or tree type by choosing the respective radio buttons. When selected, the **Summary** report type lists the most prevalent species (species that represent >1% of the entire population); remaining trees are grouped as Other Street Trees. The **Complete** report type lists all trees inventoried in descending order of prevalence and grouped by tree type.

Reports can be displayed by the scientific or common name of the species and using metric or English units. These choices are available under the **Tools** menu, under **Options**. If scientific names are desired, select **View by Scientific Name** and a check mark will appear next to the option. To return to common names, choose the option again and the check mark will be removed. Similarly, choose **View by Metric Units** to switch from English to metric.

Reporting is dynamic through selection of benefits to be analyzed and choice of subset.

NOTE: If Inputs are altered during the active project session, benefits will not reflect these changes unless the Refresh button is pressed.

2.5.1 Benefit - Cost Analysis Reports

STRATUM is not intended to account to the penny for every benefit that trees produce. Reported benefits and costs are initial approximations as some benefits and costs are intangible or difficult to quantify (*e.g.,* impacts on psychological health, crime, and violence). Also, limited knowledge about the physical processes at work and their interactions makes estimates imprecise (*e.g.,* fate of air pollutants trapped by trees and then washed to the ground by rainfall). Tree growth and mortality rates are highly variable and benefits and costs depend on the specific conditions at the site (*e.g.,* tree species, growing conditions, maintenance practices). Therefore, STRATUM provides a general accounting of the benefits street trees produce given limited knowledge of site-specific conditions - an accounting with an accepted degree of uncertainty that can nonetheless provide a platform on which decisions can be made. Methods used to quantify and price these benefits are described in the published series of Tree Guides (available at http://www.fs.fed.us/psw/programs/cufr/), which correspond to the STRATUM Climate Regions.

There are three basic Benefit-Cost analyses:

Annual Benefits: Five annual benefits are assessed in STRATUM. Each benefit is quantified in terms of resource units and a dollar value is assigned to the resource units. Reports show a standard error function that describes the uncertainty for sample inventories. Complete inventories will show NA under standard error.

1. **Energy** - the sum of energy savings due to reduced natural gas use in winter (measured in MBtu/tree/year) and reduced electricity use for air conditioning in summer (measured in kWh/tree/year).
2. **Stormwater** - a measure of reduced annual stormwater runoff due to trees (measured in hundred cubic feet [CCF]/tree/year).
3. **Air quality** - the sum of air pollutants (O_3, NO_2, SO_2, PM_{10}) deposited on tree surfaces and reduced emissions from power plants (NO_2, PM_{10}, VOCs, SO_2) due to reduced electricity use (measured in pounds/tree/year). The model accounts for potential negative effects of trees on air quality due to BVOC emissions.
4. **Carbon dioxide** - the sum of decreased atmospheric CO_2 due to sequestration by trees and reduced emissions from power plants due to reduced energy use. The model accounts for CO_2 released as trees die and decompose and CO_2 released during the care and maintenance of trees.
5. **Aesthetic/other** - a measure of the tangible and intangible benefits of trees reflected in increases in property values due to trees.
6. **Summary** - the total of energy, stormwater, air quality, carbon dioxide, and aesthetic/other benefits. Reported as $ per tree or Total $.

Management Costs: Total net expenditures are summed based on all defined costs associated with street tree management.

Net Annual Benefits: Citywide benefits and costs are summed, net benefits (benefits less costs) are determined, and the Benefit–Cost Ratio (benefits/costs) is calculated.

2.5.2 Resource Structural Analysis

STRATUM's Resource Structure reports provide a **snapshot** in time of the street tree resource and are intended to provide the information necessary for resource managers

to weigh the citywide needs with the more specific needs of individual management zones. Utilizing the Structural Reports along with the Benefits and Costs Reports provides information for short- and long-term resource management. The data reported allow users to speculate about what future trends are likely and what management challenges will need to be met to achieve urban forest sustainability.

Fourteen basic report selections are associated with Resource Structure analyses:

1. **Population Summary** - summary tables or complete lists of inventoried species, their total numbers, numbers by tree type, and numbers by default DBH size classes. These reports are useful for basic understanding of species frequencies citywide, by management zone and by DBH size class. Note that trees whose species codes have not been matched will not appear in the tree type reports.
2. **Species Distribution** - pie chart and table-formatted species composition data for the 10 most prevalent species in the subset, displayed in percent of total numbers. These reports are useful for a basic understanding of species dominance in terms of tree numbers. Note that trees whose species codes have not been matched will not appear in the tree type reports.
3. **Relative Age Distribution** - tree age data, relative to DBH size class, in chart and table forms for the 10 most prevalent species for the entire city or by management zone, displayed in percent of total numbers. The age distribution by tree type is also shown. These reports are important for determining current management needs as well as how needs will change depending on total numbers and aging of individual species. The distribution of ages within a tree population influences present and future costs as well as the flow of benefits. An uneven-aged population allows managers to allocate annual maintenance costs uniformly over many years and assure continuity in overall tree canopy cover. An ideal distribution has a high proportion of new transplants to offset establishment-related mortality, while the percentage of older trees declines with age.
4. **Importance Values (IV)** - an IV is displayed for all species that make up more than 1% of the population. The STRATUM IV is the mean of three relative values (percent of total trees, percent of total leaf area, and percent of canopy cover) and is presented in table form. IVs, in theory, can range between 0 and 100; an IV of 100 suggests total reliance on one species, and an IV of 0 suggests no reliance. IVs are particularly meaningful to managers because they suggest a community's reliance on the functional benefits of particular species.
5. **Condition** - pie chart and table-formatted data on the condition of the wood (structural health) and foliage (functional health) by zone or by species for the most prevalent species, displayed in percent of total numbers. Tree condition indicates both how well trees are managed and their relative performance given site-specific conditions.
6. **Relative Performance Index (RPI)** - index values relating each species overall condition to all other species in the city; the information is presented in table form. Species with an average condition compared to all other species have an RPI value of **1**. Any value higher than **1** indicates species that have proportionately better condition ratings. Likewise, index values lower than **1** are species with below-average condition ratings when compared with other inventoried street trees. The RPI of each species provides an indication of its suitability to local growing conditions, as well as its performance. Species with more trees in good or better

condition are likely to provide greater benefits at less cost than species with more trees in fair or poor condition.

7. **Stocking Level** - data on stocking levels and available planting sites as defined in the Unmatched Non-tree Species Codes input dialogue, displayed in table form by zone. Stocking level reports are useful for identifying high-priority planting areas and strategic plant purchasing and cost planning.
8. **Maintenance Recommendation** - maintenance recommendations are displayed according to categories defined in the Define Tree Inventory by Data Fields dialogue. Each recommendation is presented individually with a summary of all recommendations below. The reports present data for each maintenance category according to zone and DBH class; the five species showing the greatest maintenance needs in each zone can also be displayed. These reports help managers understand the actual pruning and maintenance needs of the street trees. This provides clues to whether or not the pruning is adequate and suggests the level of risk and liability that is associated with the city's street tree population. Problematic species are identified, and cost planning is facilitated by displaying maintenance needs by DBH class size or the five species with the highest frequency of maintenance needs.
9. **Priority Task** - the most urgent maintenance tasks are displayed according to categories defined in the Define Tree Inventory by Data Fields dialogue. Each priority task is presented individually with a summary of all tasks below. The reports present data for each maintenance category according to zone and DBH class; the five species showing the greatest maintenance needs in each zone can also be displayed. These reports help managers understand the actual pruning and maintenance needs of the street trees. Cost planning is facilitated by displaying maintenance task needs by DBH class size or the five species with the highest frequency of maintenance needs.
10. **Land Use** - chart- and table-formatted data describing the land use (*e.g.,* residential, commercial, institutional) in the immediate vicinity of the tree, displayed by zone as percent of total numbers. These reports are useful for comparing with reports on tree conflicts, maintenance recommendations, and tasks for understanding problem planting sites for specific species.
11. **Location** - chart- and table-formatted data describing the location of the tree on the site (*e.g.,* planting strip, front or back yard, median), displayed by zone as percent of total numbers. These reports are useful for comparisons with tree conflicts, maintenance recommendations, and tasks for understanding problem planting sites for specific species.
12. **Conflicts** - table-formatted data about sidewalk heave and utility wire conflicts as defined in the Data Tree Inventory by Data Fields dialogue, displayed by species, total numbers, or percent of total numbers. These reports are useful in understanding the current and potential infrastructure-related conflicts by species and management zone location.
13. **Canopy cover** - chart- and table-formatted data about the level of canopy cover over the city and over streets, displayed in acres per area and percent of total area covered. These reports are useful in understanding the current versus desired levels of canopy cover in the city.
14. **Other** - table-formatted reports on any OtherOne, OtherTwo, or OtherThree data fields defined in the Data Tree Inventory by Data Fields dialogue, displayed as percent of total numbers.

2.5.3 Replacement Values

Replacement values are estimates of the full costs of replacing trees in their current condition, should they be removed for some reason. Species ratings, replacement costs, and basic prices were obtained for each species in each reference city from regional appraisal guides. Because of the approximations used in these calculations, replacement values are first-order estimates for the population, and are not intended to be definitive on a tree-by-tree basis.

Replacement values can be displayed by DBH class for every species in the inventory or by DBH class for each zone and are only available when using default STRATUM condition classes.

2.5.4 Exporting Reports

There are two options for exporting reports. The **Export** button on the screen allows users to export individual reports in three formats: Adobe Acrobat® (*.pdf), Microsoft Word (*.doc), and Rich Text Format (*.rtf). Alternatively, you can export reports in Excel (*.xls) format by using the **Export Reports** dialogue.

To export single reports from the active report view:

1. From the active report view, click the **Export** button.
2. Select file type (*.pdf, *.doc, or *.rtf) from the **Save as type** pull-down menu.
3. Browse to save location and enter a file name that represents the active report.
4. Click **Save** to finish.

To export single or multiple reports into Excel using the Export Reports dialogue:

1. From the **File** menu, select **Export Reports**; the Export Reports Selection for Excel dialogue box appears.
2. Select **Browse** to locate the folder where you would like to save the reports. The dialogue box that appears allows you to create a new folder if necessary.
3. Check the **Public**, **Private**, or **All** box to indicate the population subset. You may select any or all of the subsets; for multiple selections, each will be exported as a separate file.
4. The reports are available in three categories: Benefit–Cost Reports, Population Summary, and Resource Structural Analysis. For each category, you can choose either **All Reports** or you can select from among the individual reports. Individual reports from each category will be grouped together and saved in one file.

2.5.5 Printing Reports

The **Print** button allows users to print any report in the active view. Alternatively, you can select **Print** from the **File** menu.

2.6 Troubleshooting

Questions about this application should be directed to i-Tree Support through any of the means listed on the i-Tree website http://www.itreetools.org/support.

Below are some common problems that may arise when using STRATUM and suggestions for correcting them.

I receive an error message that says "Cast from string" ... " to type 'integer' is not valid":

Your inventory contains information in the Zone category that is not numeric. In the **New Project** dialogue box, you must choose **Zone Recorded By Name**.

The Population Summary Report shows the incorrect number of trees (or no trees at all), but other reports such as Conflicts show the correct number of trees:

In the New Project dialogue box, you incorrectly selected that your DBH was recorded **By Class**. Begin again and create a new project, selecting DBH recorded **By Measurement**.

The Population Summary Report shows the correct number of trees, but they aren't broken down into the correct DBH classes:

Create a new project, making sure in the **New Project** dialogue box that you select the correct units to describe your DBH measurements (inches vs. centimeters).

Some reports show species codes instead of common or scientific names:

You have not matched all species codes in the Define Species Codes dialogue box. Under the **Input** menu, select **Define Species** and follow the directions for matching species codes that are not included in STRATUM's database.

Species that I know are included in my inventory are not appearing in the Population Summary Report:

Be sure that you have matched all species codes. Under the **Input** menu, select **Define Species** and follow the directions for matching species codes that are not included in STRATUM's database. Note also, that there are two types of Population Summary reports: one shows only species that represent more than 1% of the population with other species grouped together (Summary), the second shows all species (Complete).

When selecting Stocking Level Report, I receive a message that says "You don't have stocking information in your inventory":

You haven't designated species codes to be reported in Stocking Level Reports. Under the **Input** menu, select **Define Species** and follow the directions for matching Non-tree Species Codes.

The Population Summary Report has two entries with the same name.

You have assigned the same species name to two different species codes. From the **Input** menu, select **Define Species** and scroll through the Inventory Species Code List until you find the two species codes that have been given the same name. If the two different species codes are in fact the same species, you can recode the records to have the same species code within STRATUM. For more detailed instructions, see Define Tree Inventory by Records.

2.7 Data Collection

Appendix D: Inventory Formatting describes how STRATUM can be used to analyze an existing full inventory of a street tree resource as long as the data fields TreeId, SpCode, and DBH are present. For cities that do not have an existing inventory, data collection can be carried out specifically for STRATUM. You can choose to conduct a full street tree inventory, or sampling schemes have been devised for a sample street tree inventory if you are unable to carry out a complete inventory.

The i-Tree Inventory PDA Utility (section 3.2.1) is one method for organizing and carrying out full or sample field data collection. With this utility, field teams collect data that can be transferred easily with a preformatted, STRATUM-compatible data file.

2.7.1 Collecting Data for a Full Inventory

To utilize the full range of STRATUM's analysis and reporting features, you can choose to follow protocols for STRATUM's 17 default data fields (Appendix D). This will provide you with a good understanding of the urban forest and its needs. These data fields can be customized to the specific needs of most any community. Additionally, three other fields (OtherOne, OtherTwo, and OtherThree) can be used for management data not covered in the default fields.

2.7.2 Collecting Data for a Sample Inventory

Street tree sampling provides a cost-effective means to capture a snapshot of the resource structure, its functions, value, and management needs. Where sampling is an option, it can be used as a starting point for municipal tree planning and management by providing the necessary information for decision making. STRATUM uses a complex set of population estimators and standard error equations, and therefore, only accepts sample inventories following simple random sampling conventions; any other sample inventory is not compatible. Creating a compatible sample can be achieved two ways:

1. Using the automated i-Tree Sample Street Segment Generator – a push-button approach to selecting random street segments for inventory. This Utility requires users to have ERSI's ArcGIS® version 8.x or 9.x (see section 3.4.1).
2. Using the manual procedure for creating a random street segment sample using Arcview® 3.x – a stepwise protocol for selecting random street segments for inventory. This procedure requires ESRI® ArcView version 3.x (see Appendix B)

For STRATUM, sample inventories are generally a 3-6% sample of total street segments, depending on community size and variation from segment to segment, and will produce about a 10% standard error for the total number of trees citywide. The following, general guidelines can be used as a starting point for determing sample sizes in communities based on human population sizes:

- For communities with less than 50,000 persons, sample size is 6% of total street miles
- For communities between 50,000 and 150,000 persons, sample size is 5%
- For communities between 150,000 to 250,000 persons, sample size is 4%
- For communities over 250,000 persons, sample size is 3%

It is important to note that all communities differ in their tree density, street miles and population characteristics. Therefore, no single sampling intensity will work uniformly

for all communities of a similar size. Ultimately, it is up to the user to determine sampling size and an acceptable level of error based on how the results will be used.

Sample Street Segments Field Data

In general, field data for street segment sampling is collected in the same manner as when conducting a full inventory, though data is collected only for trees located within the bounds of the defined sample segment. Additionally, the data field "StreetSeg" must be filled in for each tree (see Appendix D). In some cases, no trees or tree sites may be present within a given street segment; these segments still need to be recorded as part of the inventory for STRATUM to accurately estimate the total number of trees as well as calculate associated error of the estimate.

For each sample segment that has no tree (or non-tree [e.g., available planting space]) entries, a single record must be added to your inventory database with the TreeId, Zone, StreetSeg, CityManaged, and SpCode (e.g., "NOTREE") fields filled in correctly. Since there were no trees, the rest of the fields for this record are recorded as "0" (zero).

After importing your data into STRATUM, the species code used for the record that defines any segment devoid of trees or planting sites--NOTREE in this example--will be recognized as "unmatched" by STRATUM (see Section 2.4.2). Do not define this code with a species value assignment or a non-tree species code in the **Define Species** dialogue box, simply ignore it. The species code NOTREE will show up in the population summary and balance the total estimated number of trees and its standard error.

3. Utilities

3.1 Mobile Community Tree Inventory (MCTI)

3.1.1 MCTI — Introduction

The Mobile Community Tree Inventory Utility (MCTI) was designed as a basic tree inventory application that allows communities to conduct tree inventories and manage those records at various levels of detail and effort. Data can be collected and entered into the program using paper tally sheets or the STRATUM/MCTI Tree Inventory PDA Utility.

MCTI Components

The MCTI system is comprised of three layered components, with each component building on the foundation of the previous one. The three layers include the following:

1. **Paper tally sheet template**. This tally sheet provides the simplest, least technical tool for recording information on trees. The Paper Tally Sheet Template can be found in Appendix E or downloaded from the i-Tree website.
2. **Computerized desktop inventory program**. This component in the MCTI system is a Windows-based software application. The software has an easy-to-use screen for entering data and a database to store the information. Tree records in the MCTI Desktop Utility can easily be searched or modified with just a few mouse clicks. With similar ease, users can produce summary reports for over two dozen useful statistics.
3. **Tree Inventory PDA Utility**. The most efficient and cost-effective way to collect tree inventory data is to use the MCTI-compatible Tree Inventory PDA Utility, whose installation, configuration, and use is described in section 3.2.1. This Utility is simple to use and allows for customizable data fields to meet most any community inventory needs.

> **NOTE: A PDA, or Personal Digital Assistant, is a handheld computer that stores, provides access to, and organizes information. The i-Tree Software Suite only supports the PocketPC platform.**

A group, organization, or community identifies its technical need and ability, and chooses the appropriate MCTI components. Some may have previous inventory experience and feel comfortable starting with the third level of the MCTI process; others may want to start at the first step.

Inventories and Usage

There are a number of reasons to conduct an inventory of public trees. The data collected in a community tree inventory provide essential information to:

- Profile the species and size composition of the community forest
- Provide information about individual trees and groups of trees
- Analyze condition of individual trees and of the entire forest
- Record information about significant trees
- Reveal planting needs

- Monitor planting success rates
- Identify potentially hazardous trees
- Set priorities for maintenance
- Develop maintenance schedules based on priorities
- Identify budget needs
- Create budget requests to municipal government
- Establish a foundation for keeping continuous records
- Create public reports of trees planted, pruned, and removed
- Build public support for protecting and expanding the community forest
- Establish the community forest's dollar value
- Set benchmarks for future planning

The decision of what type of inventory to undertake will be based upon the need identified by the community. The options with MCTI include: 1) windshield survey; 2) specific problem inventory; 3) inventory of parks and natural areas; and 4) complete inventory (periodic, continuous).

1. A windshield survey is used to collect tree information while riding in a vehicle. It offers the advantages of being quick and inexpensive. Although it is not a feasible method for precise data collection, it is helpful for identifying readily visible problems, such as dead trees or hanging limbs.
2. A specific problem inventory is used to assess how many trees in the community are affected by one or more specified conditions. For example, a specific problem inventory might be conducted for one of the following reasons:
   - To inspect all trees for presence of a serious pest
   - To locate all historic trees
   - To identify potentially hazardous trees
3. An inventory of parks or natural areas is generally used in an effort to protect and manage openspace in populated areas. In parks that are heavily used, it may be important to collect detailed data on individual trees, and to map the tree locations precisely. In natural areas where the trees grow in dense groups, a sampling method may be sufficient to collect data and generalize results without measuring individual trees.
4. A complete inventory is implemented to examine and record comprehensive data about each tree. A periodic inventory should be updated on a cycle (such as every 5 years) that suits the community's needs and resources. A continuous inventory involves the updating of tree entries as work is performed and completed. A complete, continuous inventory is the most time-consuming and expensive type, but also the most accurate.

3.1.2 MCTI — Installation

System Requirements

MCTI was designed to run on to run on Windows® based operating systems. Minimum software requirements include Excel, Word, and Adobe Reader for exporting reporting data.

Installing MCTI

Installing and running MCTI successfully will require two installed components: 1) the i-Tree User's Manual (contains complete installation instructions) and 2) the MCTI application. Follow the steps below, using default settings (recommended), to install each component. Administrative privileges may be required for correct installation.

> **NOTE: If you are using the STRATUM/MCTI Tree Inventory PDA Utility to collect field data, or configure MCTI data fields beyond their default definitions, follow the installation described in section 3.2.1.**

To install MCTI:

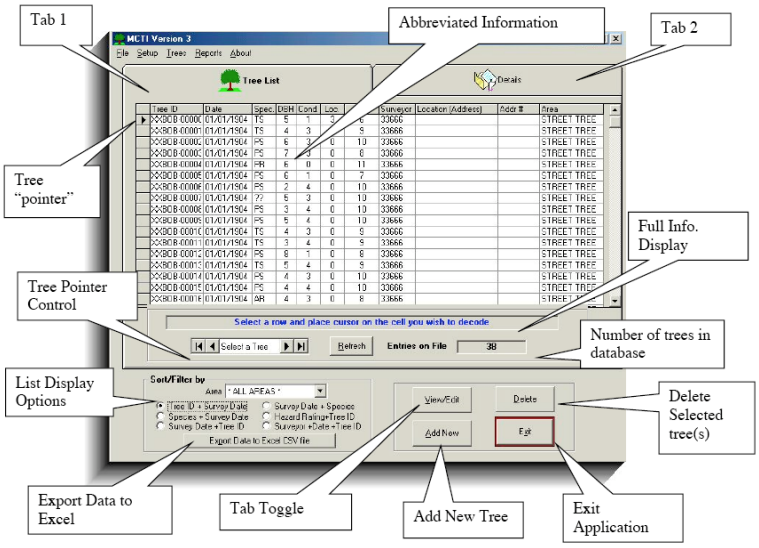
1. Insert the i-Tree CD into CD_ROM drive. Navigate to the **Get the i-Tree MCTI Utility** link and click.
2. Follow Step 1 on the screen to install the i-Tree User's Manual (if not already installed).
3. Follow Step 2 on the screen to install the MCTI application. By default, the install wizard will install the program to C:\Program Files\i-Tree\MCTI. (It is recommended that you use the default settings.) If you complete a typical installation, all the pieces of the MCTI desktop software application will be installed.
4. Restart your computer and check the installation: click your computer's desktop **Start** button, choose **(All) Programs**, and then select **i-Tree → MCTI**. If you cannot access the program, check that the system requirements have been met and repeat the installation procedures to verify that the MCTI desktop application was correctly installed.

3.1.3 MCTI — Getting Started

MCTI Desktop Utility Screen

The MCTI desktop utility screen contains two tabs: Tree List and Details.

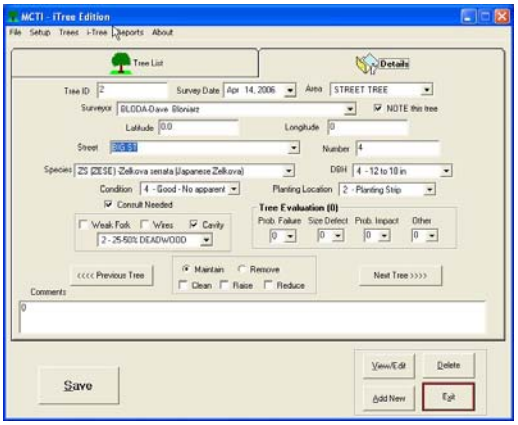
Tree List Tab – Controls and Functions



This screen gives the user a quick look at all of the trees that are stored in the database. When the user moves the mouse over the abbreviated information in the white boxes, the information is displayed in full in blue text below the table.

Select a Tree	Selects the tree record that appears when the user clicks on the Details tab or on the "view / edit" button. Use the arrows to move the pointer move up and down the list.
Refresh	The button forces the application to update the entire table based on changes in a record(s).
Sort by	Determines the display order of the trees.
View/Edit	Changes the user's screen from a list of trees to the specific tree that is being selected on the Tree List tab.
Delete	Deletes the selected tree.
Add New	This button adds a new tree record to the database.
Exit	Saves any changes and then exits the application.

Details Tab – Controls and Functions



This screen displays detailed information about a selected tree. The screen allows the user to manipulate information about a tree. For an explanation of the data fields, see section 3.1.7.

Save	Click this if you want to save changes you have made to the record of an individual tree.
View/Edit	This button is inoperative on the Details Tab.
Delete	This button deletes the open record.
Add New	This button adds a new tree record to the database.
Exit	Saves any changes and then exits the application.

3.1.4 MCTI — Data Operations

MCTI Configuration

The project configuration for MCTI includes defining a project name, surveyors, field definitions, species lists, and street names. Configuration is carried out through the STRATUM/MCTI Tree Inventory PDA Utility desktop application. Even if you are going to use paper forms, you must install that component.

- Go to section 3.2.1
  - Follow the first four steps of Installation and Setup.
  - Follow steps 1, 2 and 7 of Configuration.
- Save and exit.

Importing i-Tree Configuration and Field Data to MCTI

- Open MCTI.
- On the top menu, click **i-Tree → Import i-Tree Data**.
- A dialog box will appear with two large buttons.
  - **Import Surveyors, Species, Street Lists from iTree.MDB**
    Clicking this upper button saves the species codes, street names, and surveyor teams that were configured using the STRATUM/MCTI PDA Utility desktop component (section 3.2.1).
    - To execute this process, use the dialogue box that opens up when you click the button (**Import Surveyors**, **Species**, **Street Lists from iTree.mdb**) and navigate to the file *iTree.mdb*, located by default at: C:\Program Files\i-Tree\STRATUM_MCTI_PDA_Utility\
    - Then click **Open**.
    - Confirm success of operation, exit and restart MCTI to apply changes.

NOTE: If you are not using the PDA Utility but still want to import lists for use in the MCTI Desktop application, you need to follow these steps:

1. **If you haven't installed the STRATUM-MCTI PDA Utiltiy, do it now (see Section 3.2.1)**
2. **From the Tools menu, open the STRATUM MCTI PDA Utility and select "MCTI Defaults".**
3. **Next, select the "Project" tab.**
4. **Choose your "Climate Zone" from the pull-down menu, even if you are working in the default climate zone (see Appendix D for Climate Zone map). An item from the pull-down menu must be selected in order to activate the transfer function to MCTI Desktop.**
5. **Click the yellow button which will instruct you to locate the "STRATUM Species Database" on your computer.**
6. **Follow the on-screen instructions.**
7. **After completing the on-screen instructions, then click on the "Street List" button and follow those on-screen instructions. Your imported streets will not show up on the list until you exit and click again on "Street List" and the default street names will remain, even though you have unchecked them.**
8. **Once this is complete, you can save and exit from the MCTI-STRATUM Desktop Utility.**
9. **Finally, open MCTI Desktop application and choose "i-Tree" from the menu bar and pull down to "Import i-Tree Data" and follow the on screen instructions. The database "iTree.mdb" is located by default at: C:\Program Files\i-Tree\STRATUM_MCTI_PDA_Utility**

10. You have now completed the process of importing your street list into MCTI desktop, and your streets will be available in the pull-down menu. Note that the default street names will remain as well.

Import from the i-Tree Grand Database (GDB)

Clicking the bottom button will import the uploaded field data from the i-Tree Grand Database into the MCTI structure as well as any data field configuration conducted using the STRATUM Tree Inventory PDA Utility desktop component (section 3.2.1). The **i-Tree Grand Database** acts as a primary data location, which is shared by the individual applications of the i-Tree suite.

- To execute this process, use the dialogue box that opens when you click the button (**Import from GDB**) and navigate to the file *i-Tree_Grand_Database.mdb*, located by default at: C:\Program Files\i-Tree
- Click **Open** to complete the process of uploading the field data into the MCTI structure.
- Confirm operation success by clicking **OK** and then click the **Exit** button to return to the main MCTI interface.

3.1.5 MCTI — Reporting Results

Summary Report

On top menu, click **Reports** → **Summary Reports**.

This report uses the field data entered to calculate structural reports. Fill in the dates and areas you want reported, and then supply the community information in bold.

NOTE: The community information will only need to be updated if changes have occurred.

When you click **Print Report** you will see a print preview, which you will be able to save as a *.pdf or *.rtf file.

Street Summary Report

On top menu, click **Reports** → **Street Summary Reports**.

In this window, you can select specific date ranges and streets to be included in the summary report. A maximum of 40 streets may be selected at one time.

Note this Tree Report

On top menu, click **Reports** → **Trees with Note this Tree flag**

In this window, you can select specific date ranges and streets to be included in a report of all inventoried trees marked with the **Note this Tree** designation.

Graphic Reports

On top menu, click **Reports** → **Graphic Reports**.

In this window, Graphic Reports will be created based on Species Distribution, Tree Condition, and Tree Evaluation. Options include selecting the areas and dates to be included, copying the graph to the clipboard, showing in color or black-and-white, and selecting an "exploded" pie chart.

- **Species Distribution Tab** - provides a bar graph of the 10 most frequently occurring species.

- **Tree Condition Tab** - provides a pie chart for the percentage of trees exhibiting a given condition (Good, Fair, Poor, Dead).
- **Tree Evaluation Tab** - creates a pie chart for the percentage of each category of risk tree evaluation (the number of points earned by a tree becomes a category; *e.g.,* a group is created for all trees evaluated with an overall score of 9 points or greater).

3.1.6 MCTI — Troubleshooting

Questions about this application should be directed to i-Tree Support through any of the means listed on the i-Tree website (http://www.itreetools.org/support).

3.1.7 MCTI — Data Collection

Street Tree Population

Street trees are defined as trees that are located within the public right-of-way of a road. The state laws generally grant to the local municipalities the authority for street and public shade trees within their own jurisdictional areas.

The public street trees must be identified because they are the focus of public maintenance. The criteria for defining such trees, as well as the responsibility for their maintenance, vary from community to community, so local code should always be checked before beginning data collection.

In some ways, it is preferable to inventory planting sites instead of trees - that way, the community can track changes in the tree population without the need to redo the inventory. Planting sites must be well defined to be a specific distance from competing tree crowns and from traffic elements such as corners, driveways, signage, etc. Some planting sites will currently have trees on them, others will not. The ratio of the number of sites with trees to the total number of sites is called the stocking level or stocking rate, and it is a good measure of the level of a community's access to maximum urban forest benefits.

Inventory data collectors should follow the guidelines below to determine whether a particular tree should be counted.

- The tree is located between the curb and the sidewalk.
- The tree is located within the sidewalk corridor. It is usually planted in an underground tree pit or well.
- On streets that do not have sidewalks, the tree is located within _____ feet of a curb or pavement edge (distance defined by the community).
- The tree is located on a traffic island or median strip.

If the tree is not located as described above, it is not considered a street tree. The following are **not** street trees:

- A tree located between the sidewalk and a house or building.
- A tree located on the front yard of a property, unless it is within _____ feet of a road without a sidewalk, where there is a specific state or local law that defines a distance for an allowable public tree planting.
- A tree located on the front yard of a property, unless the community has a setback policy that would include the tree.

- A tree that arches over the street, unless it is actually planted in one of the four types of locations described above.

Data Definitions

- **Tree ID #** – a unique number given to a specific tree (or planting site, if being collected). PDA will assign Tree ID number automatically.
- **Address** – the physical street address nearest the surveyed tree. This is recorded as a street name and an actual numerical address of the nearest physical structure. If no structure is present, associate the tree with a permanent landscape feature such as a utility pole.
- **Species Code** – refers to a combination of letters to designate the species of the tree. An example would be 'AR' for *Acer rubrum* (Red Maple). The software contains a list of 70 codes and their corresponding species, with the capability to add additional species as needed.

NOTE: If using the STRATUM/MCTI Tree Inventory PDA Utility for an MCTI project, be sure to configure it to collect the 2-letter Species Codes used by MCTI.

- **DBH** – refers the **D**iameter of the tree at **B**reast **H**eight. This measurement is taken at 4½ feet above the ground. Size classes are the default for the PDA.
- **Tree Condition** – tree condition is the overall health of the tree. The following ratings are used in the MCTI software:
  - **Good** trees are healthy, vigorous, without signs of insect, disease, or mechanical injury, and they require little or no corrective work.
  - **Fair** trees are in average condition and vigor for the area, but may be in need of some corrective pruning or repair. They may show minor insect injury, disease, or other problems.
  - **Poor** trees are trees that are in a general state of decline. They may show severe mechanical, insect, or disease damage, but are not dead.
  - **Dead** trees exhibit no signs of life.
  - On the paper form, enter the abbreviation G, F, P, or D.
- **Consult Needed** – This classification is used to note a tree that requires further evaluation by a Certified Arborist to determine its condition. Enter Y on the paper form when required.
- **Weak Fork** – refers to a union where two or more stems come together at a narrow angle. Record here when included bark with associated decay is visible on large stems; if decay is suspected but not visible, use **Consult Needed**. Enter Y on the paper form when required.
- **Overhead Wires** – refers to overhead utility wires within 10' of the tree's crown. Enter Y on the paper form when required.
- **Cavity** – opening in a tree, whether visible or not. Record visible cavities when the remaining wall around the cavity is less than one-sixth the diameter at that point; if a cavity is suspected but not visible, or can not be evaluated for some reason, use **Consult Needed**. Enter Y on the paper form when required.

- **% Dead Wood** – refers to the percentage class of the crown containing dead branches that are over two inches in diameter. The percentage of deadwood is recorded in the following ranges:
  >75%
  50-75%
  25-50%
  <25%
  None
- **Latitude/Longitude** – refers to the specific latitude and longitude of the tree's location on a map. These data can be collected using a GPS (Global Positioning System) unit, but must be entered manually either in the field or during post-processing of field data.
- **Planting Location**
  - **Sidewalk –** refers to trees that have impervious material up to or close to the base.
  - **<4' –** refers to a planting strip less-than four feet wide.
  - **>4' –** refers to a planting strip greater than four feet wide.
  - **Lawn –** refers to a tree planted in a lawn area. Where no sidewalks exist, lawn refers to the area next to the road.
  – On the paper form, enter S, <4, >4, or L .
- **Maintenance Needs** – The following terms, based on the ANSI A300 Standards for Tree Pruning (2nd ed., 2001), are used to describe the maintenance needs of trees:
  - **Clean –** this type of maintenance is needed when dead wood is found. A minimum diameter such as 2" is usually specified.
  - **Raise –** crown raising removes the tree's lower limbs in order to provide clearance for pedestrian, maintenance or vehicular traffic, as well as for signage visibility. If no local code specifies heights, limbs above sidewalk should be no lower than 8 feet from the ground, above the road no lower than 14 feet, and for lawn maintenance no lower than 6 feet.
  - **Reduce –** crown reduction includes reducing the overall mass by pruning the top or sides back to a sufficiently large lateral. This is often done to prune the tree away from buildings, structures, or overhead utility wires.
  - **Remove –** this refers to the removal of a tree that is dead, presents a serious hazard, or is in poor condition and not contributing to the site.
  – On the paper form, enter Cln, Rse, Rdc or Rmv.
- **Tree Evaluation** – this evaluation is used to record the risk potential of a tree based on a point system. The methodology utilized in this rating system is based on a system that evaluates the following variables:
  – **Probability of Failure (1-4 points)**
  – **Size of Defective Part (1-3 points)**
  – **Probability of Target Impact (1-3 points)**
  – **Other Risk Factor (0-2 points)**
  The rating system was adopted from Jill D. Pokorny, Coordinating Author, *Urban Tree Risk Management: A Community Guide to Program Design and Implementation*, (Saint Paul, MN: 2003), Form 3.3.

NOTE: Risk assessment is normally reserved for tree professionals.

- **Note This Tree** – this variable allows the user to flag or 'note' the tree for further study, review or action. The specifics of the note will vary from survey to survey. Further details of the reason for the noting of the tree may be included in the Comments section. Enter Y on the paper form when required.
- **Comments** – this section contains important additional information. It should be used sparingly for critical information about the tree or area that is not covered in other fields. Examples of this could be a heavy lean, a bee's nest, or a cable in the crown.

Field Techniques and Elaboration of Data Definitions

Species

The first step in inventory data collection is to identify the tree genus and species, using either botanical (*e.g., Acer rubrum*) or common (*e.g.,* red maple) names. Work with local experts (arborists, foresters, educators, etc.) to identify the most appropriate materials and means for data collectors to master this skill quickly and accurately.

DBH

Data collectors and others measuring DBH find it most convenient to locate 4.5' on their own bodies and note that spot. This eliminates the repetitive step of measuring 4.5' up from the ground in order to find the correct spot.

A diameter tape (DBH tape, d-tape) differs from a standard measuring tape in that it has measurement numbers on both sides of the tape, but the sides are scaled differently. One side measures distances in feet and tenths of a foot (NOT inches), and may be used to measure where 4.5' is located on human body. The other side has numbers further apart that show tree diameter by dividing circumference by π (pi).

The procedure to measure DBH with a diameter tape is as follows:

- Wrap the tape around the tree at 4.5' above ground, until zero on the tape reaches the tape again.
- Read the number where the zero meets the tape. This is the tree diameter.
- Be sure to read the correct side of the tape!

Another tool used to measure DBH is a Biltmore cruiser stick, similar in appearance to a yardstick but with four sides. One side of the stick is marked "tree diameter." The procedure to measure DBH with A Biltmore stick is as follows:

- Hold the stick at arm's length, at 4.5' above the ground, and against the tree.
- Align the left side of the stick with the left edge of the tree trunk.
- Read the number on the stick's right end that is aligned with the right edge of the tree trunk.
- It is important to use only one eye; close the other eye, and hold the head still.

NOTE: The height at which the diameter is measured may have to be adjusted if an odd growth or interrupting object interferes with measuring at the 4.5' height. A tree that has a large root flare should be measured as any other tree. If the root flare extends as high as 4.5', then the diameter should be measured above it. The height at which the DBH is actually taken should then be entered in the Comments column of the Data Collection sheet or into your PDA unit.

For further details on measuring trees, see DBH Measurement in Appendix C.

Condition

Tree condition should be determined as accurately as possible, because that description will be used to plan the management steps for that individual specimen.

Every tree should be assigned a condition. The following guidelines are provided so that condition assessment will be consistent among data collection teams.

- **GOOD**
  - Full canopy
  - Minimal to no mechanical damage to trunk
  - No dieback of branches over 2" diameter in the upper crown
  - No suckering (root or water)
  - Form is characteristic of species
- **FAIR**
  - Thinning canopy
  - New growth medium to low amount for species, climate and age
  - Significant mechanical damage to trunk
  - Insect/disease affecting tree
  - Form not representative of species
  - Premature fall coloring on foliage
  - Needs train pruning
- **POOR**
  - Tree is declining
  - Visible dead branches over 2" diameter in canopy
  - Significant dieback of living branches
  - Presence of insect/disease that threatens the tree's health or stability
  - Severe mechanical damage to trunk, usually including decay resulting from damage
  - New foliage small, stunted, or minimal
  - Priority pruning required (i.e., large dead wood is present that could cause significant harm or damage)
  - Bark may be beginning to peel
- **DEAD**
  - No live foliage visible during species' growing season.

Maintenance Needs – Pruning

The most common and most important tree maintenance practice in a municipal context is pruning. Trees are usually pruned for one or more of the following reasons:

- Pruning for safety eliminates dead, split, and broken branches before they cause damage to people or property. Danger from falling limbs exists where there are targets, such as along community streets and in public parks. Pruning for safety also includes two types of clearance trimming. Low-hanging live branches need to be removed to avoid interference with traffic. The second type of clearance trimming is the removal of branches that obscure traffic signs and signals. Safety pruning is further required to keep branches away from energized electrical lines.
- Pruning for health includes removal of broken, dead, or diseased branches, in order to prevent pathogenic organisms from penetrating into adjacent parts of the tree or

spreading to other trees. Crown pruning can also reduce wind resistance when recommended.

- Pruning for appearance is not usually carried out on street trees. It used to maintain or restore the crown characteristics typical for the species.

Consult Needed

Potential problems requiring consultation include the following:

- **Cavities, wounds, and internal decay**. Shade trees in populated areas are constantly being wounded. The most serious effect of wounding is that it creates an opening for fungi and bacteria to enter the tree. These microorganisms decay wood. Columns of decayed wood may result, thus compromising health and structure of the entire tree. Trees often exhibit the physical evidence of wounding. Just as frequently, however, they have internal decay whose presence is not visible on the outside. Common symptoms of decay:
  - Large dead or dying branches throughout the crown
  - Large and deep vertical cracks on the trunk or large branches
  - Large areas of exposed wood without bark on the trunk, indicating older wounds that have not closed
  - Branch wounds that remain open
  - Mushrooms or conks (shelf-like growths of fungi) on the trunk
  - Carpenter ants along with evidence of decayed wood in or around the tree

  Record **Consult Needed** when such symptoms lead you to suspect a large cavity or area of decay inside the tree.

- **Cankers**. Cankers develop from microorganisms and appear as localized dead areas on outside bark. Cankers kill the cambium, the growing layer just inside the bark. The continuing dieback of the cambium layer prevents the wound from closing. Cankers injure trees in several ways:
  - The open wound may provide entry for other microorganisms
  - The trunk is weakened by the large dead area and may break at the canker face
  - Multiple cankers lessen overall trunk flexibility, especially in windy conditions

  Record **Consult Needed** when cankers are larger than one-fourth to one-third of the tree's circumference.

- **Root failure**. Data collectors may suspect root failure if they see:
  - Severed roots – caused by construction, excavation, sidewalk replacement, etc.
  - Shallow roots – caused by a wet site (from a high water table)
  - Decayed roots – caused by decay fungi

  Indicator signs around the tree that may signal the presence of decayed roots include:
  - Soil erosion
  - Paving over roots
  - Soil compaction
  - Flooding
  - Recent filling
  - Gas leaks

  Record **Consult Needed** when the presence of these signs makes you suspect the potential for root failure.

- **Weak forks in trunk or large branches.** Defined above under **Data Definitions**. Record **Consult Needed** when you suspect that a large fork has included bark, decay or cracks.
- **Canopy density**. A healthy tree will have a full crown, with few dead branches. Dead or dying areas in the crown may indicate that the tree is stressed and could be in decline. Record **Consult Needed** when you see large dead or dying areas and you suspect serious underlying problems.
- **Balance**. A leaning or lopsided tree may be more problematic than one that grows vertically. If a tree has always been growing off center, it is generally considered to be stable. Record **Consult Needed** when you suspect that the lean is recent and might indicate a weakening or breakage of support roots.

3.2 Tree Inventory PDA Utility

3.2.1 STRATUM/MCTI PDA

The STRATUM/MCTI PDA Utility was designed to make it easier to conduct inventories for STRATUM or MCTI projects. For STRATUM, complete or sample inventories can be carried out, while only complete inventories can be done for MCTI.

The PDA Utility has two components. One program runs on your Pocket PC (PDA) and the second program runs on your Desktop PC. The Desktop PC component allows users to prepare the Pocket PC for data collection by creating species lists, defining data collection variables, and constructing parameters specific to sample or complete inventories. After data have been collected in the field, the Desktop component moves the data into STRATUM or MCTI in a format that is compatible for analysis. The Pocket PC component is used to collect field data and helps reduce the amount of direct data input and, therefore, helps reduce mistakes.

The PDA Utility is only compatible with Pocket PC-formatted PDAs. Microsoft ActiveSync or Microsoft Device Center (Vista OS) software (provided with your Pocket PC purchase or through i-Tree) is used to transfer data between the two PDA Utility components. During the automated Sync session, configuration information flows *from* the Desktop PC *to* the Pocket PC, and field tree data flows *from* the Pocket PC *to* the Desktop PC.

Setting up an inventory project using the PDA Utility will typically require a single project manager who configures the setup on the Desktop PC and imports the data from the data collectors in the field.

Installation and Setup

Installing and running this PDA Utility successfully will require the following components:

- the desktop component of the PDA Utility
- the Pocket PC component of the PDA Utility
- Microsoft ActiveSync or Vista Device Center
- ActiveX Data Objects control for the Microsoft CE operating system (ADOCE) (Windows Mobile 5.0 operating systems only)

Follow the steps below, using default settings (recommended), to install each component. Administrative privileges may be required for correct installation.

1. Insert the i-Tree CD into the CD-ROM drive. Navigate to the **Get the i-Tree PDA Utility for STRATUM and MCTI** link and click.
2. If you haven't yet installed the i-Tree Manual, click **Step 1** on the screen.
3. Install the STRATUM/MCTI PDA Utility on your desktop computer (Step 2 on screen)
4. Complete installation of required components:
   - Connect your Pocket PC to your computer via sync cable or cradle.
   - Launch the STRATUM/MCTI PDA Utility on your desktop computer by clicking **Start → (All) Programs → i-Tree → STRATUM_MCTI_PDA_Utility**.
   - On the main screen, click the **Sync PDA** button to launch the Sync PDA dialogue.
   - Click the button **Check PDA STATUS** to check your system; you will be prompted to install any necessary components. Follow on screen directions.

     NOTE: To continue, your Pocket PC must be connected through ActiveSync or the Device Center (Vista OS), but you DO NOT need to form a relationship between the computer and Pocket PC.

   - Confirm each installation by clicking the CHECK PDA STATUS button.

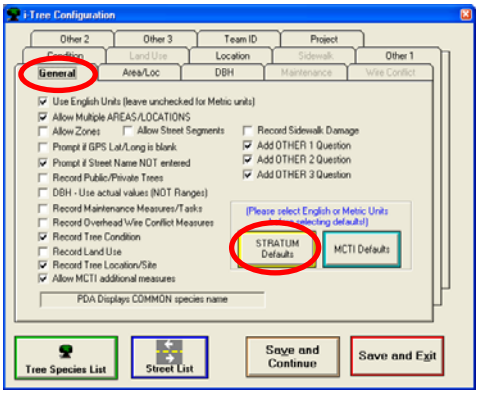
Congratulations, installation of the PDA Utility is complete. You can now configure your project, collect and transfer data.

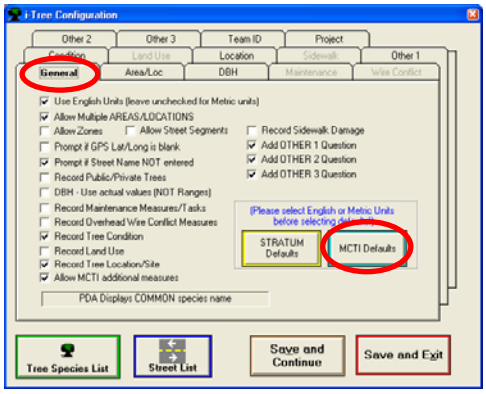
Configuration

Start the STRATUM/MCTI Tree Inventory PDA Utility on your Desktop PC by clicking **Start → (All) Programs → i-Tree → STRATUM_MCTI_PDA_Utility**; alternatively, the PDA Utility can be launched through the Tools menu in MCTI or STRATUM.

Click the **Configure Project** button.

1. General Configuration
   - For STRATUM projects: Click the **General** tab, and then click **STRATUM Defaults.**
   - For MCTI projects: Click the **General** tab, then, click **MCTI defaults.**





   - A confirmation dialog box will appear, click **OK.**

   Data Field Configuration: Further modification of the default configuration settings can be made at this point.

- If you would like to collect data in metric units, uncheck the box marked **Use English Units**.
- If you are dividing teams among locations and you wish to keep track of those locations, check the box next to **Allow Multiple Areas/Locations**. This information will be requested when logging in on the PDA.
- If you have divided your city into zones for the purposes of the inventory and/or analysis, check the box marked **Allow Zones**.
- If you are conducting a sample inventory, check the box marked **Allow Street Segments**.
- If you want to be reminded that you have forgotten to enter GPS information, check the box next to **Prompt if GPS Lat/Long is blank**.
- If you want to be reminded that you have forgotten to enter the street name, check the box next to **Prompt if Street Name NOT entered**.
- If you will be collecting information on privately owned trees in addition to public trees, check the box next to **Record Public/Private Trees**.
- If you want to collect DBH in exact values, check the box marked **DBH - Use actual values**. Otherwise, leave the box unchecked and under the DBH tab, define the category sizes you would like to use.
- The remaining boxes on the General tab relate to specific information that can be collected during the inventory. Check the boxes for any fields of data you would like to inventory (*e.g.*, Location, Land Use, Sidewalk). (Note that as you uncheck a box, its respective tab becomes grayed-out and unavailable.)
- Click on individual tabs of the fields you have chosen to include (*e.g.*, Location, Land Use, Sidewalk) to change the category definitions. You must click the **Save Info** button for each tab that you change. See section 2.4, section 3.1, and Appendix D and for more information on STRATUM and MCTI default and optional data fields.

2. Project Configuration
   - Click the **Project** tab.
   - Enter your project information: Location Name, Series (unique number or name for each project), Year, and Project Name.
   - If you will be collecting an inventory to use with STRATUM, you are encouraged to select a Climate Zone and STRATUM-compatible species list; these lists can also be helpful for MCTI users who are beginning a new inventory and do not already have species lists.
   - Select the **climate zone** from the pull-down menu.

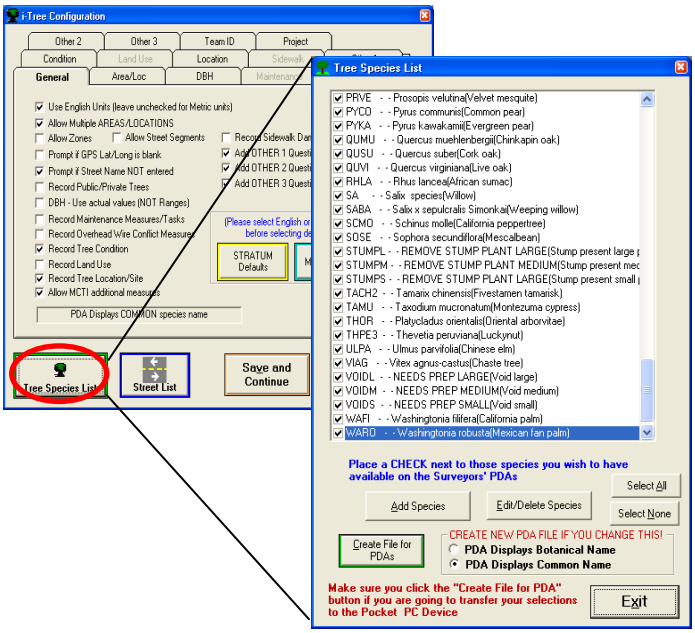
     NOTE: STRATUM research and development are ongoing; not all regions have been completed. In the current version of STRATUM, the following climate zones are available: North, Pacific Northwest, Temperate interior West, Interior West, Southwest Desert, Inland Valleys, Inland Empire, Southern California Coast, Northern California Coast, Northeast, Midwest, Lower Midwest, South, Coastal Plain, and Tropical. See Appendix D for more information.

     – Click the **yellow** button to import the STRATUM Species Database (by default located at C:\Program Files\i-Tree\).
     – Step 1: Click on button and browse to the database location. Highlight *STRATUM Species Database.mdb* and click **Open**.
     – Step 2: Click button to finish the import process.

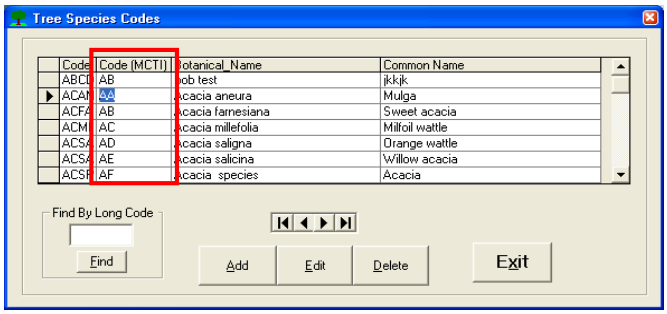
– Step 3: You must follow the "Tree Species Configuration" step (4) below.

NOTE: Selecting a climate zone will fill the species table for the Pocket PC with regional species from the STRATUM species database for use with either MCTI or STRATUM. From this list, you need to add/remove species that you expect or don't expect to encounter at your location (follow step 4 below for directions). This choice of species is flexible. i-Tree software allows on-the-fly species addition should a data collector encounter an unexpected species during data acquisition.

3. Team ID configuration
   - Click on the **Team ID** tab.
   - Click **Edit** to make changes to the current teams or surveyors.
   - Click **Add** to create an additional team or **Delete** to remove an existing team.
4. Tree Species List Configuration: If you wish to modify the species that were installed in Step 2 on the screen (Project Configuration) above, click on the button **Tree Species List**.
   - Check the boxes for the species that you want to appear on the PDA. You can check all the boxes at once by clicking **Select All**.
   - To include additional species, click the **Add** button and follow the prompts that follow.

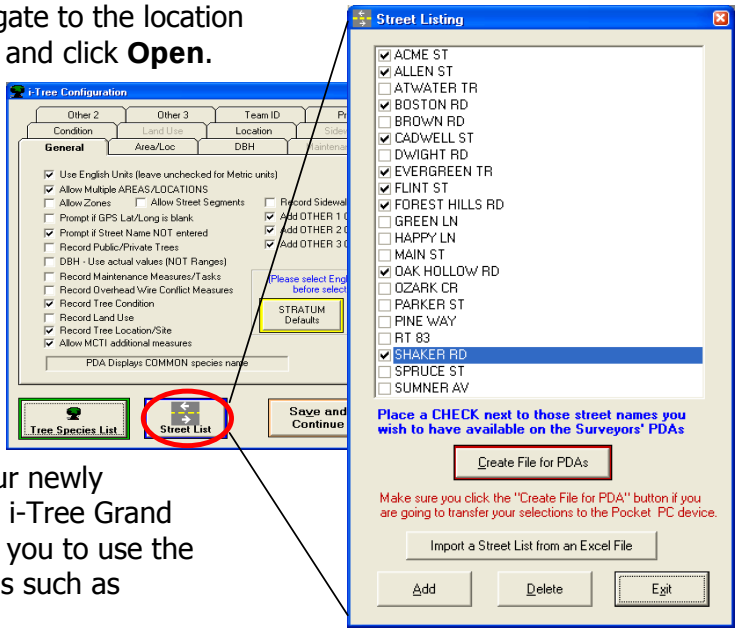


- If you are using MCTI to collect your inventory, you must make sure that the 2-character species codes have been properly installed. This can be confirmed by clicking the **Edit/Delete Species** button, which brings up the screen below, where the 2-character codes are boxed in red. If you add a species, you must designate a unique 2-character code for MCTI data collection.



- Choose whether you would like the PDA to display the species with their common or botanical names.
- Once all changes have been made, click **Create File for PDAs.**
- Finally, click **Exit** followed by **Save and Continue**.

5. Street List Configuration
   - Click the **Street List** button to set up your street list and select the streets that will appear on the PDA.
   - If you have an Excel file that includes a list of the streets that you will be inventorying, the file can be imported into the PDA. The file must be a CSV (comma separated file) and the street names must be in the first column. Street names should not contain commas or apostrophes as this will confuse Excel. To create a CSV, your Excel workbook can only have one worksheet, so delete any additional worksheets. Choose **Save As** under the **File** menu and save as *.csv. Follow the prompts that Excel gives. On the PDA configuration screen, click the **Import a Street List from an Excel file** button. Click **Find CSV file and Import the Data**. Navigate to the location where you saved the file and click **Open**.
   - To add streets manually, click the **Add** button and follow the prompts that follow.
   - Finally, click **Create File for PDAs**.
   - Click **Exit**, followed by **Save and Exit**.



6. Link Project to the i-Tree Grand Database
   - You now need to link your newly configured project to the i-Tree Grand Database. This will allow you to use the data in i-Tree applications such as STRATUM and MCTI.
   - On the main screen of the Desktop Utility, click **Setup or Update Project Information in i-Tree Grand Database**.
   - Navigate to the Database, located by default at C:\Program Files\i-Tree\i-Tree_Grand_Database.mdb and click **Open** and then **OK**.
   - Click **Exit**.
7. Apply the new configuration settings to the Pocket PC.

NOTE: Defining and sending project configuration data is typically done only once at the start of the project. This procedure will automatically clear the PDA of any existing field data.

   - Connect your Pocket PC to your computer.
   - On the main screen of the Desktop Utility, click **Sync PDA**.
   - Click the **Check PDA STATUS** button to confirm that your Pocket PC is properly connected with required components installed.

- In the **PDA Set-Up** field, press the **Send Project Configuration to PDA** button to transfer the new settings over to the PDA.

NOTE: Make sure you have exited the application on the Pocket PC; this procedure will not work if the PDA Utility is running on the Pocket PC.

- You are now ready to begin your STRATUM/MCTI data collection project. On the PDA, select the **STRATUM/MCTI Tree Inventory PDA Utility** from the **Programs** menu and begin!

Data Operations

1. PDA Utility use
   - Start by checking the correct configuration of your PDA by clicking on **Check Config**. If configuration is correct, return to the main menu. If not, you must follow the instructions above for configuring the PDA with the Desktop Utility and resynchronize the PDA.
   - Click **Log In** to begin the field session; confirm that today's date and starting tree ID are correct. If enabled, select a **Location/Area** and **Team ID**. Click **Continue**.

NOTE: Tree ID is recorded and compiled in the i-Tree desktop databases with the same entries as entered on the PDA. Project managers who want to track trees based on unique Tree ID should be mindful to ensure that data collection among two or more PDAs do not overlap. If data are uploaded to the desktop mid-project (see below) the PDAs will be cleared of data. By default, the PDAs, once cleared of data, will begin with a Tree ID of "1"; this must be adjusted to the correct number—continuous with the previously recorded tree—by the project or data collection team manger.

   - From the main menu you can add new tree data.
     – To add a new tree, tap the box marked **Add New Tree**. The next number will appear automatically in the Tree ID box. You may select a zone if you have enabled zones or enter a Street Segment if you are conducting a sample inventory. Checking the box marked **Hold Data until Street Seg Changes** will mean that you do not have to reenter the zone and street segment data until you move to a new street segment.
     – There are two ways to enter the tree species. You can choose from the drop-down menu or enter the species code directly. If the tree that is being inventoried is one whose species is not included in the Species List that you uploaded, simply enter a unique species code for it and click **Yes** when you are asked if you would like to use it even though the species code is not included in the list.
     – From the drop-down menus, select whether the tree is **public** or **private** and what its **location** is.
     – Click on the **Street Address/GPS** box if you wish to enter location data.
     – Click on the tab labeled **Dim** to record the tree's DBH.
     – Click the tab labeled **Mgmnt** to record maintenance needs and conflicts. Choose each option from the drop-down menu.
     – Click the tab labeled **Cond** to record the condition of the trees or to enter data for the three optional categories if you have defined these.

  - When you are finished with that tree, click **Save/Exit** to return to the main menu.
- From the main menu you can edit a tree that has already been entered. Click **Edit Tree** in the main menu. Click on the tree you wish to edit and click **Edit**. Proceed as above.
- From the main menu you can back up your data to a storage card by clicking **Backup Data to SD Card**.

> **NOTE: It is recommended that you back up data to a storage card after entering new tree data. That way, in the event that your PDA fails, your existing data can be recovered! Do this by clicking the box marked Backup Data to SD Card.**

- When the field session is completed, click **Exit/Done** to exit the program.

2. Transferring field data from the PDA to the Desktop.
   - Connect your Pocket PC to your computer.
   - On the Desktop, open the STRATUM/MCTI PDA Utility program under **Start→ (All) Programs → i-Tree → STRATUM_MCTI_PDA_Utility**.
   - On the main screen of the Desktop Utility, click **Sync PDA**.
   - Click the **Check PDA STATUS** button to confirm that your Pocket PC is properly connected with required components installed.
   - Under **Field Data Transfer**, press the **Retrieve Data from PDA** button to transfer new field data to the desktop utilty.

> **NOTE: Make sure you have backed-up your field data to a SD Card on the Pocket PC prior to transferring field data. After transferring field data to the desktop utility, the PDA Utility will be cleared of records to ensure that duplicates are not transferred during future synchronization sessions.**

   - The transfer is complete!
   - If needed, you can delete field data from the PDA by pressing the button **Clean PDA of Collected Data**.
3. Upload Data to the i-Tree Grand Database
   - Before you can import data into STRATUM or MCTI applications, you need to transfer your imported field data to the shared i-Tree Grand Database. This can be done at any point during a project, incrementally as data is imported from the field or one time at the end of data collection.
   - On the main screen of the Desktop Utility, click **Upload Field Data to i-Tree Grand Database**.
   - Navigate to the Database, located by default at C:\Program Files\i-Tree\i-Tree_Grand_Database.mdb, and click **Open** and then **OK**.
   - Confirm success and number of records transferred; click **OK**.

3.2.2 UFORE Tree Inventory PDA Utility

The UFORE PDA Utility was designed to aid i-Tree users interested in conducting inventories for UFORE projects. The Utility has two components. One program runs on your Pocket PC and the second program runs on your Desktop PC.

The Pocket PC component is used to collect field data and was designed to minimize the amount of direct data input. The Desktop PC component of this Utility allows users to

create species lists, choose data collection variables, and send data to the UFORE shell in compatible format for further processing.

The PDA Utility is only compatible with Pocket PC-formatted PDAs. Microsoft ActiveSync or Microsoft Device Center (Vista OS) software (provided with your Pocket PC purchase or through i-Tree) is used to transfer data between the two PDA Utility components. During the automated Sync session, configuration information flows *from* the Desktop PC *to* the Pocket PC, and field tree data flows *from* the Pocket PC *to* the Desktop PC.

Setting up an inventory project using the PDA Utility will typically require a single project manager who configures the setup on the Desktop PC and imports the data from the data collectors in the field.

Installation and Setup

Installing and running this PDA Utility successfully will require the following components:

- the desktop component of the PDA Utility
- the Pocket PC component of the PDA Utility
- Microsoft ActiveSync or Vista Device Center
- ActiveX Data Objects control for the Microsoft CE operating system (ADOCE) (Windows Mobile 5.0 operating systems only)

Follow the steps below, using default settings (recommended), to install each component. Administrative privileges may be required for correct installation.

1. The desktop component of the UFORE PDA Utility is installed as a component of the UFORE Shell.
   - If you haven't already installed the UFORE Shell, follow the installation instructions in Section 1.2 of the User's manual before continuing.
   - If you have already successfully installed the UFORE Shell, continue to Step 2 (below).
2. Complete installation of required components:
   - Connect your Pocket PC to your computer via sync cable or cradle.
   - Launch the UFORE PDA Utility on your desktop computer from the Tools menu in the UFORE Shell.

     NOTE: Access to the UFORE PDA Utility is only granted after a project has been defined and opened. See Section 1.3.2 to open the sample UFORE project or Section 1.3.3 to create a new project.

   - From the **PDA Tab** on the main screen, click the **Sync PDA** button to launch the Sync PDA dialogue.
   - Click the button **Check PDA STATUS** to check your system; you will be prompted to install any necessary components. Follow on screen directions.

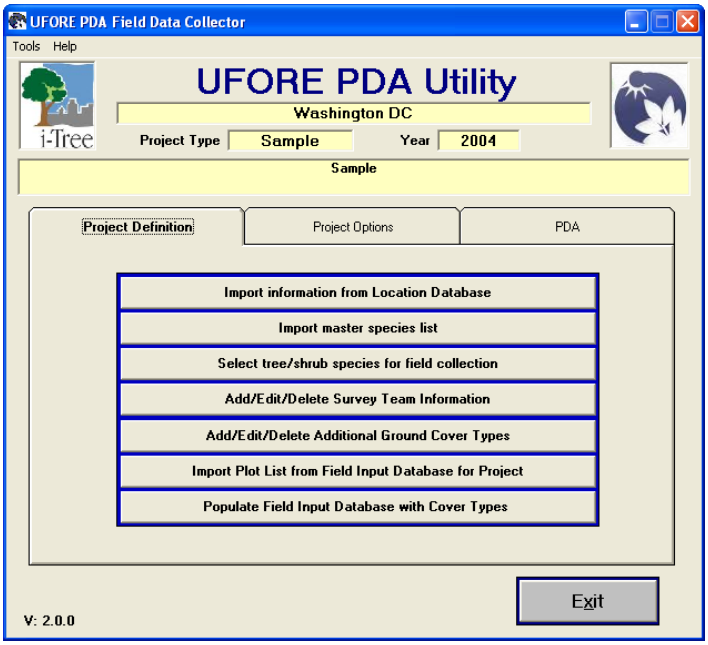
     NOTE: To continue, your Pocket PC must be connected through ActiveSync or the Device Center (Vista OS), but you DO NOT need to form a relationship between the computer and Pocket PC.

   - Confirm each installation by clicking the CHECK PDA STATUS button.

Congratulations, installation of the PDA Utility is complete. You can now configure your project, collect and transfer data.

Configuration

1. The UFORE PDA Utility is opened through the UFORE shell, under the **Tools** menu, or when configuring your project (see section 1.3.3). The main screen will appear as below.



2. Click the **Project Definition** tab.
   - Each of the steps represented by the buttons shown on this screen needs to be executed. Some may be later repeated without any harm. However, once the project is set up, changes usually will not be made.
   - Here's what each button actually does:

This button loads the UFORE Location Database from its default location (the default will be the file name and path from the Project Definition file). Then it will transfer to the local database (*UFORE.MDB*) lookup information for the PDA (Reference Objects, Field Land Use Types, and Ground Cover Types).

This button loads the UFORE Species Database from its default location (the default will be the file name and path from the Project Definition file). It will import the complete list of species, from which the user may select those to appear on the PDA using the following button: **Select tree/shrub species for field collection**. Checking the box next to each species that is wished to appear in the PDA drop-down lists will select a master list. To complete this action, click the button outlined in green. The selected species will be transferred to the PDA during the next Sync session.

This button will bring up a screen where the list of Survey Team members is created that will appear on the PDA's Log-In Screen.

This button will bring up a screen where the user may add to the list of Ground Cover Types that was transferred to the local database. Field users may supplement this list with user-defined Cover Types using ID numbers 50-99.

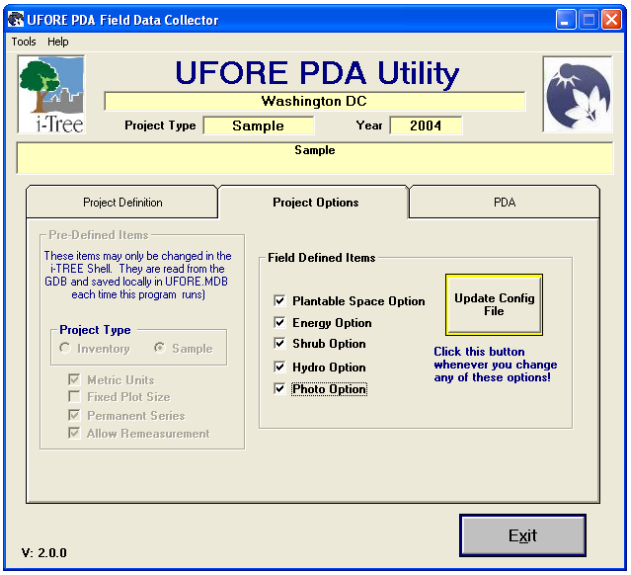
For SAMPLE projects, the list of available Plots/SubPlots must be imported so they may be selected from list on the PDA.

NOTE: The plot list should only be imported once!

As Plots are completed, they will disappear from the lower box of uncompleted plots so you can follow the progress of your project.

This button will update the local database with any Ground Cover Types added above.

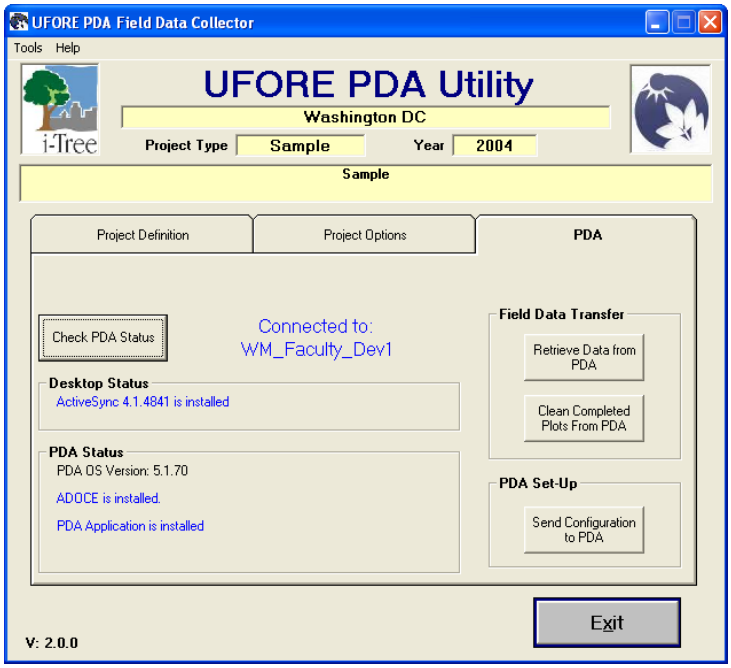
3. Set project configuration options by selecting the **Project Options** tab. The screen shown below will appear. The items on the left side of the screen are established automatically, while the Field Defined Items may be set here. After making any changes, click the button outlined in yellow to update the local database.



4. Apply the new configuration settings to the Pocket PC.

NOTE: Defining and sending project configuration data is typically done only once at the start of the project. This procedure will automatically clear the PDA of any existing field data.

- Connect your Pocket PC to your computer.
- On the main screen of the Desktop PDA Utility, click on the PDA TAB.



- Click the **Check PDA STATUS** button to confirm that your Pocket PC is properly connected with required components installed.
- In the **PDA Set-Up** field, press the **Send Project Configuration to PDA** button to transfer the new settings over to the PDA.

NOTE: Make sure you have exited the application on the Pocket PC; this procedure will not work if the PDA Utility is running on the Pocket PC.

- You are now ready to begin your UFORE data collection project. On the PDA, select the **UFORE_PDA Utility** from the **Programs** menu and begin!

Data Operations

Transferring field data from the PDA to the Desktop.

- Connect your Pocket PC to your computer.
- From the **UFORE Shell** open your project and launch the UFORE PDA Utility from the **Tools** menu; on the main screen of the Desktop PDA Utility, click the **PDA Tab**.
- Click the **Check PDA STATUS** button to confirm that your Pocket PC is properly connected with required components installed.
- Under **Field Data Transfer**, press the **Retrieve Data from PDA** button to transfer new field data to the desktop utilty.

NOTE: Make sure you have backed-up your field data to a SD Card on the Pocket PC prior to transferring field data. After transferring field data to the desktop utility, the PDA Utility will be cleared of records to ensure that duplicates are not transferred during future synchronization sessions.

- The transfer is complete!
- If needed, you can delete field data from the PDA by pressing the button **Clean PDA of Collected Data**.

Troubleshooting

Questions about this application should be directed to i-Tree Support through any of the means listed on the i-Tree website (http://www.itreetools.org/support).

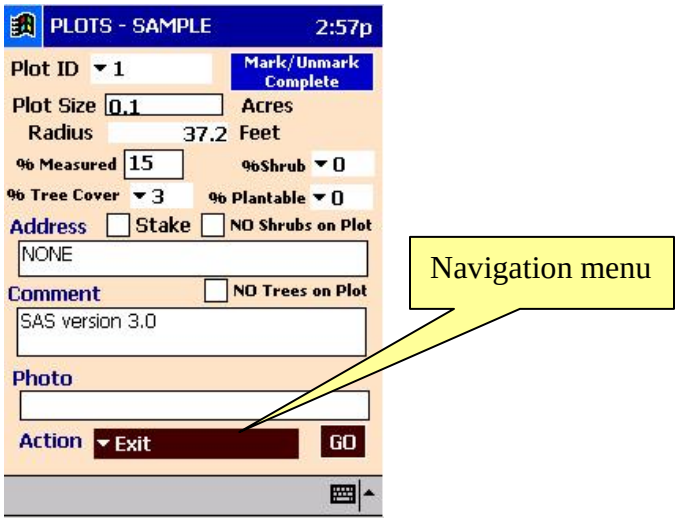
Data Collection

You should have executed successfully three steps before beginning UFORE field data collection on a PDA:

- Installed the Pocket PC component of the PDA.
- Defined a project using the UFORE shell (see section 1.3.3).
- Applied the configuration settings to the PDA application.

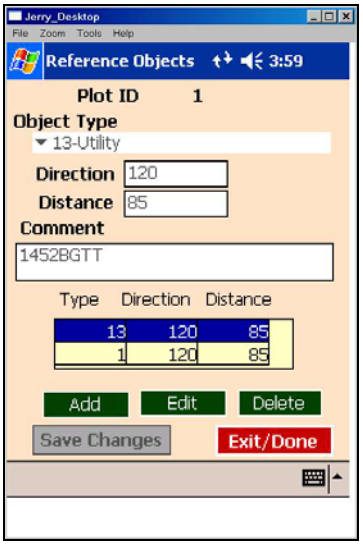
Once you have established the physical plots, follow the steps below to record UFORE data with your PDA.

1. **Start Screen**. Turn on the PDA, and click on **Programs** in the upper left corner. This takes you to Programs Screen, where you click on the **UFORE PDA** icon, bringing up the i-Tree-UFORE Screen.
2. Click on **Log In**. This takes you to Log In Screen, where you can change the Survey Date, if necessary. Select your **Surveyor/Team ID** from pull-down menu, and then click **Continue**.
3. Back on i-Tree-UFORE screen, click on **Plots**. This takes you to PLOTS-SAMPLE screen.



NOTE: if you are doing a complete inventory, the screen will be labeled PLOTS-INVENTORY.

4. **PLOTS-SAMPLE Screen** - this screen functions as the home screen: each time you complete a section of data entry such as Reference Objects, you will return to this screen and select a new section using the navigation menu at the bottom.
   - Enter all data using pull-down menus and check boxes following the data definitions in section 1.7.
   - Data fields on this screen are self-explanatory, requiring only a few clarifications.
     – Plot ID pull-down menu contains all the Plot IDs for the entire study. When the plot is finished, click on **Mark/Unmark Complete** and mark it "Complete". An asterisk will appear before the Plot ID signifying that the Plot data are ready to upload. Specific Plot IDs are removed from the pull-down menu after the plot has been completed and the plot data have been uploaded.
     – Mid-points of 5% intervals are in the pull-down menus for % Shrub, % Tree Cover and % Plantable (*e.g.*, 3 is mid-point of 1-5%; 8 for 6-10%; etc.).
     – After all data have been entered, click on pull-down navigation menu to the right of Action and select **Reference Objects**. Clicking **GO** takes you to the Reference Objects screen.

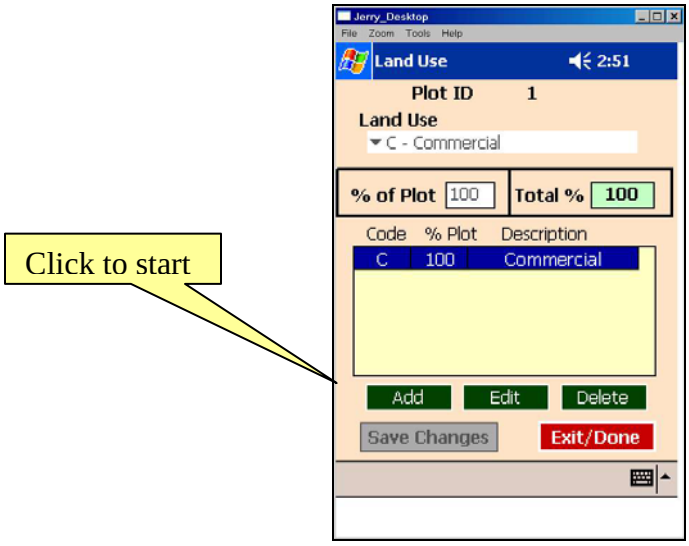


5. **Reference Objects Screen** - you must click **Add** to be able to start adding data. This is equally true for the Land Use, Ground Cover, Shrubs, Stems and Tree Building Interactions screens.

> **NOTE: After clicking the Add button, its name changes to Abort. If mistakes are made in data entry, click Abort, and the button name changes back to Add. Clicking Add now erases all entered data, allowing correct data to be entered. This toggle operates the same way in the Land Use, Ground Cover, Shrubs, Stems, and Tree Building Interactions screens.**

   Although only one reference object is required, it is strongly advised to record two reference objects.
   - Data entry fields are self-explanatory with some clarifications:
     – If **Object Type 01 –Tree** is selected, DBH is required in the DBH box.
     – If **Object Type 15 –Other** is selected, make sure to enter unique description in Comment field.

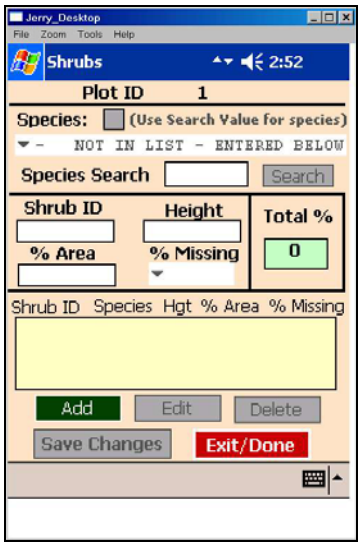
- After data for one reference object have been entered, click **Save Changes**. Screen refreshes and data are displayed in the review pane. You can choose to **Add** another reference object, or **Edit** or **Delete** data for reference object displayed.
- If you choose to describe another reference object, click **Add**, enter data, click **Save Changes**, then click **Exit/Done**. This takes you back to home PLOTS-SAMPLE screen.
- After all data have been entered, use the navigation menu as before to go to **Land Use**.



6. **Land Use Screen**
   - Select **Land Use** from pull-down menu and enter **% of Plot** in appropriate box. Click **Save Changes**. Screen refreshes and data are displayed in the review pane. You can choose to **Add** another Land Use, or **Edit** or **Delete** data for Land Use displayed.
   - If you choose to describe another Land Use, click **Add**, enter data, click **Save Changes**, then click **Exit/Done**. This takes you back to PLOTS-SAMPLE screen.
   - After all data have been entered, use the navigation menu as before to go to **Ground Cover**.
7. **Ground Cover Screen**

NOTE: Only one set of cover types is recorded for the plot, even if several land uses are present.

- Select **Cover Type** from pull-down menu and enter **% of Plot** in appropriate box. Click **Save Changes**. Screen refreshes and data are displayed in the review pane. You can choose to **Add** another Cover Type, or **Edit** or **Delete** data for Cover Type displayed.
- If you choose to describe another Cover Type, click **Add**, enter data, click **Save Changes**, then click **Exit/Done**. This takes you back to PLOTS-SAMPLE screen.
- After all data have been entered, use the navigation menu as before to go to **Shrubs** or **Trees**, if you have any to enter. If not, skip to Step 16.



8. **Shrubs Screen**

NOTE: Shrub and Tree navigation options will not be present in the pull-down menu if their fields (% Shrub, % Tree) on the PLOTS-SAMPLE screen are zero.

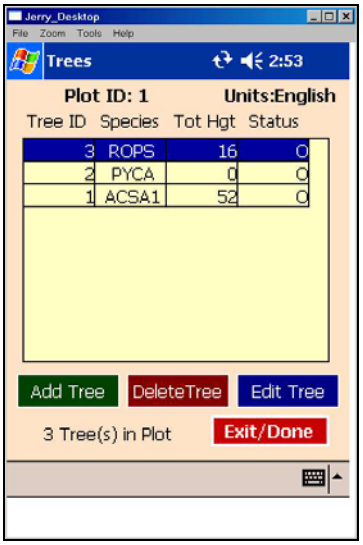
Choose one of two options for entering shrub species:

- If species code is unknown:
  - Make sure **Use Search Value for Species** box is unchecked.
  - Scroll down alphabetical list of species codes in pull-down menu and highlight the desired species.
  - Since the list of species is long, another option is to type in a known code close (alphabetically) to the code of the genus you are looking for. Type in the code in the box next to Species Search, click the **Search** button. The box will clear and the pull-down list will display the code that you've typed in. Scroll up or down to the desired species and highlight it.
- If species code is known:
  - Make sure **Use Search Value for Species** box is checked.
  - Enter known species code in the box next to Species Search. **Do Not** hit the **Search** button. The code will stay in the box.

NOTE: using this option, the program will accept any letter combination. This is good for entering a code that isn't in the pull-down menu, but also increases the chance of entering the wrong code for a species. Be very sure you know the appropriate species code, if you use this option.

- After entering the shrub species, continue with the following data entry steps:
  - **Shrub ID** is filled in sequentially by the PDA program.
  - Type in **Height** and **% Area** values into the appropriate boxes; and select **% Missing** value from the list of mid-points of 5% interval classes in the pull-down menu. Click **Save Changes**. Screen refreshes and data are displayed in the review pane.
  - You can choose to **Add** another Shrub, or **Edit** or **Delete** data for Shrubs displayed.

9. When finished working with shrubs, click **Exit / Done**. This takes you back to PLOTS-SAMPLE screen. If you have trees to enter, use the navigation menu as before to go to **Trees**. If not, skip to Step 16.



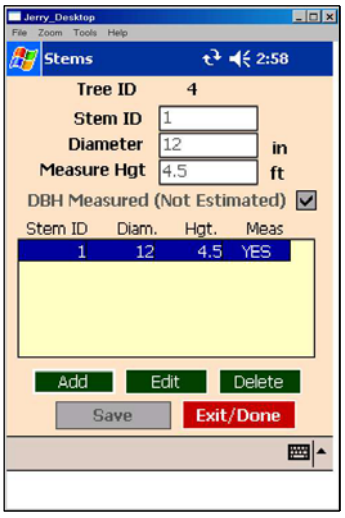
10. **Trees Screen**
    - Review pane displays any trees that have been entered for the plot.
    - Trees can be added, deleted or edited starting from this screen.
    - Click **Add Tree**. This takes you to Trees - Sample screen.
11. **Trees – Sample**
    - Tree ID is generated by the PDA program.
    - In pull-down menu, select the land use where trees are located. Unless it is a split plot, there will be only one land use in the menu. The choices will be the land use(s) entered in the **Land Use** option on the PLOTS-SAMPLE screen.
    - Enter **Distance** and **Direction** from plot center as well as any comments or Photo information. Click **Continue**. This takes you to **Tree Detail** screen.

12. **Tree Detail Screen**
    - Tree ID is generated by the PDA program.

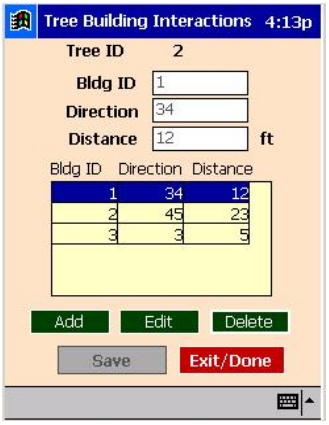
- Identify **Street tree** or **Not a street tree** in **Site** pull-down menu.
- If this is the first time trees have been measured, only one option (Initial Sample) will appear in **Status** pull-down menu. If **Remeasurement** box is checked, there will be multiple options in Status menu.
- Choose one of two options for entering tree species:
  - If species code is unknown:
    - Make sure **Use Search Value for Species** box is unchecked.
    - Scroll down alphabetical list of species codes in pull-down menu and highlight the desired species.
    - Since the list of species is long, another option is to type in a known code close (alphabetically) to the code of the genus you are looking for. Type in the code in the box next to Species Search, click the **Search** button. The box will clear and the pull-down list will display the code that you've typed in. Scroll up or down to the desired species and highlight it.
  - If species code is known:
    - Make sure **Use Search Value for Species** box is checked.
    - Enter known species code in the box next to Species Search. **Do Not** hit the **Search** button. The code will stay in the box.

NOTE: using this option, the program will accept any letter combination. This is good for entering a code that isn't in the pull-down menu, but also increases the chance of entering the wrong code for a species. Be very sure you know the appropriate species code, if you use this option.

- Enter all data into appropriate boxes or use pull-down menus. Data entry fields are self-explanatory, except for several clarifications.
- Mid-points of 5% intervals are in the pull-down menus for Dieback, Crn Miss, % Imperv and % Shrub (*e.g.*, 3 is mid-point of 1-5%; 8 for 6-10%; etc.).
- If tree is dead, click on the **Dead** box. You will only be able to enter data for Species and Tot. Hgt., and Crn Miss and Dieback have fixed values of 100. All other fields have an entry of -1 that cannot be edited.
- Clicking on the **Back** button at any point in data entry returns you to the Trees – Sample Screen where data can be re-entered, if a data entry error has been made.
- After data have been entered, click **Save**, then click **Stems** which will take you the Stems screen.



13. **Stems Screen**
    - **Stem ID** is filled in sequentially by the PDA program.
    - Enter **Diameter**. Enter **Measure Hgt** only if not taken at standard DBH height (4.5 ft./1.37m)
    - Uncheck **DBH Measured** box if DBH was estimated.
    - Click **Save**. Diameter entry will appear in review pane below.
    - If there is a second stem to measure, click **Add** and enter values for new stem, click **Save**. When finished with all stem measurement click **Exit/Done**. This takes you back to Tree Detail screen. If the tree is >20 ft. tall and there is a building within 60 feet of the tree, click **Bldg**. This takes you to Tree Building Interactions screen. If there are no adjacent buildings, click **Done**. This takes you back to the Trees screen.



14. **Tree Building Interactions Screen**
    - **Building ID** is filled in sequentially by the PDA program.
    - Enter **Direction** and **Distance** measurements.
    - Click **Save**. Building entry will appear in review pane below.
    - If there is a second building to measure, click **Add** and enter values for new building, click **Save**. When finished with all Building measurements click **Exit/Done**. This takes you back to Tree Detail screen. Click **Save**, then click **Done**. This takes you back to the Trees screen.
15. **Trees Screen**
    - Review pane displays any trees that have been entered for the plot.
    - Trees can be added, deleted or edited starting from this screen.
    - If there are no other trees on the plot, click **Exit/Done**. This takes you back to PLOTS – SAMPLE screen.
16. **PLOTS – SAMPLE Screen**
    - If you are completely finished with the plot and feel that plot data are ready to upload, click on the **Mark/Unmark Complete** button and an asterisk will be placed in front of the plot number in the pull-down menu. You will not be able to edit the plot unless you **Unmark** it.
17. **Exiting the PDA Program**
    - Select **Exit** option in pull-down menu from the PLOTS – SAMPLE Screen. Click **Go**. This returns you to the i-Tree - UFORE screen.
    - If you have a card option on your PDA, back up data to storage card.
    - Click **Exit/Done**. This returns you to the Programs Screen. You can now power off the PDA.

3.3 Storm Damage Assessment Protocol (SDAP)

3.3.1 SDAP — Introduction

General

The i-Tree Storm Damage Assessment Protocol Utility establishes a standard method to assess widespread damage immediately after a severe storm in a simple, credible, and efficient manner. This assessment method is adaptable to various community types and sizes, and it provides information on the time and funds needed to mitigate storm damage.

Sample street segments are randomly chosen in a community, a survey is performed, and time and cost estimates are reported. Data collection applications for use on personal digital assistants (PDAs) facilitate data collection and entry. Paper forms are available for those choosing or needing to do this work manually.

The protocol includes an optional pre-storm stage that evaluates a community's street-side and adjacent trees, and estimates the amount of cleanup that might be needed after a severe storm.

A template developed in MS Excel allows all computations to be carried out automatically. It estimates the costs for hazard mitigation and debris cleanup across the entire community.

Planning

The Storm Damage Assessment Protocol belongs within the general context of a community's emergency planning and emergency response. Such planning is critical for an appropriate and timely response by a community after a disaster, and it is highly recommended that a general plan be devised before implementing the Protocol. A very useful guide for community officials can be found in the Tree Emergency Plan Worksheet, updated in June 2006, by Lisa Burban (USDA Forest Service), Jim Hermann (Minneapolis Park and Recreation Board), and Katie Himanga (Heartwood Forestry). Tree managers will also profit from consulting Storms over the Urban Forest by Lisa L. Burban and John W. Andresen (2nd ed., 1994).

Sampling

Accurate estimates with the SDAP rely upon using a random sampling method (GIS tools are described in section 3.4 and Appendix B). In a test case, it was demonstrated that a 2% sample of the sample segments, or blocksides, can get within 5% of the true value of debris if the degree of damage is relatively constant. A lower percentage may suffice, especially in larger communities.

Recommended SDAP sample size in terms of blocksides:

$$10 < 2\% < 30$$

In other words: 2% of the entire number blocksides in the community, with a minimum of 10 and a maximum of 30. Since occasionally a segment may be invalid for one reason or another, the user is advised to draw an additional 5 blocksides for possible substitution (must be taken in order). Details available through the SDAP

documentation in the Resource/Learning Center on the i-Tree website (http://www.itreetools.org).

Personnel

The collection of post-storm data depends critically on having a trained damage assessor(s) ready to work. Assessors can be recruited from various groups, depending on the community:

- Community Staff
- Tree Professionals
- Volunteers

All assessors will need hands-on training for data collection. It is strongly recommended that the training be conducted during the setup period, because it is very difficult to do under emergency conditions. It is not necessary that the person be extensively experienced in estimating debris volume, labor time, or costs. The assessment system is set up to minimize the need for specialized experience to complete accurate fieldwork.

Volunteers typically require more training, as well as motivation and oversight, so that anyone interested in using volunteers for Storm Damage Protocol work - as for any community tree activity - would do well to consult resources on working with volunteers.

NOTE: Caution is urged in involving volunteers in post-storm data collection for safety reasons.

It is desirable that the same assessors be used for the pre-storm and post-storm surveys, and that they have the following qualifications:

- Some familiarity with trees and tree work
- Available time under emergency conditions
- Local residence

If a community decides to establish sample plots using in-house staff and contract out the actual damage assessment, the person doing the post-storm assessment must be trained in advance on plot location, data entry, and the protocol used to assess the sample plots.

Storage

In the event of a disaster that causes widespread damage to trees, it will be necessary to relocate and assess each sample plot in the community. For that to occur with minimal effort, careful planning must be made about storage:

- Two separate sets of the plot information should be maintained.
- Electronic equipment must be kept ready for use. PDAs must be kept charged, or have fresh batteries if they accept batteries. Because often disasters are accompanied by power failure, a laptop is preferable to a desktop as a host computer.
- Paper data-collection forms should be printed and stored with pencils, sharpener, and clipboards.

Contacts

Data summaries for each community need to be communicated to the proper officials in a timely manner if the storm damage assessment effort is to be worthwhile. For this

reason, local, state, and federal contact information should be archived with the storm assessment protocol information. This contact information can be recorded in Form 4 (see SDAP forms in Appendix E), if the Tree Emergency Plan Worksheet has not been used.

Transmission of the post-storm assessment information can be completed using pre-determined reporting methods, such as telephone, fax, E-mail, or overnight mail. More than one predetermined method should be set up because of the likely interruption of communications during a major storm event.

Storm Types

Different disaster types present different damage and debris profiles, requiring some adjustment to the use of SDAP.

- **Ice Storms** - ice storms tend to have relatively widespread and uniform damage, and the debris is almost exclusively vegetative. Furthermore, the ice-laden debris usually remains at its initial landing place and is not moved around by natural forces. These characteristics permit quick, accurate estimates of potential and actual damage and costs from a small random sample. In post-storm data collection, either the crown loss or the cubic yards method may be used.
- **Hurricanes and Floods** - hurricanes and many floods also produce widespread damage, and the Protocol should usually work well to produce a quick estimate of *actual* damage and costs. The debris must be estimated in actual cubic yards, since the crown loss method will miss C & D (construction and demolition) debris. There is also presently no separate procedure for recording any sediment that needs to be removed.

  The Storm Damage Protocol will **not** produce a good sense of the *potential* costs of such storms, since it only surveys tree density and size categories and, thus, can only predict tree and vegetative debris. A method of estimating potential hurricane damage has been developed by the U.S. Army Corps of Engineers, and is available on the web as the USACE Hurricane Debris Estimating Model.
- **Smaller-Scale Disasters** - smaller-scale disasters present sampling problems, since they commonly affect only a portion of a community, jurisdiction, or domain of interest. These disasters include tornados, derechos (straight-line storms associated with thunderstorms), and some floods. The following procedure may be used:
  - Determine the rough geographical area affected by the disaster. It may well be necessary to assess this based on a quick survey of the area - for example, by driving routes toward the area from different directions and noting where the damage begins, or by using aerial data if available.
  - Draw a boundary around the affected area on a street map or in the GIS file used for sampling.
  - Determine the total street miles in the affected area using the scaled map or standard GIS tools.
  - Establish a suitable sample of the street segments in the area.

Once this adjustment has been made, the post-storm process can be completed as described in section 3.3.7.

3.3.2 SDAP — Installation

NOTE: If you are collecting data on paper and entering data manually, then you will only need the SDAP Forms in Appendix E and the Storm Damage Assessment Protocol Template on your desktop PC (see Installation CD). No Pocket PC software or applications are required.

The Storm Damage Assessment Protocol (SDAP) software has the following Pocket PC and desktop computer requirements that must be satisfied prior to installing the SDAP system:

- **Pocket PC**
  - A Pocket PC with Windows Mobile 2002 or newer operating system (OS) Microsoft ActiveSync 3.8 (for users with Windows Mobile Pocket PC 2002 or 2003 operating systems) or ActiveSync 4.1 (for users with Windows Mobile 5.0 operating systems). Follow Step 1b on the Installation CD to install ActiveSync if needed.
  - Make sure that ActiveSync has been installed and set up as described in Appendix F before proceeding.
- **Desktop PC**
  - Windows 2000 or XP. Windows Vista is not currently supported.
  - Access 2000 or higher. Access 2000 Runtime is included in the installation package and will be automatically installed if you do not have it.
  - Excel 97 or higher.

1. Insert the i-Tree CD into the CD-ROM drive. Navigate to the **Get the i-Tree Storm Damage Assessment Protocol Utility** link and click.
2. If you haven't yet installed and set up ActiveSync on your PDA and desktop follow **Step 1b** on the screen to install.
   - Users with Pocket PCs running 2002 or 2003 operating systems, only, do not need to update to ActiveSync 4.1 or "modify the Registry" (Step 1c on screen). However, all users with Pocket PCs running Windows Mobile 5.0 must use ActiveSync 4.1 or greater and follow Step 1c on the screen to modify the Registry for MS Access compatibility.
   - Before proceeding, continue with the instructions in Appendix F of this manual for proper set-up and partnership configuration (Step 1d).
3. Follow Step 2 on the Installation CD to install the SDAP Interface system. Click on the link to run the *setup.exe* and follow instructions for a **typical** installation and default locations to ensure that the enire system will be installed correctly.
   - Click **Start → (All) Programs → i-Tree → SDA → Install VB Runtime for Pocket PC**
   - Click **Start → (All) Programs → i-Tree → SDA → Install Handheld App on Pocket PC**; the application will be loaded on the PDA at the next ActiveSync session.
4. Make sure to register your PDA with the SDA program. See Section 1 (Manage Users) under **The Interface**, below, for details.

3.3.3 SDAP — Getting Started

Components

The Storm Damage Assessment (SDA) software has three major components:

- The SDAP template, constructed in a MS Excel spreadsheet.
- An Interface to facilitate linking your data, sample segment information, and the template.
- Software for a Personal Digital Assistant (PDA) with a Pocket PC operating system.

The SDAP Template

The calculating and reporting engine of the Storm Damage Assessment Protocol consists of a Template created in an Excel spreadsheet ("StormDamageTemplate.xls") located in the folder **C:\Program Files\i-Tree\SDA**. The Template contains seven separate sections or worksheets, visible on the tabs at the bottom of the screen:

- Home. The Home page contains a navigational panel below the Storm Damage Assessment Protocol splash screen through which the user can access instructions and the other worksheets. The navigational panel is color-coded to separate pre-storm from post-storm documents, and its hyperlinked buttons are pretty much self-explanatory.

  NOTE: The user can also simply scroll down to read the instructions, and reach the other worksheets through the tabs at the bottom of the screen.

- PreData. This worksheet needs only to be accessed by users entering data manually, since those using the SDAP software on a PDA will have the data automatically inserted in the right location.
- PreAnalysis. This worksheet displays the pre-storm estimate of storm damage and costs based upon the field data collected before a disastrous event and assuming serious damage levels based on historical data (documentation in the Resource/Learning Center of the i-Tree website, http://www.itreetools.org)
- PostData. This worksheet needs only to be accessed by users entering data manually, since those using the SDAP software on a PDA will have the data automatically inserted in the right location.
- PostAnalysis. This worksheet displays the post-storm estimate of storm damage and costs based upon the field data collected after a disastrous event.
- Codes. This worksheet contains functional lookup tables not altered by the user under normal circumstances.
- StandardErrors. This worksheet contains calculations of standard error not altered by the user under normal circumstances.

The **PreStorm Report** and **PostStorm Report** buttons will display the estimate of damage and costs. For that to happen, the corresponding field data must have been entered correctly, and the **Community Values** (blue-grey boxes in image below) filled in.

COMMUNITY VALUES			Sampling
Correct numbers to right as needed	Street Miles	0	TIGER/Line
	Removal Cost/hr	$55	
	Pruning Cost/hr	$55	% Street Miles
	Brush Cost/cu yd	$6	0.0%
Based on National Data	Tree density per 100' (ROW + 50')		No. Samples
Precision Level*			0

- If the SDAP PDA Utility software is being used and the sample was created with the TIGER/Line files (see section 3.4.1 and Appendix B), then **Street Miles**, **% Street Miles** and **No. Samples** will be filled in automatically. Otherwise, the user must fill in those values manually.
- The remaining categories already contain suggested values based on current national averages. You can change them (here or in the Interface) to other values in order to make the estimate more accurate for your community.
- The **Tree density** box only appears on the PostStorm Report (**PostAnalysis** tab), as shown in the illustration above. It permits the use of national averages for tree density based on a visual estimate of the local community's approximate tree density (very low, low, medium, high, very high) and available as a pull-down menu. If local sample data are available in the PreData worksheet, this box will change to read **Based on Sample Data** and the actual tree density for the sample plots will be shown.

Aside from the lookup tables discussed below, there is nothing particularly complicated about the template's operation, since simple Excel formulas carry out the calculations. The application's own tools (such as on the menu **Tools** → **Auditing**) can be used to trace precedents and dependents of all formulas.

The report worksheets are protected - except for the Community Values box - so that the formulas will not be overwritten by mistake. This protection is not locked, so if there is a need to change a protected cell, the user can go to the menu **Tools** → **Protection** → **Unprotect sheet**. It is highly recommended that the sheet be protected again after any changes to avoid accidental corruption of the template's formulae.

The Interface

NOTE: The Interface is only needed if using PDAs for data collection.

The Interface was written in Access 2000, using Visual Basic® for Applications 9.0. Access 2000 gives the system increased flexibility for reporting and data storage, and has the potential for relatively inexpensive upgrades in the future. Access 2000 also provides a good bridge between the software packages used to develop the PDA application and the Excel Template. The interface can be run in Access 2002 and 2003, but if the user has another version of Access (or no Access at all), the program will use a copy of Access 2000 runtime is included on the installation disk.

PDA Software

The data collection application for the Pocket PC was written using eMbedded Visual Basic 3.0, a software development toolkit provided by Microsoft. It was developed to read the information stored in a Pocket Access database on the Pocket PC OS Device.

Thus, the transfer of information from the host Personal Computer to the Pocket PC OS Device is executed by Microsoft ActiveSync.

Using the Sample SDAP Data

In order that the new user may become used to the functionality and capability of the SDAP, sample street segment data have been supplied with the application.

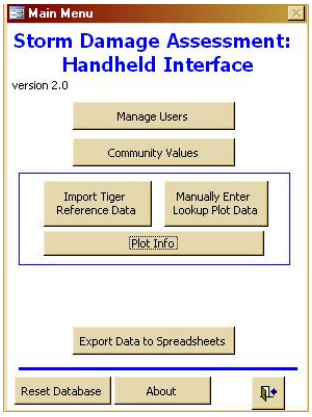
- The Interface contains pre-loaded street segments that you see when you click on **Plot Info**.
- Similarly, once the handheld application has been installed on the PDA, you will find that the **Plot Information** pull-down menu contains those same street segments.
- If you practice loading field data in and uploading it through the Interface into the Template, then you will be able to generate the reports by adjusting street mileage to the suitable level.

These street segments will be deleted when you click the **Reset** button on the Interface, along with any other data you have entered, though you will be given the option to keep you sample segment data.

Project Setup

Launch the Interface by clicking **Start → (All) Programs → i-Tree → SDA → SDA Interface**.

As the image on the right shows, the Interface is used for four major functions that are triggered by the buttons above the blue line:



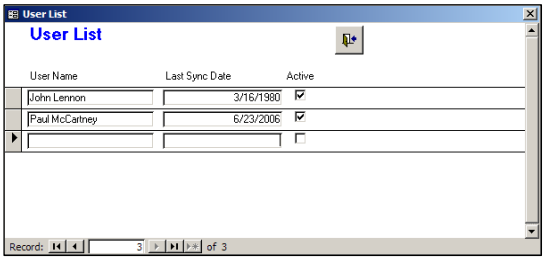
1. Manage Users
2. Community Values
3. Setting Plot Information
4. Export Data to Spreadsheets

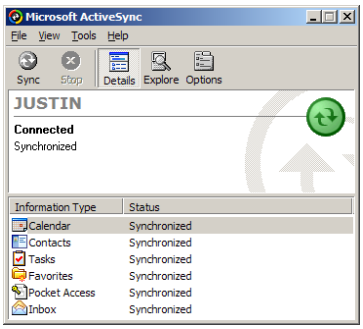
System buttons are below the blue line:

5. Reset Database
6. Find Out About the Program (About)
7. Exit

Let's look at these functions in more detail.

1. **Manage Users**
   The Interface's primary role is to set up the relationship between the template and the handheld systems. This is done by defining your users in the **Manage Users** menu. In the figure to the right, you can see two User names, the last time those PDAs were synchronized with the main computer, and User status.

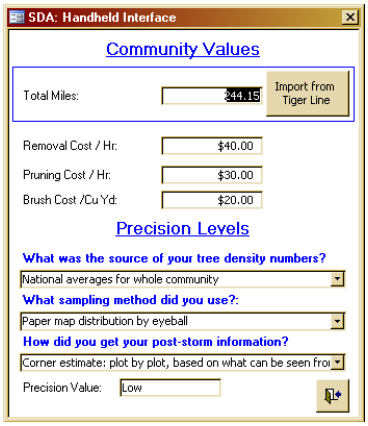




When adding a User to the interface, you need to make sure that you use the proper 'User Name'. The User name must be the ActiveSync device name for the Pocket PC users. The user name on the ActiveSync screen below is "JUSTIN".

2. **Community Values**

The community values data entry form allows the user to set some global values to be included in the Excel Template where the results of the data analysis are stored.



- **Miles and costs**

Each of these variables is used in the Excel Template. If you want the total miles to be assigned by the TIGER/Line data, then click the **Import from TIGER/Line** button. Locate the **entire** TIGER/Line **.dbf* file (not the random selection file) that you used to create your random sample (named by default *Clip_res.dbf*)and the application will automatically calculate the total mileage.

NOTE: You may also enter this value by hand into the spreadsheet template if you prefer.

- **Precision Levels**

This feature allows SDAP to be used in emergency situations where available time or field conditions prevent following the ideal protocol. The user can still benefit from the ease of estimation and report while indicating clearly the reduced quality of the field data to emergency officials.

The user indicates methods used for tree density estimation, sampling and post-storm field observations. A number between 0 (low) and 3 (high precision) is assigned to the method selected within each category, then the three are summed; the appropriate precision term is then matched to the sum and inserted automatically into the Report page following this simple scale:

- 0-1: N/A
- 2-4: Low
- 5-7: Medium
- 8-9: High

3. **Setting Plot Information**
   - **Import TIGER/Line Reference Data**
     After you have used the Sample Street Segment Generator (section 3.4.1) or followed the procedures outlined in Appendix B, you will have saved your sample street segments somewhere as a **.dbf* file (by default named *Clip_resexp.dbf)*. Clicking on the **Interface** button allows you to direct the program to that location. Once it knows where the file is located, the program will automatically download the segment reference data to the PDAs as a pull-down menu for field use.
   - **Manually Enter Lookup Plot Data**
     If you have created a manual random selection without using TIGER/Line data, then you can enter the plot information by hand.

     NOTE: Be sure your manual selection is truly random and covers a sufficient percentage of street segments to obtain accurate results. Two percent is recommended, with a minimum of 10 and a maximum of 30.

     Enter the segment's street name in **On Street**, and the address range in **From Address** and **To Address**. You also need the plot length in feet (you can drive it or estimate it from a scaled map, remembering to convert any measurement in miles to feet by multiplying by 5280). The Plot Number will be set for you automatically.
   - **Plot Info**
     – **ROW Width**
     Since Right-of-Way width is not included in TIGER/Line files, but is needed when conducting post-storm data collection, you have the option here to enter ROW Width information on a plot-by-plot basis. Any values entered here will automatically appear on the handheld when a plot is selected for data collection, but will not affect calculations.
     – **Rural?**
     SDAP treats rural roads differently than community roads because the lack of surrounding human habitation greatly reduces setup costs. Once you have loaded your sample plots, you have the option here of clicking on the radio button to designate the plot as rural. Values entered here are automatically written to the PostData sheet of the Template.
4. **Export Data to Spreadsheets**
   Once you have collected your field data and have synchronized your PDA and your main computer, you must click on this button to load those data into the Template. They will be automatically placed in the correct location. You may do this incrementally, or just once at the end of field data collection.
5. **Reset Database**
   There may be times when you want to clear everything out of the database and start again. Maybe you are just learning, you made a big mistake, or you are reusing the Interface for a different project. Clicking on the **Reset Database** button will bring up a warning screen, asking you if you are sure that you want to erase all data. When you say **yes**, a second screen asks if you want to leave the plot information, or erase that as well.
6. **Find Out About the Program (About)**
   Here you will find information about the program's development.

7. **Exit**

Calculations

Debris

The SDAP Template accepts debris data in one of two ways:

1. The user collects data about crown loss in the field, and those data are converted by the Template into debris estimates.
2. The user collects data about actual debris volumes in cubic yards, and those data are simply summed and scaled up by the Template's formulas.

NOTE: It is also possible to mix the two methods, though for any given sample street segment only one method may be used.

Data on crown loss is converted to debris estimates in the following manner:

Brush Debris Projected by Tree Density Assuming 50% Canopy Loss

Estimated Number of Trees/mi	Estimated Number of Trees/100'	Cubic Yards of Debris/mi	Cubic Yards of Debris/100'
151-200+	2.85-3.87+	633.6	12
101-150	1.91-2.84	475.2	9
43-100	0.81-1.90	316.8	6
26-42	0.49-0.80	132	2.5
1-25	0.05-0.48	66	1.25
0	0	0	0

NOTE: Christopher J. Luley constructed this table from historical debris data supplied in 2000 by Tom Rankin, at that time a consultant with DRC, Inc., 740 Museum Dr., Mobile, AL. The second column refers to street tree density, so it was necessary to convert it to include trees within 50' of the ROW. This was done based on actual field data from 15 northeastern communities. So modified, the table reappears on the "Codes" worksheet of the Template, where it is used to calculate the probable storm debris load on the report page of the pre-storm phase.

Reduction of Projected Debris by Crown Loss

Percent Canopy Loss	Initial Estimate (cu yds)				
None	0	0	0	0	0
1-20%	3	2.25	1.5	0.625	0.31
21-40%	6	4.5	3	1.25	0.625
41-60%	12	9	6	2.5	1.25
61-75%	18	13.5	9	3.75	1.86
75+%	22	16.2	10.8	4.5	2.25

NOTE: Chris J. Luley constructed this table from experiential evidence as part of the work in 2000 to produce the initial storm damage assessment protocol. It appears on the "Codes" worksheet of the template, where it is used to generate the estimated debris load when crown loss is being measured on the sample segments instead of cubic yards.

Scaling

Scaling of debris, pruning, and removal rates from sample to population is carried out on a simple linear basis based upon the mean rates for the sampled mileage. Standard errors are calculated using Excel's standard deviation (**stdev**) function to process accepted formulae. No greater level of precision is required for these estimates whose intended use lies not at the local level but at that of the entire affected region.

3.3.4 SDAP — Data Operations

Data Entry

- **PDAs** - make sure the PDA user name has been entered through the Interface. Plug the handheld into the cradle with the PC that has the Interface software installed, and synchronize the data. The field data will be imported into a temporary database managed by the Interface. When you open the Interface, you can click the **Export Data to Spreadsheets** button to put it into the Template where you can view and use the Report that is automatically calculated.
- **Paper Forms** - carefully type the values into the correct worksheet and check for errors.
  - Take frequent short breaks - it is easy to get eyestrain or fatigue during data entry, and short breaks counteract these problems.
  - Save often - a good habit is to hit **save** at the end of every record (row), after all the data from a field form have been entered and before you go on to the next.
  - There are instructions on the **Home** worksheet on how to make use of Excel's own data entry form, which is easier for some people.
- **Pre-storm Data Entry** - open the spreadsheet, then click either on the button **PreStorm Data Entry** or the **PreData** tab at the bottom of the screen to reach the correct page. Each hand-written form will become one **record** on this worksheet, with its data occupying a single row. The headers on the spreadsheet match closely those of the field form, so all that is required is to enter the word or number on the sheet in the correct cell. If Excel's data entry form is used, as explained on the **Home** page, the data are automatically entered into the right spot.
- **Post-storm Data Entry** - this is similar to pre-storm data entry, except that if you entered pre-storm data, all the location information is already transferred from the pre-storm worksheet and you do not have to re-enter it. Make sure the field data are entered in the row where the **PlotID** number matches that on the field form.

3.3.5 SDAP — Reporting Results

Once you have all field data loaded into the Template, navigate to the appropriate **Report** worksheet using either the buttons on the **Home** page or the worksheet tabs at the bottom of the screen. If you did not fill in the Community Values in the Interface, follow the directions in section 3.3.3 for filling them in now so the estimate can be made.

Whether pre-storm data or post-storm data, the report worksheets are set up so that only the first page is sent to the printer, since this is all that is usually required. That page can then be delivered to the appropriate officials by whatever means are available. It not only reports your storm damage estimate, but also indicates the method by which the estimate was derived as well as the research behind it.

3.3.6 SDAP — Troubleshooting

Questions about this application should be directed to i-Tree Support through any of the means listed on the i-Tree website (http://www.itreetools.org/support).

Below are some common questions that may arise when using the SDAP utility, and suggestions for correcting them.

Can I use sample plots that I manually entered as well as TIGER/Line data?
No, the protocol requires that your random samples be generated using one consistent methodology.

I can't find the Storm Damage application on the handheld.
Click the **Start** menu and choose **(All) Programs**. You should see an icon labeled **SDA**.

What is the ROW width?

This is a reference field that allows you to record how wide the ROW is. The default on the PDA is 49.5 feet, which is a common ROW width (3 rod road) for average-sized streets. This width will be used during data collection to separate trees in the ROW from those out of the ROW.

3.3.7 SDAP — Data Collection

Safety

Safety is always a concern when data collection is being conducted in an urban environment, and standard precautions should be taken when executing Storm Damage Assessment data collection.

Nevertheless, safety is even more of a concern for this Protocol, because it requires the resurvey of the sample plots within 12 hours of a storm's passage. Large disaster-level storms often produce hazardous conditions. Hazardous trees and tree parts have likely been created which threaten streets and sidewalks. These can include large hangers up in the crown, whole trees that have become unstable, and large amounts of debris on the ground.

Furthermore, it is common for electrical wires to have been lowered or downed, placing them in easy contact with humans. Since they often remain live, the post-storm data collector must be on the lookout for them and stay away from them. Careful coordination with local utility officials will help reduce the risk to the data collector.

The assessor will also be outside in adverse and potentially dangerous conditions. Dependable communications with the local storm center or crisis coordinators via cellular phones, two-way radios, or other methods, and a reliable vehicle (four-wheel drive in winter storm conditions) are advisable.

Preparation

After the sample plots have been selected and located, each plot needs to be surveyed in the field. If collecting data manually, a separate data collection sheet (Form 2) will be filled out for each plot.

Tools for field survey:

1. Map of sample plots
2. Able of sample plot information, including plot number, start and end, street name, and length.
3. Recording equipment

   PDA
   - Requirements
     - The PDA's name must been registered by using the Interface
     - The SDA software must be loaded on it
   - Peripherals
     - PDA case, on lanyard if preferred
     - Extra batteries, battery pack, or mobile charger
     - Extra stylus

   MANUAL TOOLS
   - The appropriate data collection form (enough copies to do all samples), see SDAP forms in Appendix E
   - Clipboards
   - Pencils (preferable) or pens

To start the field survey, locate the first street segment (sample plot) on the map and go to it in the field, then proceed through the rest of the plots.

Pre-Storm Data Collection

- General

  In each sample plot in a populated area, any tree greater than or equal to 6 inches in diameter at breast height (DBH) that is in the ROW or is within 50 feet of the edge of the ROW will be surveyed. (In rural, unpopulated areas, only ROW trees will be counted.) The reason for this difference is that FEMA will reimburse the costs of debris that can be hauled to the curbside by residents, so off-ROW trees must be included in estimations of potential debris in populated areas.

Details about which trees to include:

- Count only trees 6" or greater in DBH
- Trees on both sides of the plot will be counted.
- Dead trees should not be counted.
- If a tree is on the border of the edge of the ROW or sample area, follow local code if applicable. If not, make a visual estimate of the location of the trunk's midpoint to determine whether the tree should be counted as in the ROW or - for populated areas - within 50 feet of the edge of the ROW.
- If a median is present on the street, count all the trees in the median.

No information will be collected on tree species or other characteristics, even though it has been shown that trees in poor condition and even particular species tend to produce more debris than others. The reason for the survey is to identify any tree that may

require removal or pruning on the ROW, or that may contribute brush that could fall or be dragged into the ROW after the storm.

NOTE: data for trees that are on and off the ROW are tallied separately on the field data collection sheet.

Data will be collected on each tree, using diameter at breast height (DBH) categories. Although there are cceptable methods of determining DBH:

- Measurement with a Biltmore stick.
- Use of a diameter tape.
- Visual assessment of DBH with periodic confirmation.

Each tree will be categorized using six-inch DBH categories, ignoring any tree under 6" in diameter.

If ROW information is not available, the assessor can use field judgment (location of sidewalks, utilities, fences, etc.) to determine where the ROW ends. Many community roads are often 49.5 feet (three rods) wide, so this is the default on the handheld. In unpopulated rural areas, only ROW trees will be counted.

- **Manual Data Collection** - at the start of the plot, fill out all header information on the top of the sample plot sheet (Form 2). This includes: 1) the **on** street, or the street the trees are physically on; 2) the **from** street, or the nearest intersecting street that identifies where the plot begins; and 3) the **to** street, or the street (or dead end) that marks the end of the plot. Be sure to enter the plot number from your plot table in the upper right hand corner of the data collection sheet. Form 2 is set up to collect the tree data using a tally method.
- **PDA Data Collection** - the sample plot information you provided through the Interface will be loaded automatically onto the PDA. When you get in the field, you will ascertain your plot number from the plot table and click on that plot to open the data collection form.

Post-Storm

Once the storm has passed, the damage assessor can begin surveying the sample plots. Post-storm data collection should be completed within 12 hours after the storm's end.

NOTE: The assessor should follow a pre-planned, efficient route between plots, but should be aware of other routes in the event the planned route is blocked. Mapping programs are often able to determine the most efficient route among a number of stops. Movement may be restricted by debris or downed electric lines, making it difficult and dangerous to carry out the resurvey. The assessor should be on the look-out for hazards that have been created. The collection method detailed here may have to be modified on some plots to protect the assessor. Whenever modifications are undertaken, care should be exercised to keep quality as high as possible so that the final estimates will be accurate.

For each permanent sample plot, the assessor will record 3 critical pieces of information.

1. The number and size of trees in the ROW that will require removal.
   - Include trees that are partially down (such as trees that are partially uprooted or leaning against other trees). The tree should be counted if any part of the tree is on or may fall into the ROW.

- Trees that have significant crown damage (50% or greater of the crown lost) but are still standing can also be included as removals, since FEMA will permit such costs. But good judgment should be exercised. Research and experience suggest that some species recover even large amounts of lost crown very well, that healthy young trees have a good chance of recovery, and that the further out from the main trunk crown loss occurs the less it threatens the tree.
- Each tree for removal should be tallied in the appropriate diameter category.
- Trees that are completely on the ground are to be included in estimates of brush cleanup and, therefore, should not be included in the removal counts.

2. The number and size of trees in the ROW that have hazardous branches.
   - Here should be recorded broken or hanging branches that are two inches or greater in diameter and that are still in the crown of the tree.
   - Each tree that will require hazard pruning should be counted and placed in the appropriate diameter category.
   - Please note that hazard pruning is restricted to the removal of hanging or broken branches. Additional pruning to correct ripped branches or make proper pruning cuts of broken branches is not included.
3. The amount of debris that has been generated. The Protocol allows two methods of estimating this:
   - Crown Loss. **This option is unavailable if C & D debris is present**.
     - Percent canopy loss should be estimated in discrete 100-foot segments in the plot for all trees that are on the ROW (and, in populated areas, within 50 feet of the edge of the ROW).
     - Canopy loss should be estimated only on trees greater than 6 inches in diameter.
     - Data collection
       - **PDA** - tap on the appropriate percentage range for each 100-foot segment.
       - **Manual** - for each 100-foot segment, estimate overall crown loss in the segment with one of these values: **12.5** (0-25%), **37.5** (26-50%), **62.5** (51-75%), or **87.5** (76-100%). Note that those values represent the mid-point of their respective crown-loss class, so the selection of one of those values indicates that the crown loss falls somewhere in the corresponding range, not that it is exactly that value.
     - Crown-loss examples can be found online:
       How To Determine Percent Live Crown Loss in Hardwoods Before Leaf-Out
       Tree Emergency Manual
   - Cubic Yards
     - Estimate the actual debris on the ground in cubic yards for every 100' segment of your sample plot.
     - Include both ROW and 50' outside ROW on both sides (in populated areas).
     - If you are unfamiliar with such estimation, here is one method:
       - Start by imagining the size of the **box** created by the debris. If it is scattered about, imagine bringing it together.
       - Estimate the length, width, and height of the box in feet.
       - Multiply those numbers together, then divide by 27 to get the result in cubic yards.

- For example, a typical 100′ segment might have about 50′ ROW to each side of the midline (= a "3-rod road") and be completely covered with debris to a height of about 2′, giving this estimate:

  $$\frac{100' \text{ (L)} \times 200' \text{ (W)} \times 2' \text{ (H)}}{27'/\text{CY}} = 1{,}480 \text{ CY}$$

- On a street with multiple 100′ segments but the same ROW width throughout, it may be easier to make the surface calculation first (the **Area Factor**), since it is constant for every segment, then multiply that number by the estimated depth of debris. The **Area Factor (AF)** of each segment where the ROW is 100′ would be:

  $$AF = \frac{100' \text{ (L)} \times 200' \text{ (W)}}{27'/\text{CY}} = 740$$

  Thus, if the first segment has an estimated overall 2′ depth of debris, then:

  Debris = 740 (AF) x 2 (H) = 1,480 CY

  The next segment might only have an estimated overall debris depth of 3″ (=3/12 or 0.25 feet), then:

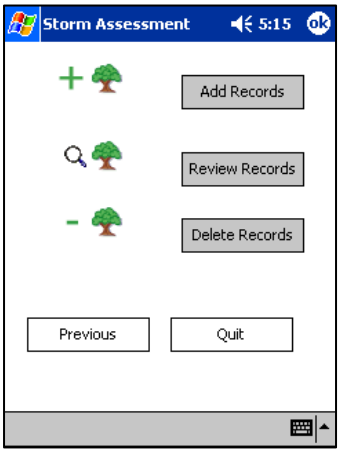
  Debris = 740 (AF) x 0.25 (H) = 185 CY

NOTE: Many smaller streets in a community tend to have the same street width and ROW, which can make repeated estimations easier.

Field Use of SDAP Software on the PDA

NOTE: If using PDAs for data collection on rural road segments, the user will be required to manually alter the record for each rural segment. After data have been uploaded, open your copy of the Template, and click on the navigation button (or tab) "PostData" on the home page. The column labeled "RuralRoad?" is highlighted in yellow, and is filled by default with the value "N." For each rural segment, change that to a "Y" so that the correct calculations will be executed.

When you start the software program (called SDA on the handheld), you will be presented with a Welcome screen. Clicking the **Next** button will carry you from screen to screen, which will be described now in sequence.



- **Storm Assessment** (**Actions menu**, see figure below) - from this screen you can add, edit, and delete records. Remember that you need to set up all your plot samples through the Interface on your computer before you get started.

  1. **Add Records**. To begin adding records, click the **Add Records** button and a data entry form will be displayed. The first step to adding a plot is to fill out general information regarding the plot, which is done on the next screen.

- **Plot Information** - this information includes the community name as well as the street name, and address range for the plot. The Plot Number is a system ID number that will be filled in automatically.

NOTE: The only field you have to fill in by hand is the community name, which the handheld application will remember from this point forward. The other fields on this screen are automatically filled in when you select a plot from the Plot Lookup pull-down menu. This is the reason that you need to have set up all your plot samples before beginning the data collection.

- **Collection Details** - on this screen you may enter some general collection details:
  - Date – this is filled in automatically
  - ROW width – default is 49.5 ft; if you entered ROW data for the street segments through the Interface, this field will be filled automatically
  - Collected by – insert name or initials
- **Plot Descriptions** - this screen can be used to enter optional information that can further clarify the beginning and end of the address range if necessary.
- **Tallying** - select on this screen whether you are collecting PreStorm or PostStorm data.

  The tallying screens all work the same way. In order to do your tallying, you simply click the button with a number in it that corresponds to the category you want on its left. The button will automatically raise the count up one. If you hit the wrong button, you can click the **Add** button at the bottom of the column. It will change to **Subtract** and now when you click a button, it will decrease the count by one. After correcting your mistake, you can click the toggle to switch it back to **Add**, and continue.

  PreStorm Tallies

NOTE: The recommended procedure is to first walk the length of the plot, tallying only ROW trees on both sides. You can then backtrack the length of the plot and count the Off ROW trees.

- **ROW Trees** - here you record the number of trees greater than 6" in each size class that are standing in the ROW. Each entry on the left represents a size class in inches, and tapping the corresponding button on the right tallies the presence of a tree of that class.
- **Off ROW Trees** - here you record the number of trees greater than 6" in each size class that are standing within 50' of the ROW. Each entry on the left represents a size class, and tapping the corresponding button on the right tallies the presence of a tree of that size.

PostStorm Tallies

NOTE: The recommended procedure is to first walk the length of the plot, examining ROW trees on both sides for hazard prune or removal. You can then backtrack the length of the plot and estimate the debris, whether by using the crown loss method or the direct estimation of debris.

- **ROW Hazard Prune** - here you record by size class any broken or hanging branches that are two inches or greater in diameter and that are still in the crown of trees in the ROW.
- **ROW Hazard Removal** - this screen functions exactly like the preceding one. Record in this screen trees by size class that are partially down, such as those

partially uprooted or leaning against other trees or objects. The tree should be counted if any part of the tree is on or may fall into the ROW. Trees that have significant crown damage (50% or greater of the crown lost) but are still standing can also be included.

- **Debris Estimate** - here you record data for each 100-ft. section of the sample segment to produce an estimate of the debris. At the end of your segment, count anything less than 100 feet as an entire segment, and ignore all remaining fields.

  NOTE: You are not obligated to follow this procedure. On some segments it may be easier to simply record a single crown loss or cubic yard figure.

  You use the gray button at the top left of the screen to indicate the means to be used for the whole plot:

  – Crown loss estimate in percentage classes. For each 100' section on the left, you choose from the pull-down menu a range of percentages: 0-25%, 26-50%, 51-75%, 75-100%. (You will notice that the program actually records the middle value of the range.)
  – Actual debris estimate in cubic yards. For each 100' section on the left, you write the entry directly. So, if there are 25 cubic yards lost, simply write a "25" in the field.

- **Debris Estimate Stats** - this screen gives you the total debris and mean per 100-ft. segment. Click on **Save Tallies** to close the record and return to the **Actions** menu. Click on **Save** again to exit the plot.

2. **Review Records** - in order to edit a plot, you simply highlight the row containing the plot number you wish to act on, and then click **Edit**. The plot record will re-loaded into the set of screens we worked with in the last section.
3. **Delete Records** - in order to delete a plot, you simply highlight the row containing the plot number you wish to act on, and then click **Delete**. The plot record will be removed and you will be returned to the Actions menu.

3.4 Sample Inventory Generator

The i-Tree Sample Inventory Generator was designed to facilitate sample inventories for UFORE, STRATUM, and Storm Damage Assessment Protocol (SDAP) projects. For these applications, stringent protocols can make drawing samples a complex and time-consuming procedure. The Sample Inventory Generator automates the process through the use of a Geographic Information System (GIS), allowing any community to set up a statistically valid and compatible sample inventory with minimal expertise and effort.

The Sample Inventory Generator has two components: 1) a Street Segment Generator for use with STRATUM and SDAP projects, and 2) a Sample Plot Generator for use with UFORE projects.

Tools

i-Tree includes ArcGIS tools for selecting sample plots as well as street segments. These tools are available for use with ArcGIS versions 8.3 and also 9.0/9.1. In most cases, they work without issues in these versions; should errors be encountered, please notify i-Tree

Support. The random plot tool requires either ESRI's Spatial Analyst Extension OR an ArcGIS installation at the ArcINFO license level.

NOTE: the Sample Plot Generator is incompatible with ArcGIS version 9.2. However, manual procedures are in development and available online at: http://www.itreetools.org/applications/sig.shtm

Data Preparation

As with any GIS project, one must make certain the map layer data used are consistent in terms of Projection/Coordinate system and Map Units. Take care to note these parameters from the source(s) of the data. Typically, Census data obtained through the ESRI Geography Network are in a Geographic Projection System employing latitude and longitude presented in decimal degrees. NLCD data are released by the federal government in an Albers Equal Area Conic projection system employing metric units in meters.

When using the Sample Plot Generator, the stratification map layer (ex: NLCD land cover) and boundary layer (ex: city outline) should be projected to a common coordinate system and choice of units (metric or English) using standard GIS data management techniques. Furthermore, the stratification layer must be of a raster data type. When using the Sample Street Segment Generator, the boundary and street layers should be projected to a common coordinate system and choice of units.

3.4.1 Sample Street Segment Generator — STRATUM & SDAP Utility

The Sample Street Segment Generator creates a sample inventory of street segments for STRATUM and SDAP projects. The Generator is based on access to and utilization of the TIGER database developed by the U.S. Census Bureau, and provides users with a random sample of street segments for inventory.

Sampling intensity is determined by the user following suggested guidelines for efficiency and accuracy within different community profiles. For STRATUM, a 3-6% sample of street segments, depending on community size and variation from plot to plot, will generally produce about a 10% standard error for the total number of trees. Smaller communities and towns have used sampling intensities at the 6% level, while large cities have used 3% samples (see section 2.7 for STRATUM sampling guidelines). SDAP typically uses lower intensities (see section 3.3.7) than STRATUM because it is designed for emergency work, where speed is critical, and because what it seeks to estimate varies less from sample plot to sample plot.

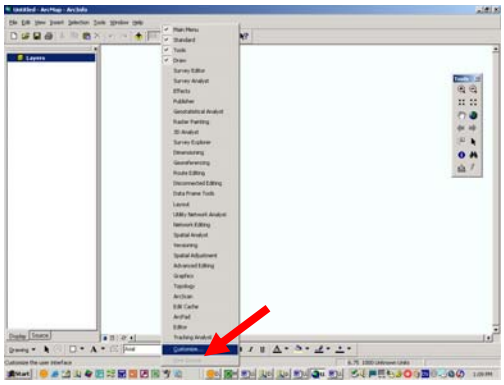
Users run the Utility using ESRI's ArcGIS software (version 8.3 or higher)—specifically the ArcMap® module—on their Desktop PC. Maps and location information can be produced to help field crews locate sample plots on the ground.

NOTE: A separate protocol for creating a random sample using ESRI's older ArcView 3.x can be found in Appendix B.

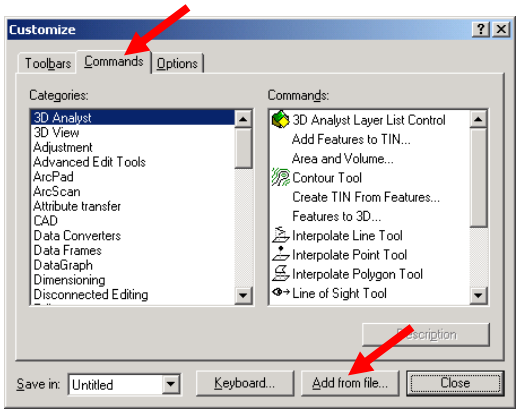
Installation and Setup

1. Insert the i-Tree CD into the CD-ROM. Navigate to the **Get the Sample Street Segment Generator Utility for STRATUM & SDAP** link and click.
2. If you haven't yet installed the i-Tree Manual, follow **Step 1** on the screen.

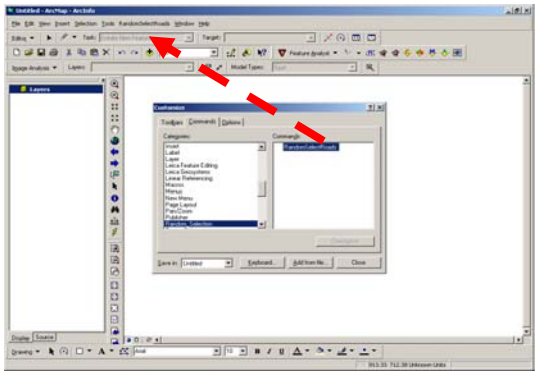
3. Click the link (**Step 2**) to install the Utility to its default location at C:\Program Files\i-Tree\Sample Inventory Generator\Sample Street Segment Generator\. This will install the Dynamic Link Library (DLL) that allows the Utility to function with ESRI's ArcGIS software.
4. Open ArcMap, accept the default start with a new empty map by clicking **OK**.
   - Right-click on the **menu bar** and select **Customize** at the bottom of the list. The Customize dialogue box will open.



   - Select the **Commands** tab and click **Add from file** at the bottom.



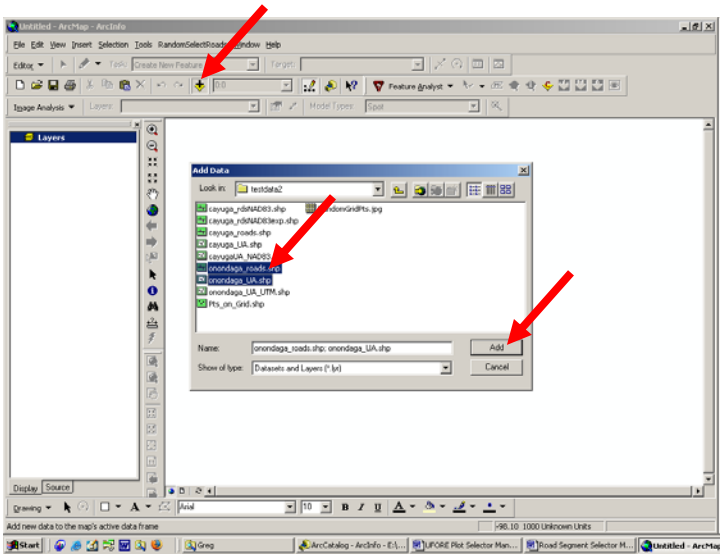
   - Select the correct *RandmSel.dll* from the folder C:\Program Files\i-Tree\Sample Inventory Generator\Sample Street SegmentPlot Generator\ and click **Open**. If you are using ArcMap 8.3, select *RandmSel_v8.dll*, for ArcMap 9.x, select *RandmSel_v9.dll*.
   - Click **OK** to the Added Objects box that pops up.
   - Back on the **Commands** tab of the **Customize** dialogue box, click on **RandomSelectRoads** that now appears in the **Commands** panel to the right, and drag it up to the menu bar of the main screen. Click **Close**.



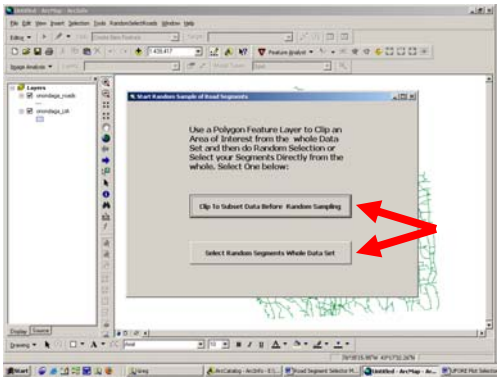
Program Operation

1. Download from the ESRI website Geography Network® (www.geographynetwork.com) the appropriate road and polygon shapefiles for the study area as described in Appendix B. This can also be done through ArcMap: click **File → Add Data from Internet → Geography Network**, then enter "Tiger" in the Keyword search space, and click on **Link to Content** below the entry "TIGER 2000 Map Service."
2. Add the road shapefile and - if needed - the polygon shapefile (*e.g.*, a city boundary) to the map by clicking the **Add Data** button (**+** icon); locate and highlight the files, then click **Add**.

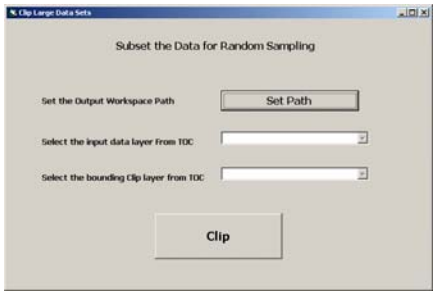
NOTE: A polygon shapefile is only necessary if it will be used to clip the road segments to within a certain study area's boundary. Otherwise, a random selection of road segments can be performed on the road shapefile alone.



3. Click on **RandomSelectRoads** on the menu bar and *choose one* of the random selection options from the dialogue box that pops up:
   - **Clip to Subset Data Before Random Sampling** – clips the road shapefile to the area within the polygon shapefile before randomly sampling road segments.
   - **Select Random Segments from Whole Dataset** – randomly selects a specified number of road segments from the entire road shapefile.



4. If you choose **Subset Data Before Random Sampling**:
   - In the Clip Large Data Sets dialogue box that pops up, click **Set Path** to indicate a file location where outputs will be placed.

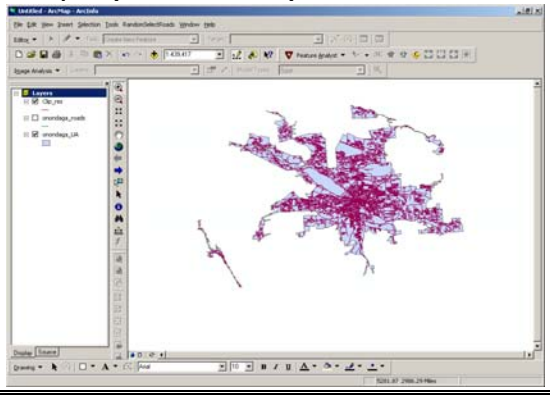


NOTE: The folder you select must already have a shapefile in it or else you will not be able to select it and the application will crash.

   - Click **OK** in the RandmSel dialogue box that pops up.
   - In the pull-down box Select the Input data layer from TOC, highlight the road shapefile that you added to ArcMap earlier.
   - In the pull-down box Select the bounding Clip layer from TOC, highlight the bounding polygon shapefile that you added earlier. This will allow you to exclude any road segments that do not fall within the polygon.

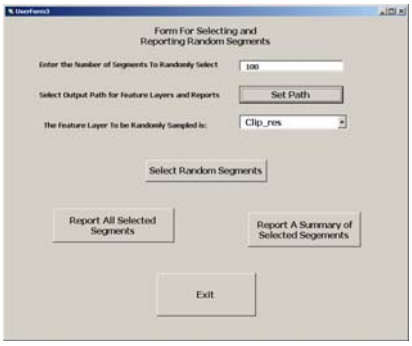
NOTE: The polygon shapefile you downloaded may contain multiple polygons, but only one can be used to clip the road shapefile. Use ArcView's tools to select the polygon you want, and create a new shapefile from it.

   - Click **Clip**.
   - A new layer, named by default *Clip_res*, is added to the ArcMap table of contents. This layer (shown below) will now be randomly sampled.

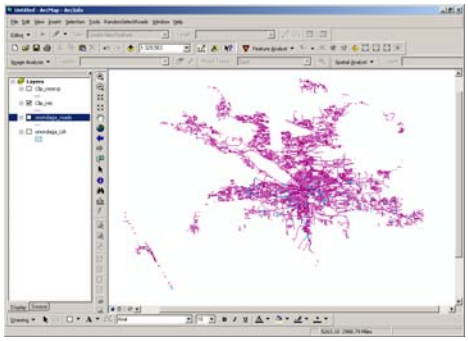


NOTE: If the clipped file to be generated already exists, create a new file as prompted.

   - In the dialogue box (Userform3) that now pops up entitled Form for Selecting and Reporting Random Segments, enter the number of road segments you want to select from the clipped road shapefile.

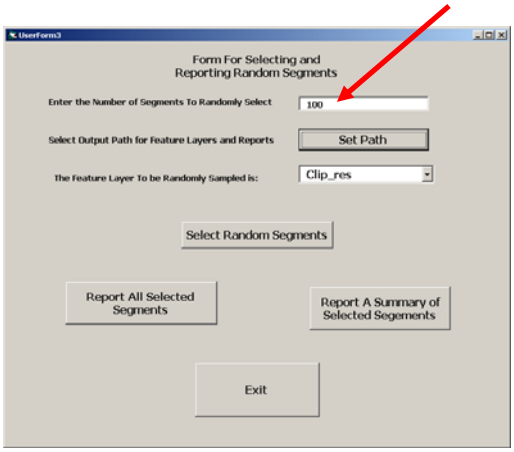


- Click **Set Path** to set a file location in which outputs will be placed.
- Make sure your new clipped layer is selected in the Feature Layer to be Randomly Sampled box.
- Click **OK** on the Choose an Output Folder dialogue box, then highlight the output folder you want to use, click **Add**, and then **OK**.
- Click the **Select Random Segments** button, then **OK** in the RandmSel dialogue box that pops up.
- The resulting selection is stored as a new shapefile, *Clip_resexp*, which only contains the selected road segments (highlighted blue in the image below).



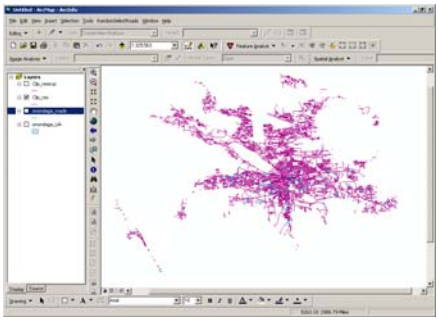
- To create reports about the selected road segments, click either **Report All Selected Segments** or **Report a Summary of Selected Segments**. Select file name and click **OK** twice. A Word file containing the relevant information will be stored in the output location chosen earlier when clicking **Set Path**.
- If you want to use your segment selection with the Storm Damage Assessment Protocol, be sure to have available the file *Clip_resexp.dbf* that has been saved with your shapefile of selected segments in the output folder.
- Click **Exit** to exit the Generator.

5. If you choose **Select Random Segments from Whole Dataset**:
   - In the dialogue box (Userform3) that pops up entitled Form for Selecting and Reporting Random Segments, enter the number of road segments you want to select from the clipped road shapefile.



   - Make sure the road shapefile you added earlier is selected in the Feature Layer to be Randomly Sampled drop-down menu. Click **Set Path** to set a file location in which outputs will be placed.

- Click **OK** on the Choose an Output Folder dialogue box, then highlight the output folder you want to use, click **Add**, and then **OK**.
- Click the **Select Random Segments** button, and then click **OK**.
- The resulting selection is stored as a new shapefile *Clip_roadsexp* that only contains the selected road segments (highlighted in blue below).



- For reports, follow the directions in Step 4, above.
- Click **Exit** to exit the **Generator**.

3.4.2 Sample Plot Generator — UFORE

The Sample Plot Generator creates a sample inventory of plots for UFORE projects. Plot size and number are user-determined by means of suggested guidelines for efficiency and accuracy within different community profiles. See section 1.3.3 for details.

Users can import a city land-use map if desired for stratification. The Sample Plot Generator is designed to work with USGS 1992 and 2001 National Land Cover Data (NLCD). Raster files containing other land cover/use classes can be used, but the class names will be converted to NLCD names during sampling and report generation. Numerical raster values will be unaffected.

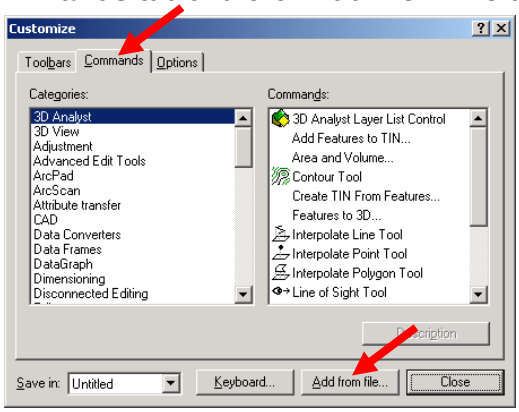
The Sample Plot Generator is run using ESRI's ArcGIS software 8.3 or higher on a desktop PC. The user must have the Spatial Analyst extension to ArcMap installed and enabled. Also, the AOI Polygon used in Steps 3 and 6, below, must be projected with measurement units expressed in feet or meters.

NOTE: A legacy plot generator exists written for ArcView 3.x, but it is not supported by i-Tree. It can be downloaded from the Resource/Learning Center of the i-Tree website: http://www.itreetools.org/. Follow the directions in the accompanying README file, then use the manual method of plot generation when setting up a new project (see section 1.3.3) to insert the plot information into the shell.

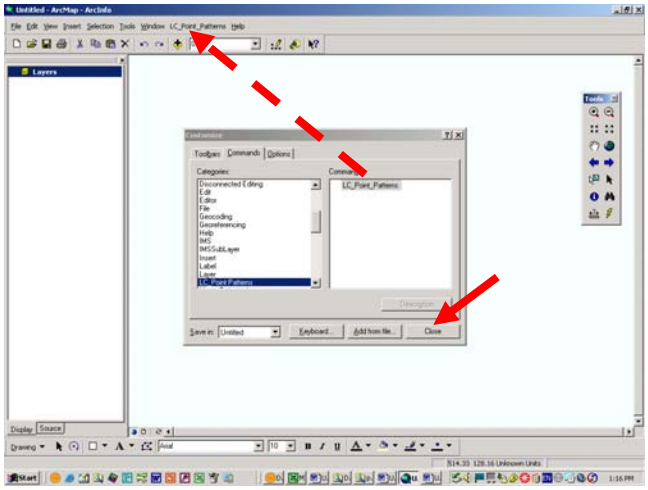
Installation and Setup

1. Insert the i-Tree CD into the CD-ROM. Navigate to the **Get the Sample Plot Generator Utility for UFORE** link and click.
2. If you haven't yet installed the i-Tree Manual, follow Step 1 on the screen.
3. Click the link (Step 2) to install the Utility to its default location at C:\Program Files\i-Tree\Sample Inventory Generator\Sample Plot Generator\. This will install the Dynamic Link Library (DLL) that allows the Utility to function with ESRI's ArcGIS software.
4. Open ArcMap, accept the default start with a new empty map by clicking **OK**.

- Right-click on the **menu bar** and select **Customize** at the bottom of the list. The Customize dialogue box will open.
- Select the **Commands** tab and click **Add from file** at the bottom.

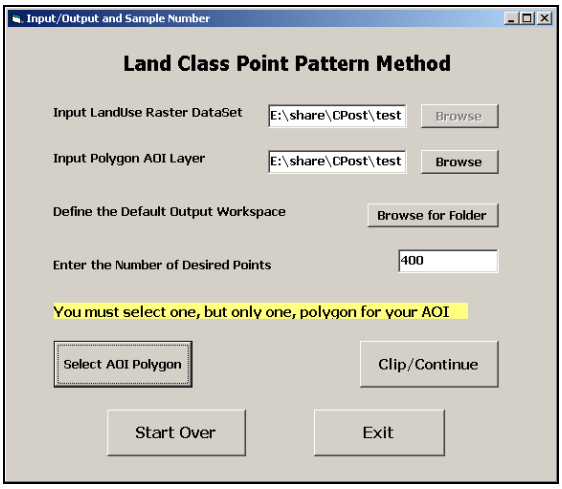


- Select the correct *LCPoints.dll* from the folder C:\Program Files\i-Tree\Sample Inventory Generator\Sample Plot Generator\ and click **Open**. If you are using ArcMap 8.3, select *LCPoints_v8.dll*; for ArcMap 9.x, select *LCPoints_v9.dll*.
- Click **OK** to the Added Objects box that pops up.
- Back on the Commands tab of the Customize dialogue box, click on **LC_Points_Patterns** that now appears in the Commands panel to the right, and drag it up to the menu bar of the main screen. Click **Close**.



Program Operation

1. Click on **LC_Point_Patterns** on the menu bar. A dialogue box Land Class Sample Point Patterns Program opens with two options:
   - If a land use raster file is available for use in the UFORE analysis (recommended), click **Continue With LandClass** and proceed to Step 2. This option allows a raster file to be loaded for the inclusion of land use information.
   - To create plots without a land use raster file, click on **Continue Without LandClass** and skip to Step 3.
   - For both choices, a new dialogue box Land Class Point Pattern Method opens.



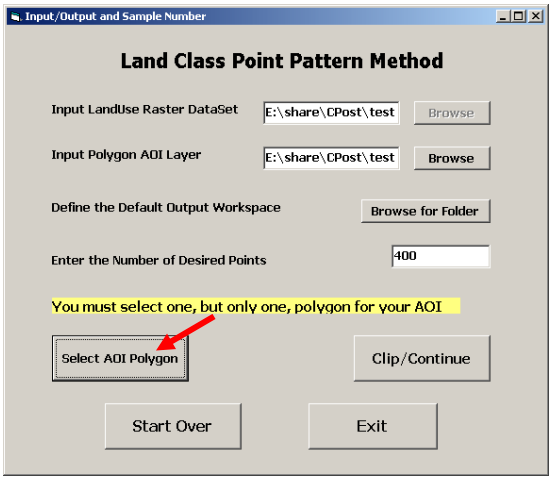
2. (Continue With LandClass only) You need to carry out the first step indicated on the dialogue box:
   - In order to Load an Input LandUse Raster Dataset, you must point the program to the raster file you want to use.
   - Click **Browse**, locate and highlight the file, and click **Add**.

NOTE: Both options described in Step 1 execute all the remaining steps.

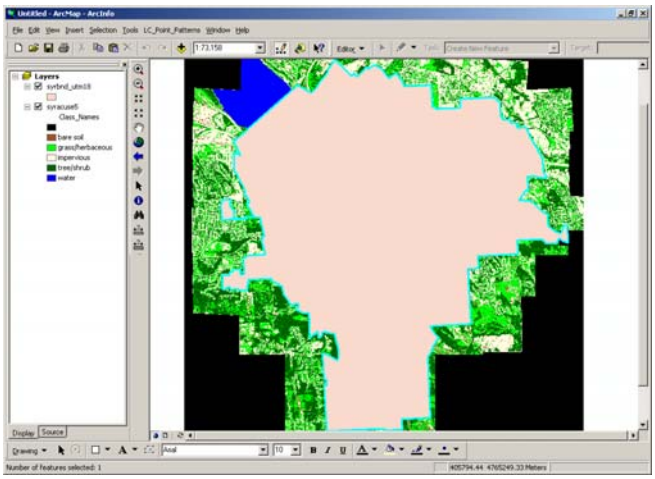
3. Load an Input Polygon AOI (Area of Interest) Layer: click **Browse**, locate and highlight the polygon shapefile you want to use, and click **Add**.

NOTE: The study area polygon shapefile must contain only one polygon.

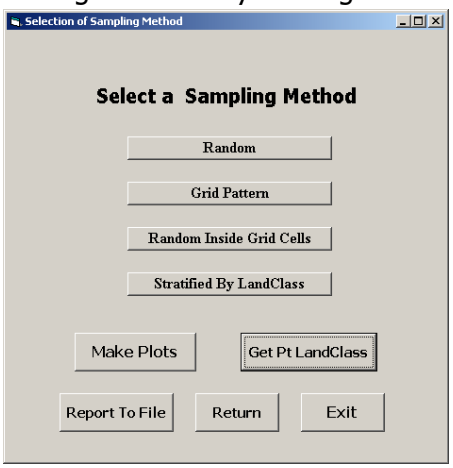
4. Now Define the Default Output Workspace by clicking on **Browse for Folder** to determine where outputs are to be placed. Select the folder you want to use and click **Add**.
5. To set the number of plots you want to distribute, put the desired number (see section 1.3.2) in the box for **Enter the Number of Desired Points**.
6. Click **Select AOI Polygon** to select a single polygon as the study area.



7. Highlight the polygon layer in ArcMap



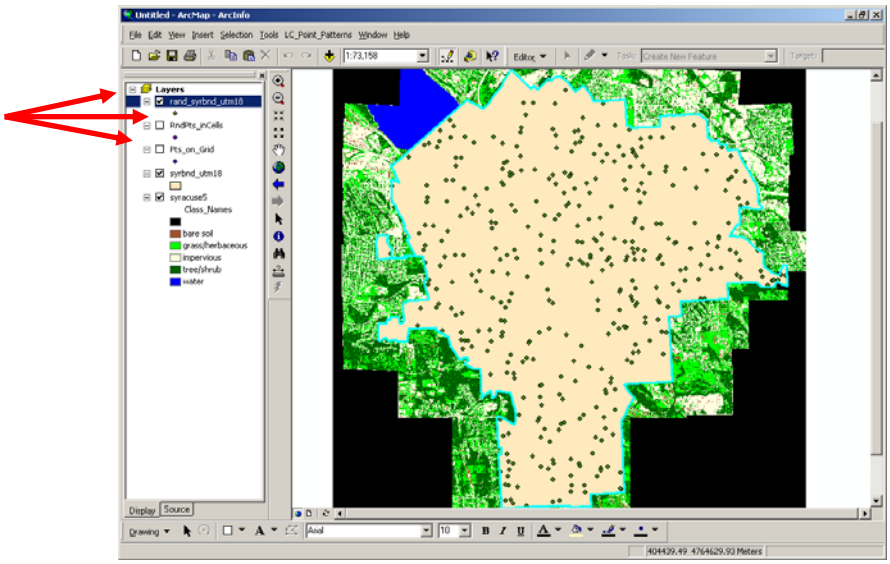
8. Select the **ArcMap** program window on the bottom of the screen (**Windows** taskbar) to bring back the dialogue box you are working in; click **Clip/Continue**. A new clipped raster file (with altered colors) is produced and loaded into ArcMap.
9. A new dialogue box **Selection of Sampling Method** opens with four large buttons. Select one of the following methods by clicking on the appropriate button:



- **Random** – plots will be randomly distributed throughout the polygon study area.
- **Grid Pattern** – plots will be distributed on a grid pattern throughout the polygon study area with a random start for the first plot.
- **Random Inside Grid Cells (Recommended for long-term monitoring)** – creates cells of equal areas that cover the entire study area and randomly locates a plot within each grid cell. This approach distributes plots throughout the polygon like a grid pattern approach, but provides randomization within the grid cells.
- **Stratified by LandClass** – plots will be distributed among land use classes according to the relative coverage of each class. The number of plots in each class can be redistributed to the user's preference (prestratification to reduce overall variance). This option is only available if a land use raster has been loaded in the project.

NOTE: Due to the processing of grids and polygons, the number of plots distributed within the polygon will not be the exact number entered in the last step, though it will be close. For this reason, it is recommended that the user add 10% to the desired number of plots (*e.g.*, if 100 plots are wanted, enter 110).

10. Follow the steps for the method you chose.
    - **Random** method:
      - In the box that opens, select the folder you want to use.
      - Accept the default file name (*rand_[YourFileName]*), and click **Save**.
      - If the default file exists, you will be prompted to create a new file name. Do so in the Name blank and click **Save**.
    - **Grid Pattern** method:
      - In the box that opens, select the folder you want to use.
      - A default file (*Pts_on_Grid*) will be created and added to the ArcMap Table of Contents.
      - If the default file exists, you will be prompted to create a new file name. Do so in the Name blank and click **Save**.
    - **Random Inside Grid Cells** method:
      - A default file (*RndPts_inCells*) will be created and added to the ArcMap Table of Contents.
      - If the default file exists, you will be prompted to create a new file name. Do so in the Name blank and click **Save**.
    - **Stratified by LandClass** method: **Skip to Step15**.
11. A random point shapefile is created and added to the ArcMap Table of Contents. Its exact name will depend on which of the three options you chose; if you chose **Random**, you will see that the name of the polygon file will also be shown. All three are shown at the top of the list below, where the **Random** method file is highlighted.



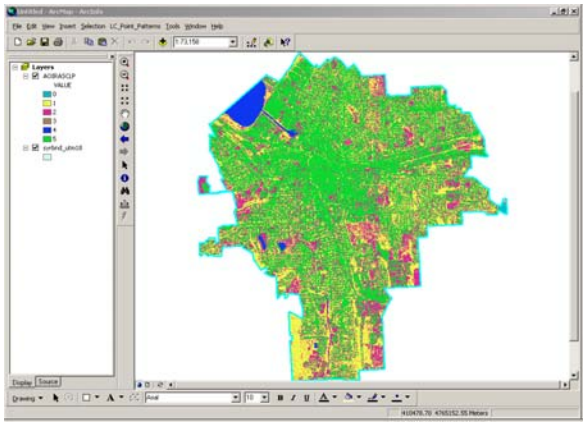
12. Return to the Selection of Sampling Method dialogue box, and click on **Get Pt LandClass** to determine the land use for each plot based on the raster land use map.

13. In the LandUseCode dialogue box that pops up, select the random point shapefile you created and the land use raster, using the drop-down menus if necessary; a sample file name for the Random method is shown. Click **Submit**.

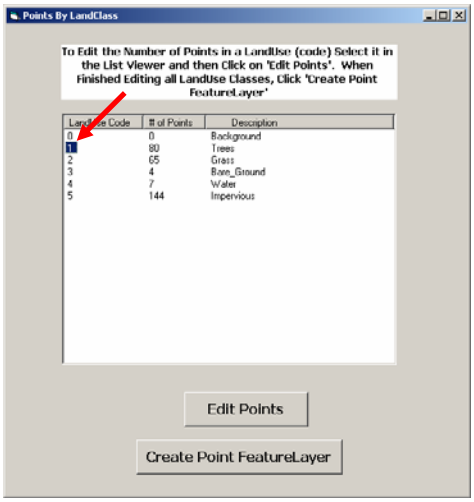
14. Click **OK** on the LCPoints dialog box that pops up, then click **Return** to exit the LandUseCode box. **Now skip to Step 19**

NOTE: Steps 15 – 18 only apply to those who selected Stratification by LandClass in Step 9.

15. (Stratification by LandClass only) If you clicked on **Stratification by LandClass** back in Step 9, a new raster file, clipped to the study area boundary, is created and added to the ArcMap table of contents. The map colors may be altered in the clipped raster file, but the land use classes remain the same (*e.g.*, residential is still residential).

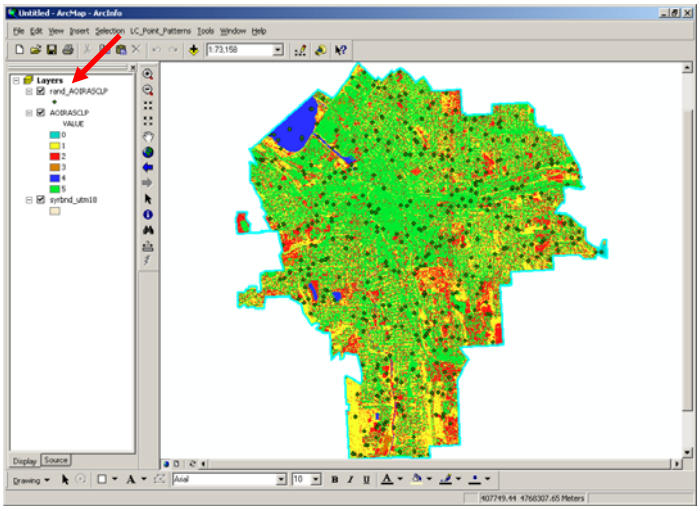


16. (Stratification by LandClass only) A Points by LandClass dialogue box pops up.
    - To accept the number of points to be allocated to each land use type, click **Create Point FeatureLayer** at the bottom of the box.
    - To edit the number of points generated in a particular land use class, click the code (LandUse Code column) of the land class you want to alter in the Points By Landclass dialog box.



- In the Landuse Distribution Modification Form that pops up, enter the new number of points for the land use you want to alter. Click **OK** to return to the Points by LandUse box, then click **Create Point FeatureLayer** at the bottom.

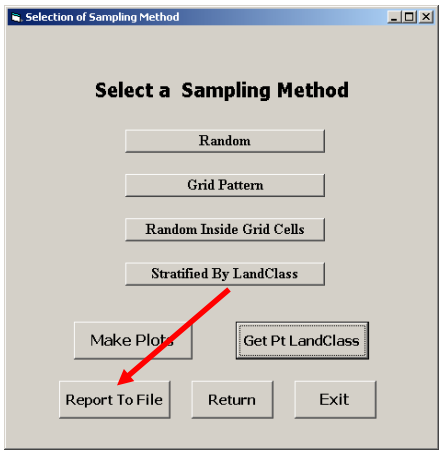
17. (Stratification by LandClass only) Accept the default plot file name or create a new one and click **Save**, and then click **OK** in the LCPoints dialogue box that pops up.
18. (Stratification by LandClass only) A new shapefile is added to the ArcMap table of contents.



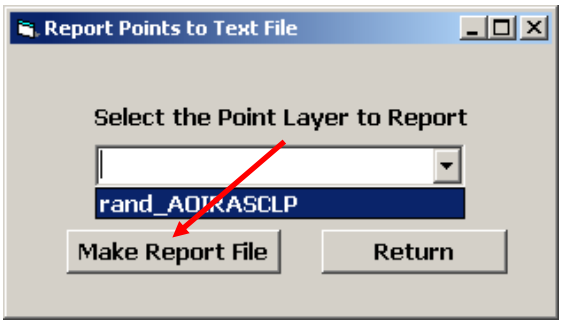
NOTE: Steps from here forward to the end apply to all selection methods.

19. Whatever selection method you chose in Step 9, you will end up back in the Selection of Sampling Method box once your random point shape file has been created and saved.

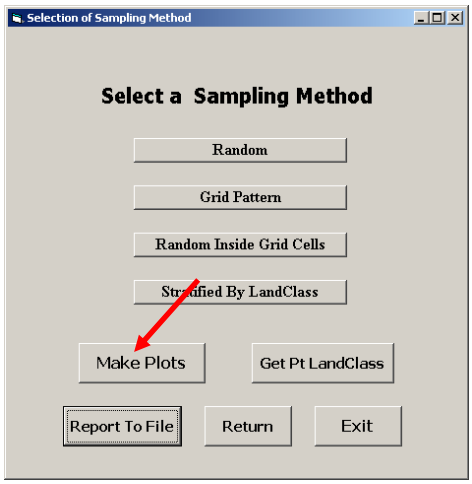
20. Click on **Report to File** to create the output file needed for the UFORE model.



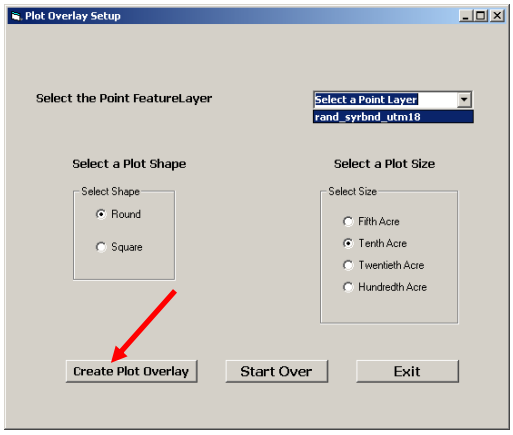
21. In the Report Points to Text File dialogue box that pops up, select the random point shapefile that you have created from the drop-down menu and click **Make Report File**. Accept the default file name (*Points_Report.doc*) by clicking **OK**. If the default file exists, you will be prompted to enter a new file name in the blank; save it and click **OK**.



22. Click **OK** twice in the LCPoints box. A Report File with critical plot information is generated and saved in the output folder you selected earlier.
23. Click **Return** in the Report Points to Text File box.
24. Back in the Selection of Sampling Method box, click **Make Plot**s to create plots centered on each point. In the Go To Plot Maker box that pops up, click **Yes** if a Report File has already been created, **No** if not.



25. In the Plot Overlay Setup dialogue box that pops up, select your random point layer from the drop-down menu. Next, select a plot shape and a plot size. Click **Create Plot Overlay**, then click **OK** in the LC Points box that pops up.



26. A plot shapefile of the specified shape and size is created and added to the ArcMap table of contents. Click **Exit** to return to ArcMap or **Start Over** to return to the beginning.

> **NOTE: If you wish to generate a new plot shapefile of different sizes and/or shapes, select a point feature layer, shape, and size and click Create Plot Overlay.**

27. You can now go back to the UFORE shell and point the Random Plot Generator dialogue box (see section 1.3.3, Step 5) to the contents of your Report File.

> **NOTE: If you have done this sampling on a computer other than the one where the i-Tree Suite is installed and will be used, make sure the Report File is available to the computer with the UFORE shell.**

This Report File contains three files that are needed by the shell:

- Plot List file, named by default *Points_Report.doc*
- Strata File, named by default *Strata_Area_Report.doc*
- GIS Projection File, carrying the name you gave the project with the extension *.prj

3.5 Species Selector (Beta)

3.5.1 Species Selector — Introduction

The Species Selector is a free-standing utility that provides a relative rating for environmental benefits of each tree species at maturity. As such, it complements existing tree selection programs that rank species for esthetics and/or other features.

The Species Selector rates the following tree functions, based on a user's ranking (0-10 scale):

- Air pollution removal
- Air temperature reduction
- Ultraviolet radiation reduction
- Carbon storage

- Pollen allergenicity
- Building energy conservation
- Wind reduction
- Stream flow reduction

The program contains index values for about 1,600 individual species. The user enters state and city, from which the program determines the hardiness zone and eliminates all species not sufficiently hardy. The combination of hardiness and selected functionality produces a ranked list of appropriate species.

The large species database covers a broad range of native, naturalized and exotic trees, some of which are commonly planted in urban areas. Since only city hardiness zone, tree height and user functional preference are used to produce the list, there may well appear many species on the list that are unsuitable to the local context for a variety of reasons. A species may have particular structural, drainage, sun, pest, or soil pH limitations that should exclude it from use. Furthermore, since many native and exotic species are included, items may appear that are simply not available in the local trade.

For these reasons, the user should treat the list produced as a beginning, rather than an end. The list will need to be whittled down through adjustment to meet local needs and limitations. Relevant cultural information will need to be taken into account as well, information typically available from a State or County source. The result will be a list of recommended species suited for local use that maximizes environmental services.

3.5.2 Species Selector — Installation

To install the Species Selector:

1. Insert the i-Tree Installation CD into your CD-ROM drive.
2. Navigate to the **Get the Species Selector Utility** link and click.
3. Follow Step 1 on the screen to install the i-Tree User's Manual.
4. Follow Step 2 on the screen to run the *setup.exe*; Follow the Installation Wizard instructions to complete the installation (default location recommended).

3.5.3 Species Selector — Getting Started

To open the Species Selector Utility click **Start→ (All) Programs→ i-Tree**, and then select **Species Selector**. Alternatively, the species can be accessed through the **Tools** menu of the UFORE Shell (see 1.3.6).

The interface of the Species Selector is straightforward, and should be filled in from top to bottom. It is divided into five outlined sections, within each of which the user must enter information needed by the program.

Location

Each of the four boxes needs to be completed in order:

1. Nation
2. State
3. City
4. County

The County name will be filled in automatically as soon as City name is supplied, unless the city happens to straddle two counties; in that case, a choice will be available on the pull-down County menu.

Height Constraints

If the user wishes, species selection can be restricted to suit limitations in typical mature tree height.

Air Pollutant Removal

The user has a number of options here:

1. Select whether to rate species in this category for all pollutants (click radio button "Overall," the default) or for selected pollutants (click radio button "Specific").
2. Decide whether a pollutant is important to the community or project. Leaving a "0" (zero) in the "Overall Rate" box, no matter which radio button clicked above, indicates that one or all pollutants should be ignored during species selection. Selecting "10" in the "Overall Rate" box indicates air pollutant removal has the highest importance.
3. Select which specific pollutants should affect selection. When the radio button "Specific" is clicked, the user can rate five individual air pollutants on an importance scale of 0 to 10 (highest).

Other Functions

This section is similar to the preceding one, where a "0" in any category means that this environmental function should be ignored during selection. Seven environmental functions are displayed:

1. Low VOC Emissions – importance of selecting species for their potential to produce low amounts of volatile organic compounds (precursor chemicals that contribute to ozone formation).
2. Air Temperature Reduction – importance of selecting species for their potential to lower air temperature.
3. Streamflow Reduction – importance of selecting species for their potential to reduce runoff and stream flow through rainfall interception and transpiration of water.
4. Carbon Storage – importance of selecting species for their potential to store carbon from CO_2 within its woody material.
5. UV Radiation Reduction – importance of selecting species for their potential to reduce ultraviolet radiation.
6. Low Allergenicity – importance of selecting species for their reduced potential to cause allergic reactions.
7. Wind Reduction – importance of selecting species for their ability to block air flow.
8. Building Energy Reduction – importance of selecting species for their potential to reduce the heating and cooling demand of a building.

3.5.4 Species Selector — Reporting Results

The two radio buttons allow the user to choose whether to see the top ten percent or all of the available species (within 10% categories) for that hardiness zone ranked according to the functional choices made.

To view the report, click the **Print Report** button. From the **Species Report** window, the user can export the report as a *.pdf or *.rtf file by clicking the Export button.

3.5.6 Species Selector — Troubleshooting

Species Selector (Beta) Utility Methods can be accessed from the **Help** menu of the main interface.

Questions about this application should be directed to i-Tree Support through any of the means listed on the i-Tree website (http://www.itreetools.org/support).

Glossary

Benefit–Cost Ratio (BCR) – Benefits/Costs. In STRATUM, the BCR represents the return on investment for the care of trees. For example, if the BCR = 1.6, then the city receives $1.60 in benefits for every dollar spent on tree management annually—a 60% return on investment.

Biltmore (cruiser) stick – A device resembling a yardstick that can be used easily in the field to measure trunk diameters and heights of standing trees. It uses the geometric principle of similar triangles to allow the user to obtain a quick reading of trunk diameter (±1") when the stick is held against the trunk 25" from the eye with the left end lined up to the outside edge of the trunk.

Biogenic Volatile Organic Compounds (BVOCs) – Hydrocarbon compounds emitted from vegetation, (*e.g.,* isoprene and monoterpenes) into the air that contribute to the formation of smog and/or may themselves be toxic.

Biomass – Organic, non-fossil material of biological (usually plant) origin constituting a renewable energy source.

Boundary Layer – A layer of air in the lower atmosphere that is directly connected to, and influenced by, the forces affecting the earth's surface.

Carbon Dioxide (CO_2) – A greenhouse gas that may contribute to global warming; CO_2 is a by-product of the energy used to heat and cool buildings, the fuel consumed in the maintenance of trees, and the decomposition of dead trees.

Diameter-at-Breast Height (DBH) – Tree diameter measured at breast height (4.5 ft.) above ground level. MCTI wants DBH to be rounded down to nearest unit, STRATUM accepts DBH data that is classified or to the nearest unit (inches or centimeters) of measurement, and UFORE requires the nearest tenth of an inch or centimeter.

Full inventory – A full inventory includes data for all existing street trees within a community. Additional information, such as available planting sites, may be included.

Inventory Field – A column in the STRATUM_Inventory table that stores the values for a single attribute, *e.g.,* tree ID and species code are inventory fields. All Inventory Fields must conform to STRATUM formatting.

Inventory record – The individual attributes or data field values that represent one tree in the inventory; a row in the STRATUM_Inventory table.

KWh – see Watt-hour

Management zone – Management zones are areas or neighborhoods delineated by street tree managers for purposes of planning and maintenance. Management zones are often based on existing political boundaries (*e.g.,* neighborhoods or boroughs), age, land use, or character.

MBtu – Million British thermal units. A BTU (British Thermal Unit) is the amount of heat necessary to raise one pound of water by 1 degree Farenheit.

MWh – see Watt-hour

Net Benefits – In STRATUM, the sum of all annual benefits less the sum of all identifiable internal and external costs associated with the annual management of street trees citywide.

Nitrogen Dioxide (NO_2) – Nitrogen dioxide and other oxides of nitrogen (NO_x) are compounds typically created during the combustion process, and are major contributors to smog formation and acid deposition. As a result, NO_2 can have numerous adverse health effects.

Non-tree Species Codes – Codes used to designate empty planting spaces, shrubs, or other entities that are not trees. Within STRATUM empty planting spaces may be further defined according to the size of the potential tree they will hold.

Other Street Trees – For some STRATUM reports, only the most prevalent tree species are presented (those species that represent more than 1% of the population). All other species are grouped under "Other Street Trees."

Ozone (O_3) – A strong-smelling, pale blue, reactive toxic chemical gas consisting of three oxygen atoms. It is a product of a photochemical process involving the sun's energy, VOCs, and nitrogen oxides. Ozone exists in the upper atmosphere as well as at the earth's surface. The latter can cause numerous adverse human health effects, and is a major component of smog.

Particulate Matter – A major class of air pollutants consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and mists. The EPA currently monitors fine particle pollution of PM2.5, particulate matter that is less than or equal to 2.5 μm in diameter - 1/30th the diameter of a human hair. The size of the particles allows them to enter the air sacs (gas-exchange region) deep in the lungs where they can be deposited and result in adverse health effects. These pollutants are released from many sources including the production of energy to heat and cool buildings. Because research has not yet shown that trees affect PM2.5 levels, both STRATUM and UFORE calculate the benefit with respect to the former EPA standard of PM10.

PDA – A Personal Digital Assistant, or "PDA," is a handheld computer that stores, provides access to, and organizes information in many formats. The major operating systems are Windows-based (Pocket PC) and the Palm OS® (Palm PDA). The i-Tree Software Suite only supports the PocketPC platform.

Private trees – For purposes of STRATUM street tree inventories, private trees are typically defined as trees located in the public right-of-way, but planted and maintained by adjacent property owners. Because these trees are in the public right-of-way, they represent a city liability as well as community resource.

Public trees – Street trees planted and maintained by a municipality. Typically defined as any tree within the public right-of-way (ROW).

Raster – A raster graphic image consists of rows and columns of cells where each cell/pixel is used to represent a single value or color of an image in computer graphics. Raster graphics are distinguished from vector graphics in that vector graphics represent an image through the use of geometric objects such as points, lines, arcs, and polygons.

Replacement value – Estimates of the full costs of replacing trees in their current condition, should they be removed for some reason. STRATUM and UFORE follow the method in the Council of Tree and Landscape Appraisers Guide, 9th edition.

Resource units – In STRATUM, the value used to quantify benefits of individual trees. For example, the reduction in electricity use due to lower air conditioning needs measured in kWh/year/tree, air pollutant uptake in pounds/year/tree, rainfall intercepted in CCF/year/tree.

Sample inventory – For purposes of STRATUM and Storm Damage Assessment Protocol, sample inventories are those conducted using a simple random sample of street segments. Recommended minimum sampling intensities for STRATUM are 5% for communities of fewer than 100,000 people and 3% for communities of more than 100,000 people. However, street tree density varies by community and more intense sampling may be required where the error of population estimates is higher than desired. The recommended option for conducting a STRATUM-compatible sampling scheme is the Sample Street Segment Generator.

SAS – A "Statistical Analysis System" marketed by the SAS Institute Inc. that is a powerful and flexible computer program for entering, storing and analyzing data. It is driven by SAS programs that define a sequence of operations to be performed on data stored as tables.

Sequestration (carbon) – The removal by plants of carbon dioxide from the air through photosynthesis.

Shapefile – A proprietary digital vector file format for storing geometric location and associated attribute information. It was originated by ESRI for its application ArcView, and is used in many Geographic Information Systems software products.

Shell – A means of interaction between a computer and any other entity (printer, operator, etc.). In UFORE, the word "shell" refers to the graphical user interface (GUI) that provides access to and exchanges data with UFORE components.

Simple random sampling – A sampling design in which *n* distinct units are selected from the N units in the population in such a way that every possible combination of *n* units is equally likely to be the sample selected.[1] Simple random sampling is the only method that can be used for selecting sample inventories in STRATUM. It is recommended that the Sample Street Segment Generator be followed to facilitate this process.

Species value assignment – In order to extrapolate the benefits, costs, and growth data from the regionally modeled species to all trees contained in the STRATUM inventory, each species in the population is matched directly with a corresponding model species. When there is no corresponding tree, the best match is determined by identifying which of the regionally modeled species is most similar in leaf shape/type, structure and habit. If there is no obvious choice, one of the 12 Tree Types can be selected.

Standard error – The Standard Error (Standard Error of the Mean, or SEM) calculates how accurately a sample mean estimates the population mean. The formula is

$$SEM = SD/\sqrt{N}$$

where SD = "standard deviation" of the sample, and N = sample size. Note that as SD goes down or N goes up, SEM gets smaller—i.e., the estimate made by the sample improves.

Stocking level – The ratio of the number of sites with trees to the total number of possible sites.

Storage (carbon) – The amount of carbon bound up in the above-ground and below-ground parts of woody vegetation.

[1]Thompson, S.K. 2002. Sampling, 2nd Ed. John Wiley & Sons, Inc., New York. 367 pp.

Stratification – The process of grouping members of a population into relatively homogeneous subgroups before sampling, a step that often makes the sample more representative by reducing sampling error.

STRATUM climate region – Benefits and costs reported by STRATUM are based on regionally defined tree growth and benefit–cost models following procedures described in the series of *Tree Guides* published by the Center for Urban Forest Research. During a STRATUM analysis, users select one of the 16 STRATUM climate regions. Based on this selection, STRATUM loads regionally specific data sets. A map of the STRATUM climate zones can be found in Appendix D.

STRATUM_Inventory – The required name of the STRATUM-formatted Access table which is imported as the basis for a STRATUM project. This table name is used for all sample or full inventories.

STRATUM project – A STRATUM project is denoted by the .proj file extension. Projects include the imported inventory and the inputs that were defined and saved by the user.

Street segment – A segment of street, defined by a start node and end node in the TIGER/Line file topology. Street segment lengths vary across the city, typically beginning and ending at a street intersection or street end (*e.g.,* cul-de-sac).

Street tree benefits – The sum of energy, stormwater, air quality, carbon dioxide, and property value benefits of street trees.

Street tree costs – The sum of all identifiable internal and external costs associated with the annual management of street trees citywide. Costs include, but are not limited to planting, pruning, tree and stump removal, pest and disease control, establishment and irrigation costs, repair and mitigation of infrastructure damage, litter and storm damage clean-up, program administration, and inspection and service requests.

Structure (forest) – The distribution of tree and shrub species, size class and other attributes in a study area.

Sulfur dioxide (SO_2) – A strong-smelling, colorless gas that is formed by the combustion of fossil fuels. Power plants, which may use coal or oil high in sulfur content, can be major sources of SO_2. Sulfur oxides contribute to the problem of acid rain.

TIGER/Line files – **T**opologically **I**ntegrated **G**eographic **E**ncoding and **R**eferencing, the name for the system and digital database developed at the U.S. Census Bureau to use in mapping the Census (details in the TIGER/Line file topology). It is recommended that users who want to conduct a Sample Inventory use TIGER/Line files, a process facilitated by i-Tree's Sample Street Segment Generator.

TIGER/Line ID (TLID) – A unique 10-digit number associated with each street segment of a Tiger Line file for a city. This number is entered under the StreetSeg field code in STRATUM and MCTI, and underlies the PlotLookup field in Storm Damage Assessment Protocol.

Tree Guides – A series of publications by the Center for Urban Forest Research, USDA Forest Service, which use STRATUM to analyze the street trees of each STRATUM climate region. A description of the methodology behind STRATUM can be found in the Appendix of each *Tree Guide*. As a companion to all STRATUM analyses, Tree Guides provide additional valuable information that can be used to manage your city's street trees more effectively:

- Background information on the potential of trees of that climate region to provide benefits
- Typical regional management costs

- Detailed assumptions, data sources, and calculations of benefits and costs
- Estimates of street tree benefits and costs for a typical community of the region and tips to increase the cost-effectiveness of the urban forest
- Guidelines for selecting and siting trees in residential yards and public areas
- Tree selection list with information on tree species recommended for that region
- Definitions and terms used in the Guide
- Tables that list annual benefits and costs of regionally typical trees at 5-year intervals for 40 years after planting
- Additional references

Tree Guides published to date include:

- Tree Guidelines for Coastal Southern California Communities
- Tree Guidelines for Inland Empire Communities
- Western Washington and Oregon Community Tree Guide: Benefits, Costs, and Strategic Planting
- Northern Mountain and Prairie Community Tree Guide: Benefits, Costs and Strategic Planting
- Tree Guidelines for San Joaquin Valley communities
- Desert Southwest Community Tree Guide
- Midwest Community Tree Guide: Benefits, Costs and Strategic Planting
- Piedmont Community Tree Guide: Benefits, Costs and Strategic Planting

The Tree Guide series is available at http://www.fs.fed.us/psw/programs/cufr/tree_guides.php.

Tree type – In STRATUM, tree types are characterized by life-form and mature size:

- Broadleaf deciduous – large (BDL), medium (BDM), and small (BDS).
- Broadleaf evergreen – large (BEL), medium (BEM), and small (BES).
- Coniferous evergreen – large (CEL), medium (CEM), and small (CES).
- Palm – large (PEL), medium (PEM), and small (PES).

Tree location factor – Used in STRATUM to calculate annual property value benefits, the Tree Location Factor accounts for differences in value of trees associated with different land uses. Trees located near single-home residential, multi-home residential, large commercial/industrial, vacant, park and small commercial properties were valued at 100%, 70%, 40%, 40%, 40%, and 66%, respectively, of the full contribution to property value increases.[2]

Tree structure – A tree structure is a way of representing the hierarchical nature of a file system in graphical form. The graph looks a bit like a tree upside down compared with a real tree, since the "root" is at the top and the "leaves" at the bottom.

Typical large-tree leaf area – Used in calculating annual property value benefits in STRATUM, the Typical Large-Tree Leaf Area represents the total leaf area of a typical, large, mature tree in a particular STRATUM climate region. These data are based on regional species-growth data as described in the Tree Guide series.

[2]McPherson, E.G., J.R. Simpson, P.J. Peper, Q. Xiao, D.R. Pettinger and D.R. Hodel. 2001.Tree Guidelines for Inland Empire Communities. Local Government Commission, Sacramento, CA. pp. 115.

Unmatched species code – Unmatched Species Codes are SpCode designations for species that are not contained in the regional STRATUM data set. These undefined species codes are excluded from reports unless they are defined in the Unmatched Tree Species Codes dialogue.

Vector – A vector graphic image uses geometrical basic figures such as points, lines, arcs, and polygons to represent images in computer graphics. It is used by contrast to the term raster graphics, which is the representation of images as a collection of grid cells/pixels.

Volatile organic compounds (VOCs) – Hydrocarbon compounds that exist in the ambient air and are by-products of energy used to heat and cool buildings. Volatile organic compounds contribute to the formation of smog and/or are toxic. Examples of VOCs are gasoline, alcohol, and solvents used in paints.

Watt-hour – One watt-hour is equivalent to one watt of power used for one hour. For example, a forty-watt light bulb uses 40 watt-hours of energy per hour. A kilo-watt-hour (KWh) is one thousand watt-hours, and a mega-watt-hour (MWh) is one million watt-hours.

Appendix A. NLCD 2001 Land Cover Class Definitions

11. Open Water - All areas of open water, generally with less than 25% cover of vegetation or soil.

12. Perennial Ice/Snow - All areas characterized by a perennial cover of ice and/or snow, generally greater than 25% of total cover.

21. Developed, Open Space - Includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes

22. Developed, Low Intensity - Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-49 percent of total cover. These areas most commonly include single-family housing units.

23. Developed, Medium Intensity - Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-79 percent of the total cover. These areas most commonly include single-family housing units.

24. Developed, High Intensity - Includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to100 percent of the total cover.

31. Barren Land (Rock/Sand/Clay) - Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.

32. Unconsolidated Shore* - Unconsolidated material such as silt, sand, or gravel that is subject to inundation and redistribution due to the action of water. Characterized by substrates lacking vegetation except for pioneering plants that become established during brief periods when growing conditions are favorable. Erosion and deposition by waves and currents produce a number of landforms representing this class.

41. Deciduous Forest - Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.

42. Evergreen Forest - Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.

43. Mixed Forest - Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.

51. Dwarf Scrub - Alaska only areas dominated by shrubs less than 20 centimeters tall with shrub canopy typically greater than 20% of total vegetation. This type is often co-associated with grasses, sedges, herbs, and non-vascular vegetation.

52. Shrub/Scrub - Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20% of total vegetation. This class includes true shrubs, young trees in an early successional stage or trees stunted from environmental conditions.

71. Grassland/Herbaceous - Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.

72. Sedge/Herbaceous - Alaska only areas dominated by sedges and forbs, generally greater than 80% of total vegetation. This type can occur with significant other grasses or other grass like plants, and includes sedge tundra, and sedge tussock tundra.

73. Lichens - Alaska only areas dominated by fruticose or foliose lichens generally greater than 80% of total vegetation.

74. Moss - Alaska only areas dominated by mosses, generally greater than 80% of total vegetation.

81. Pasture/Hay - Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.

82. Cultivated Crops - Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.

90. Woody Wetlands - Areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

91. Palustrine Forested Wetland* -Includes all tidal and non-tidal wetlands dominated by woody vegetation greater than or equal to 5 meters in height and all such wetlands that occur in tidal areas in which salinity due to ocean-derived salts is below 0.5 percent. Total vegetation coverage is greater than 20 percent.

92. Palustrine Scrub/Shrub Wetland* - Includes all tidal and non-tidal wetlands dominated by woody vegetation less than 5 meters in height, and all such wetlands that occur in tidal areas in which salinity due to ocean-derived salts is below 0.5 percent. Total vegetation coverage is greater than 20 percent. The species present could be true shrubs, young trees and shrubs or trees that are small or stunted due to environmental conditions.

93. Estuarine Forested Wetland* - Includes all tidal wetlands dominated by woody vegetation greater than or equal to 5 meters in height, and all such wetlands that occur in tidal areas in which salinity due to ocean-derived salts is equal to or greater than 0.5 percent. Total vegetation coverage is greater than 20 percent.

94. Estuarine Scrub/Shrub Wetland* - Includes all tidal wetlands dominated by woody vegetation less than 5 meters in height, and all such wetlands that occur in tidal areas in which salinity due to ocean-derived salts is equal to or greater than 0.5 percent. Total vegetation coverage is greater than 20 percent.

95. Emergent Herbaceous Wetlands - Areas where perennial herbaceous vegetation accounts for greater than 80 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.

96. Palustrine Emergent Wetland (Persistent)* - Includes all tidal and non-tidal wetlands dominated by persistent emergent vascular plants, emergent mosses or lichens, and all such wetlands that occur in tidal areas in which salinity due to ocean-derived salts is below 0.5 percent. Plants generally remain standing until the next growing season.

97. Estuarine Emergent Wetland* - Includes all tidal wetlands dominated by erect, rooted, herbaceous hydrophytes (excluding mosses and lichens) and all such wetlands that occur in tidal areas in which salinity due to ocean-derived salts is equal to or greater than 0.5 percent and that are present for most of the growing season in most years. Perennial plants usually dominate these wetlands.

98. Palustrine Aquatic Bed* - The Palustrine Aquatic Bed class includes tidal and nontidal wetlands and deepwater habitats in which salinity due to ocean-derived salts is below 0.5 percent and which are dominated by plants that grow and form a continuous cover principally on or at the surface of the water. These include algal mats, detached floating mats, and rooted vascular plant assemblages.

99. Estuarine Aquatic Bed* - Includes tidal wetlands and deepwater habitats in which salinity due to ocean-derived salts is equal to or greater than 0.5 percent and which are dominated by plants that grow and form a continuous cover principally on or at the surface of the water. These include algal mats, kelp beds, and rooted vascular plant assemblages.

* Coastal NLCD class only

Appendix B. Using TIGER/Line Data to Create a Random Street Segment Sample

Both STRATUM and SDAP i-Tree applications accommodate the use of random sampling of street tree segments. The recommended mechanism takes advantage of the TIGER database (Topologically Integrated Geographic Encoding and Referencing): the system and digital database developed at the U.S. Census Bureau to create the random sample maps used during the Census. The design of the TIGER database adapts the theories of topology, graph theory, and associated fields of mathematics to provide a disciplined, mathematical description for the geographic structure of the United States and its territories. The TIGER database integrates a variety of encoding techniques, such as automated map scanning, manual map "digitizing," standard data keying, and sophisticated computer file matching. The goal is to provide automated access to relevant geographic information about the United States and its territories. The following sections address the utilization of this database by the i-Tree Software Suite.

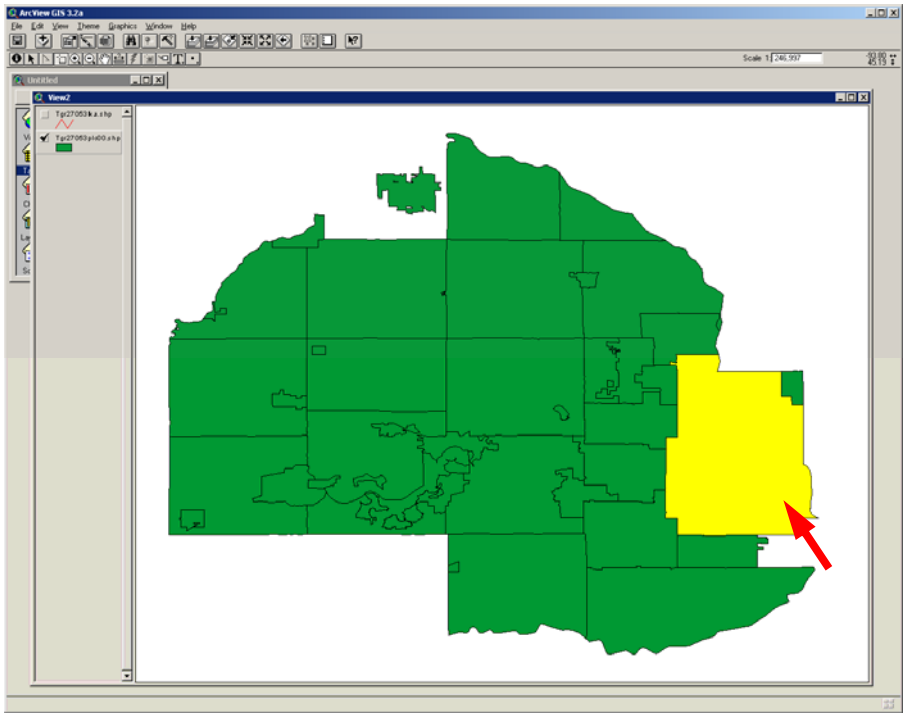
Procedure to Create a Random Street Segment Sample Using ArcView 3.x

Steps in Making a Street Segment Sample in ArcView 3.x

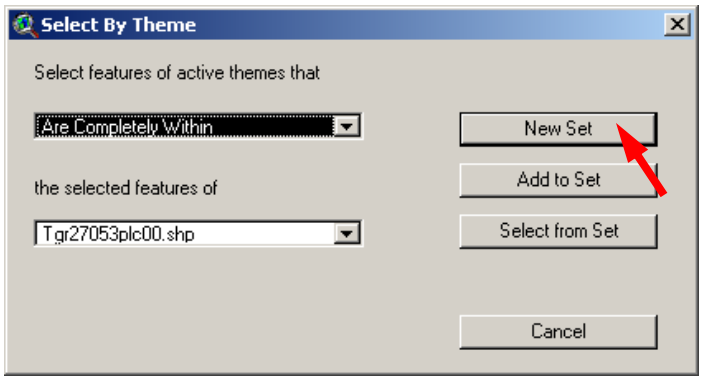
This procedure allows the creation of a street segment sample based on the TIGER database making use of ArcView 3.x.

NOTE: You can do the sampling (or have it done) on another computer, but you will need to bring the original downloaded shapefiles as well as the output files (map, database) back to the computer where i-Tree is installed.

1. Download the TIGER/Line files for your community.
   - Obtain Line features-roads and Designated places shape files from ESRI's free site. Go to http://www.geographynetwork.com/. Under **Featured content and Data** choose **Census TIGER/2000**. Click the link **TIGER/Line Files, Redistricting Census 2000**.
   - Select **Preview and Download**.
   - Choose your state under **Select a State**. Click **Submit Selection**.
   - Choose your county under **Select by County**. Click **Submit Selection**.
   - Under **Available Data Layers**, check the box next to these two files:
     - Designated Places 2000
     - Line Features – Roads
   - Select **Proceed to Download**.
   - Select **Download File**.
   - Save file to disk and unzip into your working directory, or another location that you can easily find again.
2. Open new project in ArcView, add above shapefiles to a new view document.
3. Make **Places** the active theme, then highlight the place of interest. Select the place using the open square icon.



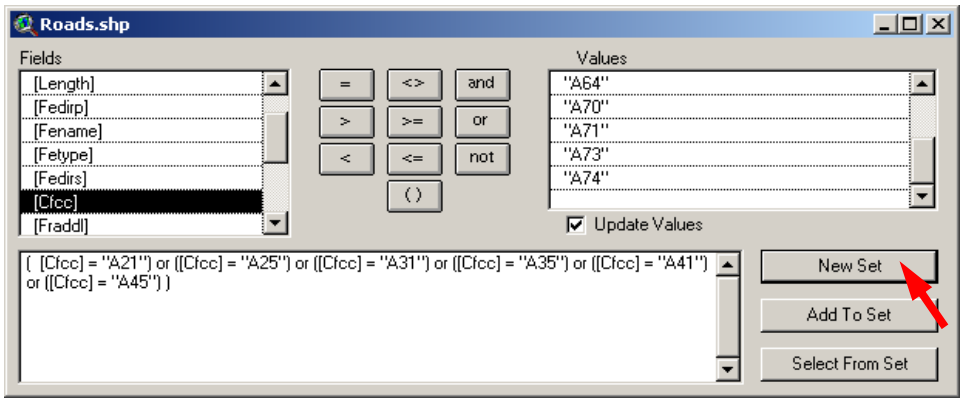
4. Select the roads that are within the selected place as follows:
   - Set the **roads shapefile** as the active theme.
   - Select the menu item **Theme → Select By Theme**.
   - Select the roads that **are completely within** the selected feature of the places theme. Click **New Set**.



   - Make a copy of the selected roads by selecting the menu item **Theme → Convert to Shapefile** and entering a filename. Click **OK**.
   - Add this new theme to your view by clicking on the **+** icon and selecting the new shapefile.
5. Exclude certain types of roads.
   - With the new road theme active, open the query builder.
   - Build a query similar to the following to select only the types of roads you wish to sample. (See **TIGER/Line Road Codes** below.)

```
([Cfcc] = "A21") or ([Cfcc] = "A25") or ([Cfcc] = "A31") or ([Cfcc] = "A35")
or ([Cfcc] = "A41") or ([Cfcc] = "A45")
```

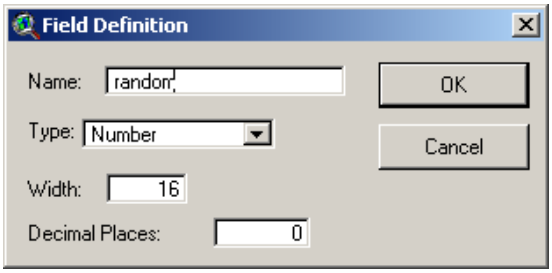
- Click **New Set**.



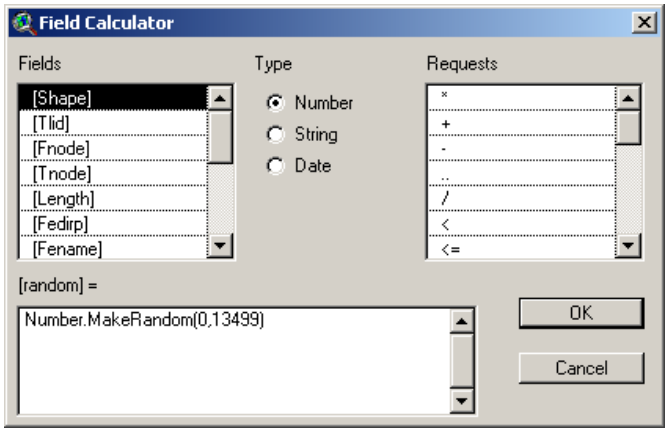
- Close the **Query Builder** window.
- Open the **attribute table** for the roads shapefile.
- **Table → Start Editing**.
- **Edit → Switch Selection**.
- **Edit → Delete Records**.
- **Table → Stop Editing**. Save Edits? Click **Yes**. The roads that remain are potential sample streets.

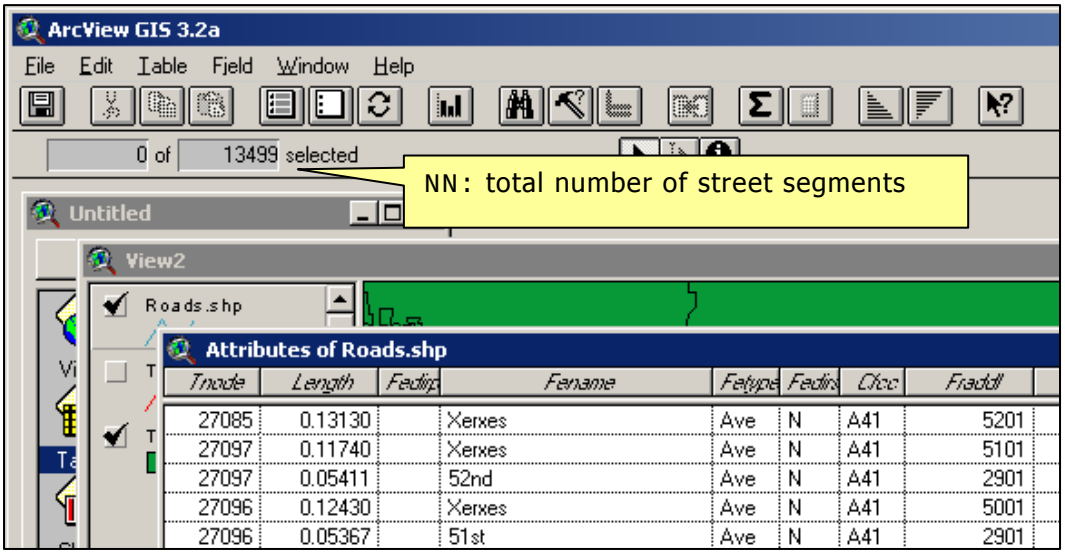
With the table still open, edit the roads file and add a random number field.

- **Table → Start Editing**.
- **Edit → Add Field**…
- Enter the new field's name, **random**. Click **OK**.



- Click the **Calculate** button.
- Select the formula: **Number.MakeRandom(0,NN)** from the list of Fields, substituting the total number of street segments for NN. The total number of street segments can be found just below the ArcView button bar. Click **OK**.
- Click **Edit → Stop Editing**. Save Edits? Click **Yes**.



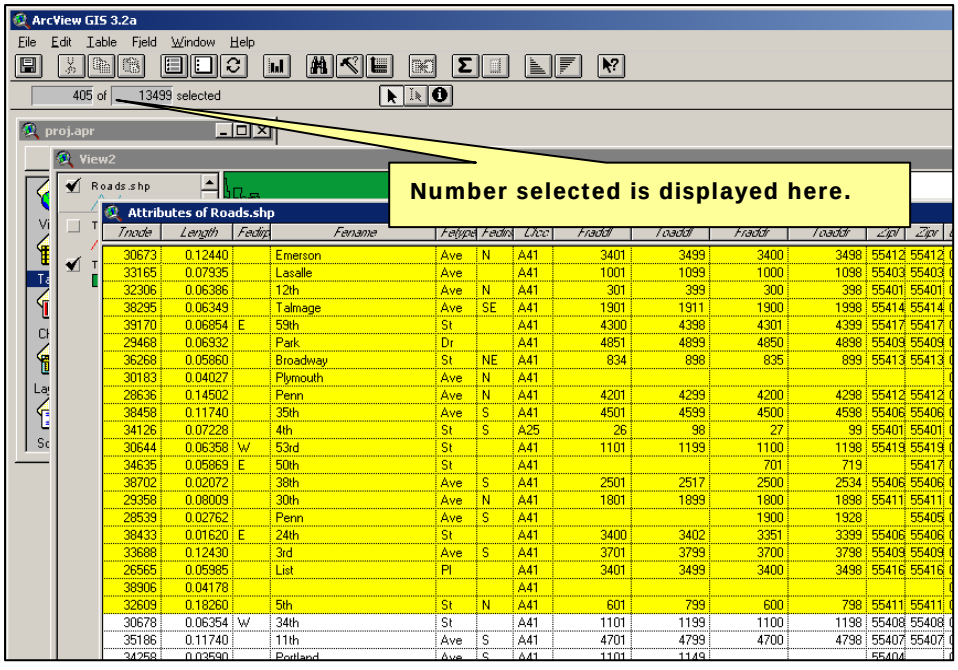


Tnode	Length	Fedip	Fename	Fetype	Fedir	Cfcc	Fraddl
27085	0.13130		Xerxes	Ave	N	A41	5201
27097	0.11740		Xerxes	Ave	N	A41	5101
27097	0.05411		52nd	Ave	N	A41	2901
27096	0.12430		Xerxes	Ave	N	A41	5001
27096	0.05367		51st	Ave	N	A41	2901

6. Sort the table by the random field in ascending order by clicking **Sort Ascending** on the button bar.
7. Using the mouse while holding down the shift key, select the first n records in the table where n is the number of sample street segments desired.

NOTE: See sections 2.7.2 and 3.3 for STRATUM and SDAP sampling guidlenes.

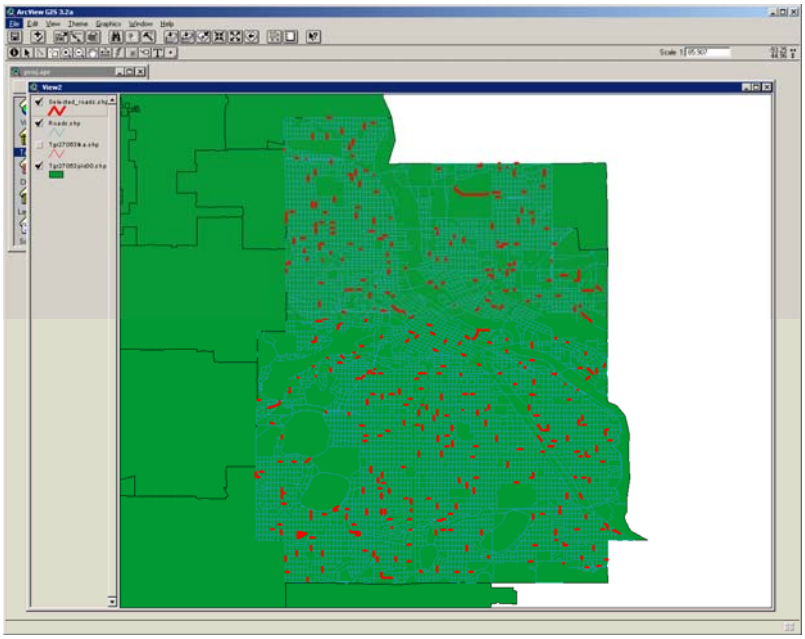
8. Export the selected records to be used by the inventory crew:
   - **File→ Export**.



Tnode	Length	Fedip	Fename	Fetype	Fedir	Cfcc	Fraddl	Toaddl	Fraddr	Toaddr	Zipl	Zipr
30673	0.12440		Emerson	Ave	N	A41	3401	3499	3400	3498	55412	55412
33165	0.07935		Lasalle	Ave		A41	1001	1099	1000	1098	55403	55403
32306	0.06386		12th	Ave	N	A41	301	399	300	398	55401	55401
38295	0.06349		Talmage	Ave	SE	A41	1901	1911	1900	1998	55414	55414
39170	0.06854	E	59th	St		A41	4300	4398	4301	4399	55417	55417
29468	0.06932		Park	Dr		A41	4851	4899	4850	4898	55409	55409
36268	0.05860		Broadway	St	NE	A41	834	898	835	899	55413	55413
30183	0.04027		Plymouth	Ave	N	A41						
28636	0.14502		Penn	Ave	N	A41	4201	4299	4200	4298	55412	55412
38458	0.11740		35th	Ave	S	A41	4501	4599	4500	4598	55406	55406
34126	0.07228		4th	St	S	A25	26	98	27	99	55401	55401
30644	0.06358	W	53rd	St		A41	1101	1199	1100	1198	55419	55419
34635	0.05869	E	50th	St		A41			701	719		55417
38702	0.02072		38th	Ave	S	A41	2501	2517	2500	2534	55406	55406
29358	0.08009		30th	Ave	N	A41	1801	1899	1800	1898	55411	55411
28539	0.02762		Penn	Ave	S	A41			1900	1928		55405
38433	0.01620	E	24th	St		A41	3400	3402	3351	3399	55406	55406
33688	0.12430		3rd	Ave	S	A41	3701	3799	3700	3798	55409	55409
26565	0.05985		List	Pl		A41	3401	3499	3400	3498	55416	55416
38906	0.04178					A41						
32609	0.18260		5th	St	N	A41	601	799	600	798	55411	55411
30678	0.06354	W	34th	St		A41	1101	1199	1100	1198	55408	55408
35186	0.11740		11th	Ave	S	A41	4701	4799	4700	4798	55407	55407
34258	0.03590		Portland	Ave	S	A41	1101	1149			55404	

- Select the desired file format. Click **OK**.
- Enter a file name. Click **OK**.
- Create and print map (see example below) and database for field use.

NOTE: STRATUM requires the user to enter the total number of street segments citywide when no Zone information was collected. Where management zones were delineated, STRATUM requires users to enter total number of street segments per zone. STRATUM calculates the actual number of street segments sampled directly from inventory entries.



TIGER/Line Road Codes

On the basis of the following code descriptions, segments with the following codes should usually be deleted before making a random selection: A11-19, A22, A23, A26, A27, A32, A33, A36, A37, A42, A43, A46, A47, A51-53, A63, A64, A65, A71-74. In particular communities, however, such roads may be bordered by trees that are maintained by the community, so it is advisable to check with local officials.

NOTE: The following codes and descriptions have been taken from the TIGER/Line documentation: US Census Bureau 2002. TIGER/Line Files Technical Documentation. Pp. 3-26 to 3-30. Online: http://www.census.gov/geo/www/tiger/tiger2002/tgr2002.pdf.

Primary Highway With Limited Access Interstate highways and some toll highways are in this category (A1) and are distinguished by the presence of interchanges. These highways are accessed by way of ramps and have multiple lanes of traffic. The opposing traffic lanes are divided by a median strip. The TIGER/Line files may depict these opposing traffic lanes as two distinct lines, in which case the road is called *separated*.

CFCC Description

- A11 Primary road with limited access or interstate highway, unseparated
- A12 Primary road with limited access or interstate highway, unseparated, in tunnel
- A13 Primary road with limited access or interstate highway, unseparated, underpassing
- A14 Primary road with limited access or interstate highway, unseparated, with rail line in center
- A15 Primary road with limited access or interstate highway, separated
- A16 Primary road with limited access or interstate highway, separated, in tunnel

- A17 Primary road with limited access or interstate highway, separated, underpassing
- A18 Primary road with limited access or interstate highway, separated, with rail line in center

Primary Road Without Limited Access This category (A2) includes nationally and regionally important highways that do not have limited access as required by category A1. It consists mainly of US highways, but may include some state highways and county highways that connect cities and larger towns. A road in this category must be hard-surface (concrete or asphalt). It has intersections with other roads, may be divided or undivided, and have multi-lane or single-lane characteristics.

CFCC Description
- A21 Primary road without limited access, US highways, unseparated
- A22 Primary road without limited access, US highways, unseparated, in tunnel
- A23 Primary road without limited access, US highways, unseparated, underpassing
- A24 Primary road without limited access, US highways, unseparated, with rail line in center
- A25 Primary road without limited access, US highways, separated
- A26 Primary road without limited access, US highways, separated, in tunnel
- A27 Primary road without limited access, US highways, separated, underpassing
- A28 Primary road without limited access, US highways, separated, with rail line in center

Secondary and Connecting Road This category (A3) includes mostly state highways, but may include some county highways that connect smaller towns, subdivisions, and neighborhoods. The roads in this category generally are smaller than roads in Category A2, must be surface (concrete or asphalt), and are usually undivided with single-lane characteristics. These roads usually have a local name along with a route number and intersect with many other roads and driveways.

CFCC Description
- A31 Secondary and connecting road, state highways, unseparated
- A32 Secondary and connecting road, state highways, unseparated, in tunnel
- A33 Secondary and connecting road, state highways, unseparated, underpassing
- A34 Secondary and connecting road, state highways, unseparated, with rail line in center
- A35 Secondary and connecting road, state highways, separated
- A36 Secondary and connecting road, state highways, separated, in tunnel
- A37 Secondary and connecting road, state and county highways, separated, underpassing
- A38 Secondary and connecting road, state and county highway, separated, with rail line in center

Local, Neighborhood, and Rural Road A road in this category (A4) is used for local traffic and usually has a single lane of traffic in each direction. In an urban area, this is a neighborhood road and street that is not a thoroughfare belonging in categories A2 or A3. In a rural area, this is a short-distance road connecting the smallest towns; the road may or may not have a state or county route number. Scenic park roads, unimproved or unpaved roads, and industrial roads are included in this category. Most roads in the Nation are classified as A4 roads.

CFCC Description
- A41 Local, neighborhood, and rural road, city street, unseparated
- A42 Local, neighborhood, and rural road, city street, unseparated, in tunnel
- A43 Local, neighborhood, and rural road, city street, unseparated, underpassing
- A44 Local, neighborhood, and rural road, city street, unseparated, with rail line in center

- A45 Local, neighborhood, and rural road, city street, separated
- A46 Local, neighborhood, and rural road, city street, separated, in tunnel
- A47 Local, neighborhood, and rural road, city street, separated, underpassing
- A48 Local, neighborhood, and rural road, city street, separated, with rail line in center

Vehicular Trail A road in this category (A5) is usable only by four-wheel drive vehicles, is usually a one-lane dirt trail, and is found almost exclusively in very rural areas. Sometimes the road is called a fire road or logging road and may include an abandoned railroad grade where the tracks have been removed. Minor, unpaved roads usable by ordinary cars and trucks belong in category A4, not A5.

CFCC Description

- A51 Vehicular trail, road passable only by 4WD vehicle, unseparated
- A52 Vehicular trail, road passable only by 4WD vehicle, unseparated, in tunnel
- A53 Vehicular trail, road passable only by 4WD vehicle, unseparated, underpassing

Road with Special Characteristics This category (A6) includes roads, portions of a road, intersections of a road, or the ends of a road that are parts of the vehicular highway system and have separately identifiable characteristics.

CFCC Description

- A60 Special road feature, major category used when the minor category could not be determined
- A61 Cul-de-sac, the closed end of a road that forms a loop or turn-around
- A62 Traffic circle, the portion of a road or intersection of roads forming a roundabout
- A63 Access ramp, the portion of a road that forms a cloverleaf or limited access interchange
- A64 Service drive, the road or portion of a road that provides access to businesses, facilities, and rest areas along a limited-access highway; this frontage road may intersect other roads and be named
- A65 Ferry crossing, the representation of a route over water that connects roads on opposite shores; used by ships carrying automobiles or people

Road as Other Thoroughfare A road in this category (A7) is not part of the vehicular highway system. It is used by bicyclists or pedestrians, and is typically inaccessible to mainstream motor traffic except for private owner and service vehicles. This category includes foot and hiking trails located on park and forest land, as well as stairs or walkways that follow a road right-of-way and have names similar to road names.

CFCC Description

- A70 Other thoroughfare, major category used when the minor category could not be determined
- A71 Walkway or trail for pedestrians, usually unnamed
- A72 Stairway, stepped road for pedestrians, usually unnamed
- A73 Alley, road for service vehicles, usually unnamed, located at the rear of buildings and property

A74 Driveway or service road, usually privately owned and unnamed, used as access to residences, trailer parks, and apartment complexes, or as access to logging areas, oil rigs, ranches, farms, and park lands

Appendix C. UFORE Appendices

Plot Center on Building

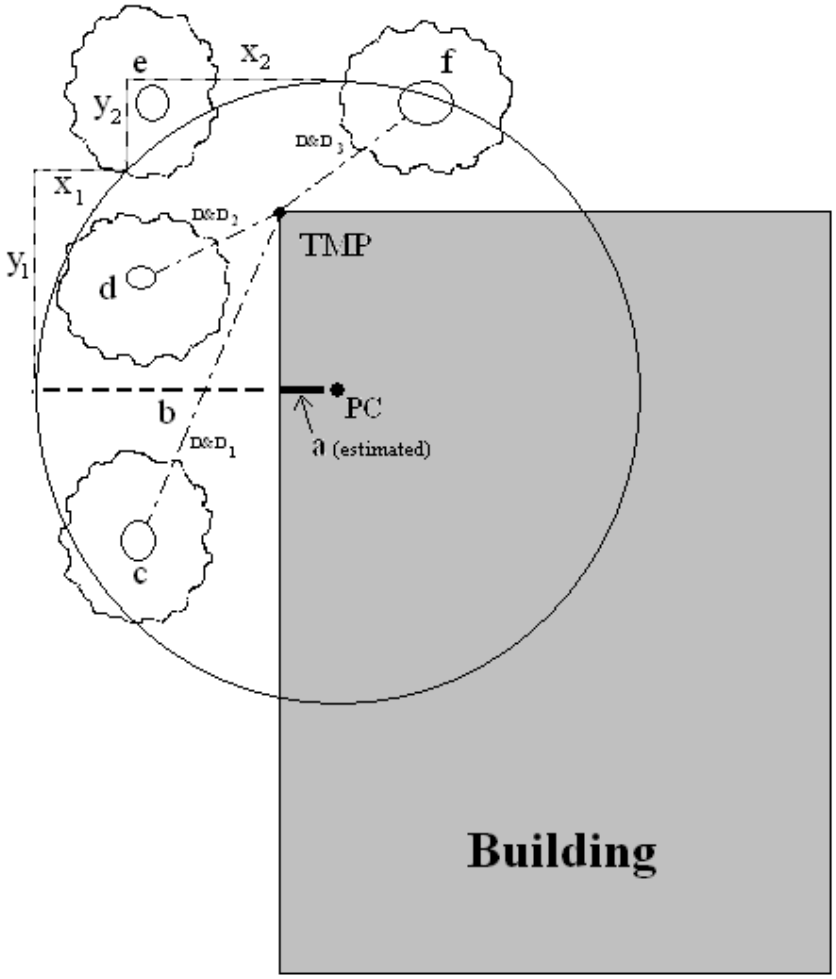


Figure A-1. PC – Actual Plot Center TMP – Tree Measuring Point
D&D – Distance & Direction.

The following describes how to determine plot boundaries and location of trees with plot centers that are located on buildings. Determine 'a' by estimating the approximate location of the actual plot center from aerial photo or cover map. Then calculate 'b' by subtracting 'a' from the limiting distance of the plot (*e.g.,* 1/10 acre plot limiting distance is 37.2 ft.). Then 'b' is the distance from the plot boundary to the building's wall.

To outline the general plot boundary walk parallel to the building for 26.2 ft (y_1), then perpendicular to the building for 11ft (x_1). This would represent a point along the boundary approximately 45° along its edge. If one then walked 11 ft (y_2) parallel to the buildings edge, and 26.2 ft (x_2) perpendicular the next plot boundary would be reached; representing a place 90° from the PC. **This example is for a 1/10 acre plot only.**

In order to create a more efficient tool to locate the trees that are in-plot, the crew must first determine the plot boundaries as described above, and then locate a point from which a distance and direction can clearly be delineated. In figure 1 (above) TMP, or Tree Measurement Point, 8 is chosen (notes should be recorded as to which corner of the building was chosen, *eg.,* North-West corner). Record the trees starting at 0° and rotating in a clockwise direction. Trees 'c', 'd', 'f' are all within the plot boundary first delineated, as such they must be tallied; tree 'e' on the other hand is outside the plot boundary and is not tallied. Even though the plot center is moved to create an easier method to locate the trees in plot no tree can be either added, or removed, due to the change in plot center location (moving from PC to TMP).

Example: Tree 'e' is not within 37.2 ft of the actual PC, but it is within 37.2 ft of the TMP, it is still not tallied because of the aforementioned conditions. This example is for a 1/10 acre plot.

DBH Measurement

Source: Forest Inventory and Analysis National Core Field Guide. Volume 1: Field Data Collection Procedures for Phase 2 Plots. Version 1.4

Special DBH situations:

1. **Tree with butt-swell or bottleneck**. Measure these trees 1.5 ft. above the end of the swell or bottleneck if the swell or bottleneck extends 3.0 ft. or more above the ground (Figure C-1).
2. **Tree with irregularities at DBH**. On trees with swellings (Figure C-2), bumps, depressions, branches (Figure C-3), etc. at DBH, diameter will be measured immediately above the irregularity at the place it ceases to affect normal stem form.
3. **Tree on slope**. Measure diameter at 4.5 ft. from the ground along the bole on the uphill side of the tree (Figure C-4).
4. **Leaning tree**. Measure diameter at 4.5 ft. from the ground along the bole. The 4.5 ft. distance is measured along the underside face of the bole (Figure C-5).
5. **Live windthrown tree**. Measure from the top of the root collar along the length to 4.5 ft. (Figure C-6).

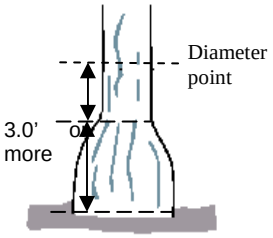


Figure C-1. Tree with swelled butt

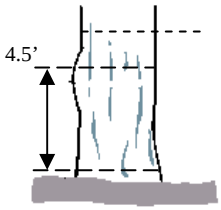


Figure C-2. Tree with swelling

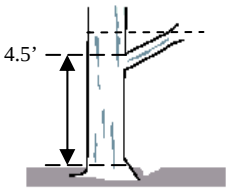


Figure C-3. Tree with branch

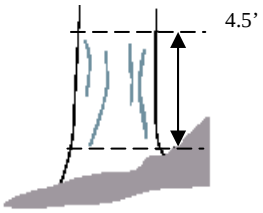


Figure C-4. Tree on a slope

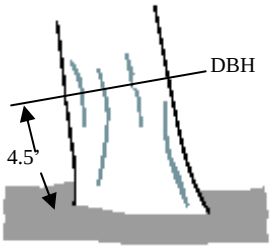


Figure C-5. Leaning tree

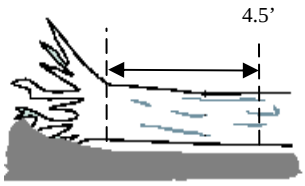


Figure C-6. Tree on the ground

Percent Canopy Missing and Base of Live Crown

Total height of tree is measured from ground up to top (living or dead) of tree. Many times there are additional live branches below the "base of live crown". The live crown base becomes that point on the main bole perpendicular to the lowest live foliage on the last branch that is included in the live crown. **The live crown base is determined by the live foliage and not by the point where a branch intersects with the main bole.**

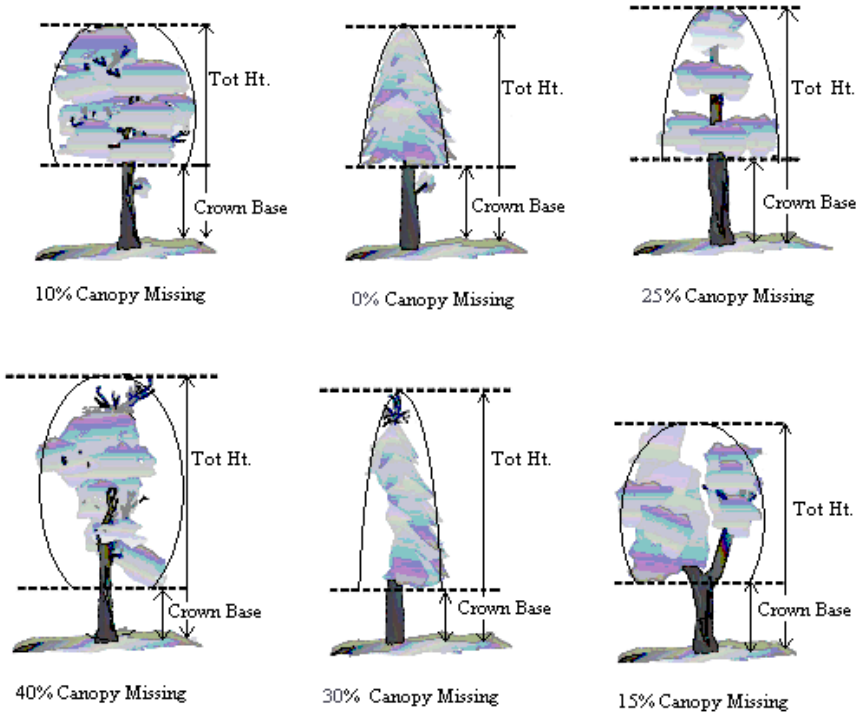


Figure D-1. Examples of Percent Canopy Missing and Crown Heights.

Percent Canopy Missing is measured by two people standing perpendicular angles to the tree (Figure D-2). Typical and actual crown shape is determined by the measurements made for crown width, tree height, and height to base of live crown.

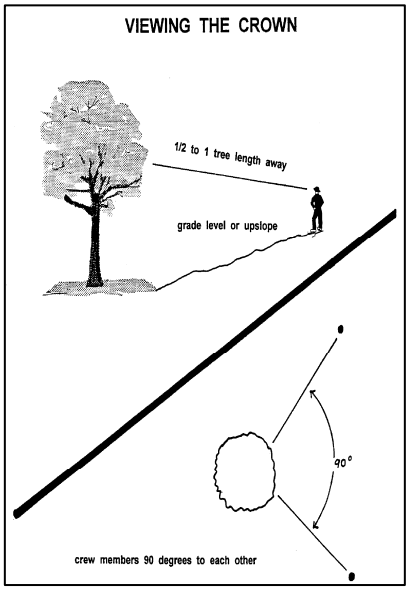


Figure D-2. Crew positions for viewing crowns.

When two individuals disagree with their estimates, follow the guidelines listed below under "Crown Rating Precautions."

Crown Dieback

Source: Forest Inventory and Analysis National Core Field Guide. Volume 1: Field Data Collection Procedures for Phase 2 Plots. Version 1.4.

Crown dieback is defined as recent mortality of branches with fine twigs, which begins at the terminal portion of a branch and proceeds toward the trunk. Dieback should occur from the top of the crown down and from the outside in toward the main stem. Dieback is only considered when it occurs in the upper and outer portions of the tree. When whole branches are dead in the upper crown, without obvious signs of damage, such as breaks or animal injury, assume that the branches died from the terminal portion of the branch. Dead branches in the lower portion of the live crown are assumed to have died from competition and shading. Dead branches in the lower live crown are not considered as part of crown dieback, unless there is continuous dieback from the upper and outer crown down to those branches.

Crown dieback estimates reflect the severity of recent stresses on a tree. Estimate crown dieback as a percentage of the live crown area, including the dieback area. Assume the perimeter of the crown is a two-dimensional outline from branch-tip to branch-tip, excluding snag branches and large holes or gaps in the crown (Figure E-1).

Crown dieback is obtained by two people (Figure D-2). Binoculars should be used to assist in the data collection. Observers should be conscious of lighting conditions and how light affects the day's observations. Under limited-light conditions, observers should take extra time. Poor lighting can make the measurement more difficult.

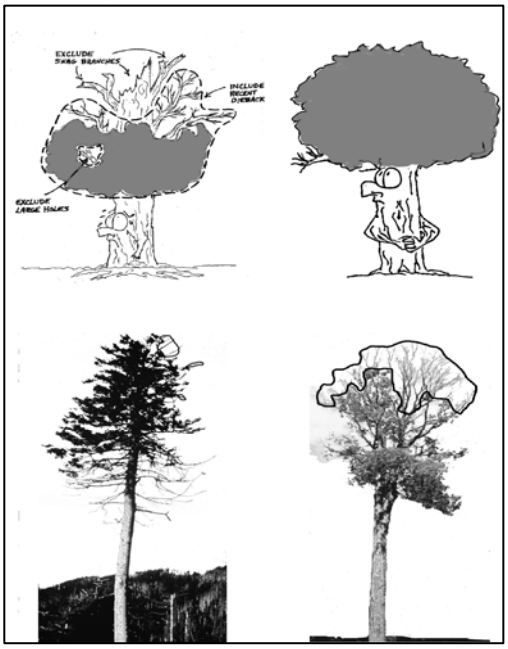


Figure E-1. Dieback Rating Examples.

Each individual should mentally draw a two-dimensional crown outline, block in the dieback and estimate the dieback area.

When two individuals disagree with their estimates, follow the guidelines listed below under "Crown Rating Precautions." The estimate is placed into one of 21 percentage classes.

Crown Rating Precautions

Crews must be especially careful when making evaluations under certain conditions and follow these procedures:

Distance from the Tree

Crews must attempt to stay at least 1/2 to 1 tree length from the tree being evaluated. Some ratings change with proximity to the tree. In some situations, it is impossible to satisfy this step, but the crew should do the best it can in each case. All evaluations are made at grade (same elevation as base of the tree) or up slope from the tree. This may not be possible in all cases but never get in the habit of evaluating trees from the down slope side.

View of the Crown

Crewmembers should evaluate trees when standing at an angle to each other, striving to obtain the best view of the crown. The ideal positions are at 90 degrees to each other on flat terrain (Figure D-2). If possible, never evaluate the tree from the same position or at 180 degrees. In a forest, getting a good perspective of the crown becomes difficult. Overlapping branches, background trees, and lack of a good viewing area can cause problems when rating some trees. Crews need to move laterally to search for a good view. Take special care when rating such trees.

Climatic Conditions

Cloudy or overcast skies, fog, rain, and poor sun angles may affect estimates. Crown diameters may be affected but to a lesser degree than other crown indicators. Crown dieback may be underestimated, because it is difficult to see dead twigs and/or to differentiate defoliated twigs from dead twigs. Crews need to be especially careful during poor lighting conditions. Crews should move around a tree to get another view, even if the view appears adequate at a specific location.

Heavy Defoliation

During heavy defoliation, crown dieback may be overestimated. The use of binoculars may help in separating dead twigs from defoliated twigs.

Trees with Epicormics or Sprigs

Trees that are densely covered in epicormic sprouts are not considered special cases in field data collection. There are two methods for handling this situation. The first choice is to not consider epicormic sprouts as part of the live crown base (if located under the actual branches crown base). The foliage the epicormics do produce for the tree would be considered for the percent canopy missing, overall decreasing the amount of percent canopy missing.

EXAMPLE: A tree has epicormic sprouts extending to four feet from the ground, but its live crown base is measured at eight feet high. The crew estimates the percent canopy missing at 15%, but also estimate the additional four feet of epicormic sprouts to contain approximately 5% of canopy cover. The percent canopy missing would then be recorded as 10%. All of the percentages would be based on the crown measurements (crown widths, total height, and crown base height).

The second way would be to lower the crown base measurement to the lowest epicormic sprout, and then that point would be utilized to estimate the percent canopy missing of the tree. More times then not this method will increase the percent canopy missing.

Either way in handling epicormic sprouts will work in the UFORE model, but in the field, it is more useful to be consistent. Use one method or the other for most, if not all, of the cases when encountering epicormic sprouts.

If a tree's canopy is consisting of only epicormic sprouts, or if they are located above the crown base, then they will be considered for the trees canopy. Measure them as if they were the crown.

Measurement Differences Resolution

If the numbers for a crown measurement estimate by two crewmembers do not match, arrive at the final value by:

- Taking an average, if the numbers differ by 10% (2 classes) or less.
- Changing positions, if the numbers differ by 15 % or more and attempt to narrow the range to 10% or less.
- Averaging the two estimates for those trees that actually have different ratings from the two viewing areas (ratings of 30 and 70 would be recorded as 50)

Quality Assurance Standards and Procedures

This Quality Assurance (QA) Plan was designed specifically for data collection for the UFORE computer model that employs either volunteer or professionally trained field crews. If such a plan is used by your city or locality, please forward a copy to our office. It is important to implement QA procedures to ensure accurate data. By setting standards and monitoring fieldwork, one can prevent or at least detect and correct errors, and eliminate the repetition of most errors. Quality assurance procedures used in data collection should be documented and sent along with the field data to the Syracuse Unit. Information on Quality Assurance procedures is included in the final report.

After the initial training period, periodic inspections will be made of every crew's fieldwork. Inspections are the most important mechanism for assuring quality data. The number of errors detected will determine the frequency of inspections.

Definitions

Quality Assurance – Quality Assurance (QA) is a procedure designed to ensure that the field data are collected accurately. Quality Assurance involves a series of hot and cold checks of the field plots.

Hot Check – Trainer works with the crew as they conduct measurements on the plot to ensure that they have mastered the measurement techniques. Hot checks are normally done as part of the training process. Trainer observes crews during data collection and checks their measurements while the crew is on the plot. Hot checks are informal, allowing for one-on-one interaction between the trainer and the trainee. Errors encountered during hot checks are corrected.

Cold Check – Cold checks are done on regular intervals throughout the field season. Inspector or an alternate crew revisits a plot after it has been completed. Original crew is not present and critical measurements are checked. These plots are selected at random so field crews do not know which plots will have a cold check. Errors encountered during cold checks are corrected.

After the initial field training, a series of hot and cold checks should be completed on a total of approximately 5% of the plots. It is recommended that more cold than hot checks be completed (*e.g.,* 70% cold; 30% hot).

QA Timing

Week 1 and Week 2: Hot checks are conducted using a variety of plot types (wooded, residential, etc…)

Weeks 3 – 7: Cold checks are conducted on a variety of plots (*e.g.,* plots with low/no tree cover, plots with a few trees, and plots with high number of trees). For **plots with <5 trees,** verify that all trees on the plot were measured, verify species identification is correct, re-measure DBH and Total Height, and verify building interaction for all trees. For **plots with >5 trees**, verify that all trees on the plot were measured and verify species identification is correct for all trees. Then for approximately 5 randomly selected trees, re-measure DBH and Total Height, and verify building interaction. A paper data collection form (Appendix E) should be filled-out during QA for each plot selected, with remeasurements recorded for the selected trees. Every crew needs to have hot and cold checks.

Variables to Re-Measure

The following variables should be re-measured and recorded on the QA tree data forms. Measurement quality objectives (MQOs) are also listed. MQOs are objective, quantitative statements describing the tolerable level of error (deviation between true and measured value) in a given measurement. They are the objective standards against which data quality is measured. An MQO for a measurement generally consists of a maximum acceptable error size and the percent of the time that measurement error must be less than or equal to the maximum error. When measurements can be repeated with uniform results by several individuals, it is proper to set close tolerance limits that define acceptable data.

For variables that require subjective evaluation, tolerance limits should reflect the degree of subjectivity. Attributes with greater subjectivity should have broader tolerance limits.

Variable	Measurement Unit	MQO
Plot level		
Land use	Land use	No errors, 99% of the time
Plot tree cover	5% classes	+ or – two 5% classes, 95% of the time
Tree level		
Trees Present		
- (<25 trees on plot)	presence/absence	No errors, 99% of the time
- (≥25 trees on plot)	presence/absence	+ or – 3% accounted for, 99% of the time
Species*	Species	No errors, 95% of the time
DBH		
- 1-10 inch diameter tree	0.1 inch	+ or - .1 inch, 95% of the time
- > 10 inch diameter tree	0.1 inch	+ or – 3%, 95% of the time
Total height	1 foot	+/- 10%, 95% of the time

*Genus code is acceptable if species cannot be determined.

Bldg Interaction – only verify the number of buildings being impacted. No errors, 95% of the time.

For all other measurements at the plot and tree level, make sure all items have been measured/recorded by the crew and that values are reasonable. No need to re-measure anything else unless a problem is obvious.

On the Cold Check data sheet, highlight measurements where tolerances have been exceeded. Write notes as to your observations on accuracy of the other data collected. If major problems are encountered, document what you did to fix them (*e.g,.* if one species is consistently being incorrectly identified, state that you re-trained crew, went back to previously completed plots and fixed them). **Documentation as to how the problem was fixed is critical.**

NOTE: For any stray errors, talk with the crew to determine why errors occurred. Encourage them to be more careful. Determine if these few errors are symptomatic of a bigger problem. If you recognize a trend and the problems are consistent from plot to plot, corrective action needs to take place: retrain the crews, fix the data sheets, and/or go back to the affected plots and re-measure the necessary items. The key, critical items to focus on are species identification and determination of how many trees are on the plot. Trends in diameter measurement are important to note. (Is the crew consistently measuring too high or too low?)

It is important to perform several QA checks early in the data collection process, but also occasional checks should be performed through the field season. Correcting errors early will reduce overall error and minimize the amount of correction or re-measurement needed to ensure quality data.

Completeness

It is the responsibility of each crew to complete all variables before leaving the sample plot. Before leaving the plot, crews will complete a thorough edit to make sure all required fields are complete and all entries are reasonable. If data are collected with PDAs, data should be downloaded several times a week, if not more often. **MAKE BACKUP COPIES** of electronic files. Inspectors will review sheets (or printouts of downloaded data) periodically (more often during the first few weeks) to spot check for errors.

Manual Generation of Plot Location Files for PDA

Three files generated by the Random Plot Generator are needed by the UFORE Shell in order to be able to load the plots coordinates into the PDA. If you used a GIS to produce random plots with coordinates and want to be able to have those available on the PDA, you can manually create the three necessary files. Please note these conditions:

- If there are no coordinates to import, the plot numbers can be simply entered through the Shell during new project setup (User's Manual, section 1.3.3, Step 5).
- The Manual asks for .doc files, but the UFORE Shell will accept these .txt files without problem.
- The two text files can not include the use of tabs, commas, or other punctuation. The Shell only accepts values and empty spaces.
- No empty lines can be present.

Points Report

1. Create the required number of points using ArcView or ArcMap
2. Open the associated **.dbf* file in Excel, and save as a working file

3. Insert a column between the plot ID column and the first coordinate
4. Fill the column with "1" (no stratification = 1 single stratum)
5. Delete the headers and anything else above the plot information, so there only remain four columns of data: Plot ID, Stratum (=1), X, Y. For example:

```
1 1 1578701.99712000 1165983.32608000
2 1 1579604.18701000 1166147.34998000
3 1 1577747.10724000 1166453.54246000
```

   Please follow the formatting of this example exactly, or you will receive an error message.
6. Save as a comma delimited (**.csv*) file
7. Open the file in NotePad
8. Insert two empty lines above the data columns
9. Fill the two new lines with this text

```
$U4PLLS! 1.0 20060911 1500
0
```

10. Replace "20060911" with the current date, and "1500" with the time the file is made
11. If meters are being used, change the "0" in the second line to "1"
12. Save it as Points_Report.txt

Strata Report

1. Open NotePad
2. Enter the following 3 lines:

```
$U4STAR! 1.0 20060911 1500
0
1 YourTotalArea Urban
```

3. Replace the date and time as before
4. If hectares are being used, replace the "0" in the second line with "1"
5. Replace "YourTotalArea" with the total acres or hectares of the entire study area from which the sample plots are taken
6. Make sure that only a single space separates the data groups
7. Save as Strata_Area_Report.txt

GIS Projection File

1. Locate the file **.prj* associated with your plot selection
2. Store a copy of it with the previous 2 files for importation into the UFORE shell

Appendix D. STRATUM Appendices

Inventory Formatting

Before you can begin a STRATUM project, you must prepare your data, which is most likely in the form of an Excel worksheet or an Access database. Though STRATUM is flexible, it has very strict limits on the way data can be organized.

The only exception to this STRATUM-formatting convention is the Access table (STRATUM_MCTI_Inventory) created if you collected your inventory data using the i-Tree PDA Utility application. STRATUM accepts the i-Tree format and recognizes its data fields.

Data Fields

STRATUM inventories must be organized according to specific field names, though to some extent the field names can be defined differently. In order to import your data into STRATUM, the data must include 17 data fields, which *must* have specific names and formatting and *must* be in a specific order. The field names and order are as follows:

1. TreeId
2. Zone
3. StreetSeg
4. CityManaged
5. SpCode
6. LandUse
7. LocSite
8. DBH
9. MtncRec
10. PriorityTask
11. SwDamg
12. WireConflict
13. CondWood
14. CondLvs
15. OtherOne
16. OtherTwo
17. OtherThree

STRATUM can run with a minimum amount of data, though reports will be limited; however, there *must* be values for TreeId, SpCode, and DBH. Additionally, all 17 data fields must be present and records must be filled with null values (*e.g.,* 0) if no data were collected.

The 17 STRATUM data fields are defined as follows:

TreeId - a number assigned to each tree within a particular city in order to distinguish trees and count the number of trees per city. Each record must have a TreeId; it must be numeric and it is recommended that this number be unique.

Zone - an alphanumeric code or name that represents the management area or zone that the tree is located in within a particular city. If no zones or areas are associated with inventoried trees, 1 is entered for each record. Up to 20 zones can be defined.

StreetSeg - a numeric code (must be a positive integer) to identify the street segment within a city where the tree is located. If TIGER/Line files have been used to create a sample inventory, the Tiger Line ID (TLID) is the StreetSeg. For full inventories, 0 (zero) is entered for each record.

NOTE: When sampling, all random street segments visited must be inventoried and recorded as part of the inventory database whether or not trees and/or sites were present. If segments devoid of trees and planting sites are not recorded, population estimates and associated error will be inaccurate. See Section 2.7.2 for more information.

CityManaged - a numeric code to distinguish trees owned by the city (1) and those privately planted and managed (2). If private trees were not included, 1 should be entered for each record.

SpCode - an alphanumeric code consisting of the first two letters of the genus name and the first two letters of the species name followed by two optional letters or numbers to distinguish two species with the same four-letter code. Additional codes for available planting sites or empty planting basins may be entered (*e.g.*, AVPS [available planting site] or EMBA [empty basin]). A SpCode must be entered for each record.

NOTE: If you are creating a new inventory, it will greatly facilitate your use of STRATUM if you assign your species the same codes as STRATUM uses. Similarly, if you are working with an existing inventory, you may find it easiest to change your species codes directly in your database to match those on the pre-installed list. This will save you time and effort in creating a project. A list of installed species codes and their respective species for each climate zone can be found in this appendix.

LandUse - a numeric code to describe the type of area where the tree is growing. The default values are as follows:

1 = Single-family residential
2 = Multi-family residential (duplex, apartments, condos)
3 = Industrial/large commercial
4 = Park/vacant/other (agricultural, riparian areas, greenbelts, park, etc.)
5 = Small commercial (minimart, retail boutiques, etc.)

Additional or alternative definitions (up to 10) can be defined in STRATUM. If no LandUse value is available, 0 (zero) is entered for each record.

LocSite - a numeric code to describe the kind of site where the tree is growing. The default values are as follows:

1 **=** Front yard
2 **=** Planting strip
3 **=** Cutout (tree root growth restricted on all four sides by hardscape within dripline)
4 **=** Median
5 **=** Other maintained locations
6 **=** Other un-maintained locations
7 **=** Backyard

Additional or alternative definitions (up to 10) can be defined in STRATUM. If no LocSite value is available, 0 (zero) is entered for each record.

DBH – a numeric entry for the diameter at breast height (4.5 ft [1.37 m] above the ground). Alternatively, up to 9 numerical categories can be used to define classes (*e.g.,* 1 = trees within

the 0–6 in DBH size class). If the class option is used, a minimum of 5 classes must be defined in STRATUM. Each record must have a DBH value. Enter 0 (zero) for all non-tree SpCode entries.

MtncRec - a numeric code to describe the recommended maintenance for the tree. The default values are as follows:

1 **= None** – tree does not need immediate or routine maintenance.
2 **= Young tree (routine)** – tree is less than 18 ft. tall and in need of maintenance; health or longevity of tree is not compromised by deferring maintenance for up to five years.
3 **= Young tree (immediate)** – tree is less than 18 ft. tall and in need of maintenance; deferring maintenance beyond one year would compromise health or longevity of tree.
4 **= Mature tree (routine)** – tree is more than 18 ft. tall and in need of maintenance; health or longevity of tree is not compromised by deferring maintenance for up to five years.
5 **= Mature tree (immediate)** – tree is more than 18 ft. tall and in need of maintenance; deferring maintenance beyond one year would compromise health or longevity of tree.
6 **= Critical concern (public safety)** – tree should be inspected without delay.

Additional or alternative definitions (up to 10) can be defined in STRATUM. If no MtncRec value is available, 0 (zero) is entered for each record.

PriorityTask - a numeric code to describe the highest priority task to perform on the tree. The default values are as follows:

1 **= None** – tree does not need maintenance.
2 **= Stake/train** – staking or training needed to encourage a straight trunk, strong scaffold branching, or eliminate multiple leaders, crossing branches, and girdling ties. Includes removing or replacing stakes and ties to prevent damage to tree bole.
3 **= Clean** – crown needs cleaning to remove dead, diseased, damaged, poorly attached, or crossing branches to increase health or longevity of tree.
4 **= Raise** – crown should be raised by removing lower branches from the tree trunk to eliminate obstructions or clearance issues.
5 **= Reduce** – crown should be reduced/thinned by pruning to reduce tree height, spread, overcrowding, wind resistance, or an increase of light penetration.
6 **= Remove** – tree is dangerous, dead or dying, and no amount of maintenance will increase longevity or safety.
7 **= Treat pest/disease** – insects, pathogens, or parasites are present and detrimental to tree longevity; treatment should be given to maintain longevity.

Additional or alternative definitions (up to 10) can be defined in STRATUM. If no PriorityTask value is available, 0 (zero) is entered for each record.

SwDamg – a numeric code to describe the amount of sidewalk damage. The default values are as follows:

1 **= None** – sidewalk heaved less than ¾ inch, requiring no remediation.
2 **= Low** – sidewalk heaved ¾ to 1½ inches, requiring minor grinding or ramping.
3 **= Medium** – sidewalk heaved 1½ to 3 inches, requiring grinding or ramping and/or replacement.
4 **= High** – sidewalk heaved more than 3 inches, requiring complete removal and replacement.

Alternative definitions (up to 4) can be defined in STRATUM. If no SwDamg value is available, 0 is entered for each record.

WireConflict – a numeric code to describe utility lines that interfere with or are present above a tree. The default values are as follows:

1 **= No lines** – no utility lines within vicinity of tree crown
2 **= Present and not conflicting** – utility lines occur within vicinity of tree crown, but crown does not presently intersect wires.
3 **= Present and conflicting** – utility lines occur and intersect with tree crown.
Additional or alternative definitions (up to 5) can be defined in STRATUM. If no WireConflict value is available, 0 (zero) is entered for each record.

CondWood – a numeric code to describe the health of the tree's wood (its structural health) as per adaptation of the Council of Tree and Landscape Appraisers (CTLA) tree appraisal standards (CTLA, 2000. *Guide for Plant Appraisal, 9th Ed*. Savoy, IL: ISA, 143 pp). The default values are as follows:

1 **= Dead or Dying -** extreme problems
2 **= Poor -** major problems
3 **= Fair -** minor problems
4 **= Good -** no apparent problems

Classes must be ordered in ascending order, with the poorest rating having the lowest numerical value. Additional or alternative definitions (up to 10) can be defined in STRATUM, but Replacement Value reporting will be unavailable. If no condition value is available, 0 (zero) is entered for each record.

If only one condition rating is inventoried, enter the same values for both CondWood and CondLvs.

CondLvs – a numeric code for the health of the tree's leaves (its functional health) as per adaptation of CTLA tree appraisal (CTLA, 2000. *Guide for Plant Appraisal, 9th Ed*. Savoy, IL: ISA, 143 pp):

1 **= Dead or dying -** extreme problems
2 **= Poor -** major problems
3 **= Fair -** minor problems
4 **= Good -** no apparent problems

Classes must be ordered in ascending order, with the poorest rating having the lowest numerical value. Additional or alternative definitions (up to 10) can be defined in STRATUM but Replacement Value reporting will be unavailable. If no condition value is available, 0 (zero) is entered for each record.

If only one condition rating is inventoried, enter the same values for both CondWood and CondLvs.

OtherOne – a numeric field with up to 10 variables to be defined by user. If no OtherOne value is available, 0 (zero) is entered for each record.

OtherTwo – a numeric field with up to 10 variables to be defined by user. If no OtherTwo value is available, 0 (zero) is entered for each record.

OtherThree – a numeric field with up to 10 variables to be defined by user. If no OtherThree value is available, 0 (zero) is entered for each record.

Final Data Prep

The simplest way to prepare for STRATUM is to save your city's tree inventory under a new name (*e.g.,* YourCityData) so that you can manipulate it and organize your data into the data

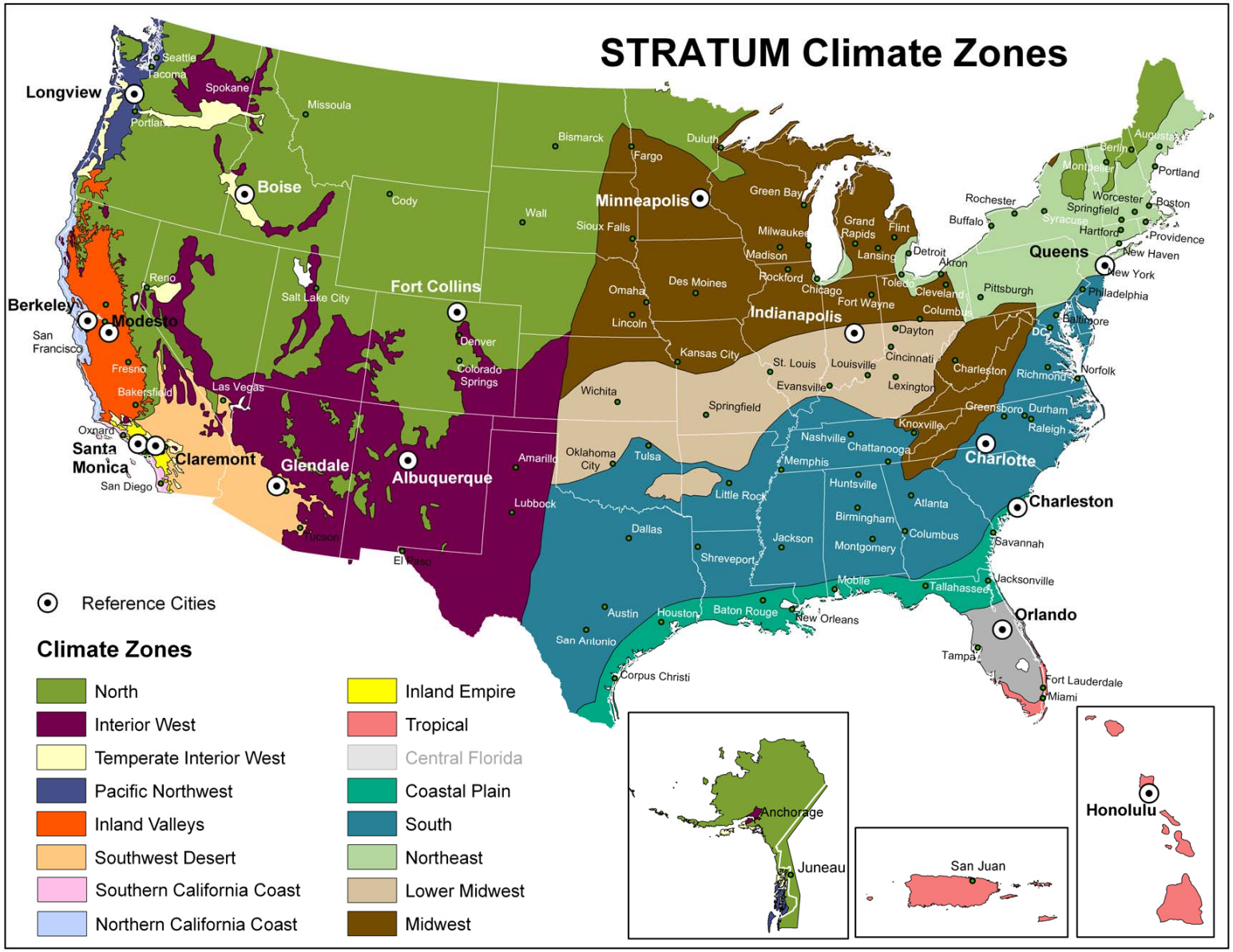
fields described above. Make sure that the data field names are spelled exactly as they are here, without spaces, and that they appear in this order. Check to be sure that the values in each category are appropriate; for example, do not distinguish seven degrees of sidewalk heave (only four are allowed). If your inventory has other information not described above that you would like to include, you can organize it under the categories OtherOne, OtherTwo, and OtherThree. Any other information should be deleted. The type of file (*e.g.,* Excel, Access, SPSS, tab-delineated text files, etc.) you use to organize your inventory for STRATUM is irrelevant, as long as you are able to convert it into an Access *.mdb file in the end.

Importing Excel Worksheets into Access

Tree inventories are most often prepared in Excel format. However, only Access *.mdb formatted files can be imported into STRATUM; all other database file types must be converted to *.mdb files. The following directions detail the process for importing a STRATUM-formatted inventory from an Excel spreadsheet into an Access Table. The process outlined below may vary slightly depending on your operating system and the version of Excel or Access you are using. (For assistance importing other formats into Access, see the Access help menu or contact i-Tree Support through any of the means listed at http://www.itreetools.org/support.)

1. Create a new Access database for STRATUM:
   - From your computer's **Start** menu, navigate to **(All) Programs** and then select **Microsoft Access** from the list.
   - In the default **Access** dialogue box, select the **Blank database** radio button under the heading of **Create new database using**.
   - In the **File New Database** dialogue box, name your database (**YourCityProject.mdb**), browse to the location where you want to save it, and press the **Create** button to create and save your new database.
2. Import an Excel spreadsheet into the newly created Access database:
   - From the **File** menu of Access, navigate to **Get External Data** and select **Import**.
   - Using the **Files of type** pull-down menu, select **Microsoft Excel (*.xls)**.
   - Navigate to the file location for **YourCityData.xls**, select file, and click on the **Import** button.
   - Using the **Import Spreadsheet Wizard**, highlight the **Show Worksheets** radio button and select the worksheet containing your inventory data records; click **Next >**.
   - Check the **First Row Contains Column Headings** box and click **Next >**.
   - Since this is a new database, highlight the **In a New Table** button for the question of where to store data and click **Next >**.
   - Verify that field names and records follow the formatting conventions described above; if not, field names can be renamed here and data fields that are not one of STRATUM's 17 defined fields can be excluded by checking the **Do not import field (skip)** box. For the category **TreeId**, under **Indexed**, choose **Yes (no duplicates)**. All other fields should be left with the default **Indexed** choice of **No**. When data field verification is complete, click **Next >**.
   - Select **Choose My Own Primary Key** and select **TreeId** from the pull-down menu; click **Next >** to continue.
   - In the **Import to Table** box, type the name **STRATUM_Inventory**; click **Finish** and then **OK** to complete the import process.

NOTE: Though your *.mdb file can have any name, the table with the STRATUM-formatted inventory must be named STRATUM_Inventory.


STRATUM Climate Zones
Longview
Seattle
Tacoma
Spokane
Portland
Missouri
Boise
Cody
Bismarck
Fargo
Duluth
Minneapolis
Green Bay
Wall
Sioux Falls
Milwaukee
Grand Rapids
Flint
Madison
Lansing
Detroit
Akron
Rochester
Buffalo
Syracuse
Hartford
Springfield
Worcester
Boston
Providence
New Haven
Queens
New York
Philadelphia
Pittsburgh
Baltimore
DC
Norfolk
Richmond
Reno
Salt Lake City
Fort Collins
Berkeley
Modesto
San Francisco
Fresno
Bakersfield
Las Vegas
Denver
Colorado Springs
Omaha
Des Moines
Rockford
Chicago
Toledo
Cleveland
Fort Wayne
Columbus
Indianapolis
Dayton
Lincoln
Kansas City
Wichita
Springfield
St. Louis
Louisville
Cincinnati
Evansville
Lexington
Charleston
Greensboro
Durham
Raleigh
Knoxville
Nashville
Chattanooga
Charlotte
Oxnard
Santa Monica
Claremont
Glendale
Albuquerque
San Diego
Amarillo
Oklahoma City
Tulsa
Memphis
Huntsville
Atlanta
Lubbock
Little Rock
Birmingham
Columbus
Dallas
Jackson
Montgomery
Savannah
Charleston
Tucson
El Paso
Shreveport
Mobile
Tallahassee
Jacksonville
Austin
Houston
Baton Rouge
New Orleans
Orlando
San Antonio
Tampa
Corpus Christi
Fort Lauderdale
Miami
Reference Cities
Climate Zones
North
Interior West
Temperate Interior West
Pacific Northwest
Inland Valleys
Southwest Desert
Southern California Coast
Northern California Coast
Inland Empire
Tropical
Central Florida
Coastal Plain
South
Northeast
Lower Midwest
Midwest
Anchorage
Juneau
San Juan
Honolulu

STRATUM Species and Species Codes by Climate Zone

NOTE: STRATUM research and development are ongoing; not all regions have been completed. In the current version of STRATUM, the following climate zones are available: North, Pacific Northwest, Temperate Interior West, Interior West, Southwest Desert, Inland Valleys, Inland Empire, Southern California Coast, Northern California Coast, Northeast, Midwest, Lower Midwest, South, Coastal Plain and Tropical.

North					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ABCO	AB	*Abies concolor*	White fir	CEL	PIPU
ACFR	AD	*Acer x freemanii*	Freeman maple	BDL	FRPE
ACGL	AF	*Acer glabrum*	Rocky mountain maple	BDL	FRPE
ACNE	AG	*Acer negundo*	Boxelder	BDL	FRPE
ACPL	AH	*Acer platanoides*	Norway maple	BDL	ACPL
ACSA2	AK	*Acer saccharum*	Sugar maple	BDL	ACSA2
ACSA1	AJ	*Acer saccharinum*	Silver maple	BDL	ACSA1
AC	AC	*Acer* species	Maple	BDL	FRPE
AEGL	AM	*Aesculus glabra*	Ohio buckeye	BDM	ACPL
AEHI	AN	*Aesculus hippocastanum*	Horsechestnut	BDM	ACPL
AM	AO	*Amelanchier* species	Serviceberry	BDS	MA2
BE	AV	*Betula* species	Birch	BDM	ACPL
CABE	BE	*Carpinus betulus*	European hornbeam	BDM	ACPL
CAOV	BF	*Carya ovata*	Shagbark hickory	BDL	FRPE
CA3	BD	*Catalpa* species	Catalpa	BDL	FRPE
CA1	BC	*Carya* species	Hickory	BDL	FRPE
CECA	BH	*Cercis canadensis*	Eastern redbud	BDS	MA2
CEOC	BK	*Celtis occidentalis*	Northern hackberry	BDL	CEOC
COCO2	BN	*Corylus colurna*	Turkish hazelnut	BDM	ACPL
CO1	BM	*Cornus* species	Dogwood	BDS	MA2
CR	BO	*Crataegus* species	Hawthorn	BDS	MA2
ELAN	BP	*Elaeagnus angustifolia*	Russian olive	BDS	MA2
FA	BQ	*Fagus* species	Beech	BDL	FRPE
FASY	BR	*Fagus sylvatica*	European beech	BDL	FRPE
FRAM	BT	*Fraxinus americana*	White ash	BDL	FRAM
FRPE	BU	*Fraxinus pennsylvanica*	Green ash	BDL	FRPE
FR	BS	*Fraxinus* species	Ash	BDL	FRPE
GIBI	BV	*Ginkgo biloba*	Ginkgo	BDL	FRPE
GLTR	BW	*Gleditsia triacanthos*	Honeylocust	BDL	GLTR
GYDI	BX	*Gymnocladus dioicus*	Kentucky coffeetree	BDL	GYDI
JUCI	BZ	*Juglans cinerea*	Butternut	BDL	FRPE
JUCO1	CA	*Juniperus communis*	Common juniper	CES	PICO5
JUMO	CB	*Juniperus monosperma*	One seed juniper	CES	PICO5
JUNI	CC	*Juglans nigra*	Black walnut	BDL	FRPE
JUSC	CD	*Juniperus scopulorum*	Rocky mountain juniper	CES	PICO5
JU	BY	*Juniperus* species	Juniper	CES	PICO5
JUVI	CE	*Juniperus virginiana*	Eastern red cedar	CES	PICO5

North					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
LIST	CF	*Liquidambar styraciflua*	Sweetgum	BDL	FRPE
LITU	CG	*Liriodendron tulipifera*	Tulip tree	BDL	FRPE
LOSP	CH	*Lonicera* species	Honeysuckle	BDS	MA2
MA2	CI	*Malus* species	Crabapple	BDS	MA2
MEGL	CK	*Metasequoia glyptostroboides*	Dawn redwood	BDL	FRPE
PICE	CP	*Pinus cembroides*	Mexican pinyon	CES	PICO5
PICO	CQ	*Pinus contorta*	Lodgepole pine	CEM	PINI
PIED	CR	*Pinus edulis*	Pinyon pine	CES	PICO5
PIEN	CS	*Picea engelmannii*	Engelmann spruce	CEL	PIPU
PIGL1	CU	*Picea glauca*	White spruce	CEL	PIPU
PIMA	CV	*Picea mariana*	Black spruce	CEL	PIPU
PIMU	CW	*Pinus mugo*	Sweet mountain pine	CES	PICO5
PINI	CX	*Pinus nigra*	Austrian pine	CEM	PINI
PIPO	CY	*Pinus ponderosa*	Ponderosa pine	CEL	PIPO
PIPU	CZ	*Picea pungens*	Blue spruce	CEL	PIPU
PIRU	DA	*Picea rubens*	Red spruce	CEL	PIPU
PI1	CM	*Picea* species	Spruce	CEL	PIPU
PIST2	DC	*Pinus strobiformis*	Southwestern white pine	CES	PICO5
PISY	DD	*Pinus sylvestris*	Scotch pine	CEM	PINI
POAC5	DF	*Populus x acuminata*	Lanceleaf cottonwood	BDL	FRPE
POAL	DG	*Populus alba*	White poplar	BDL	FRPE
POAN	DI	*Populus angustifolia*	Narrowleaf cottonwood	BDL	FRPE
POAL	DH	*Populus alba var. bolleana*	White poplar	BDL	FRPE
POCA2	DK	*Populus x canadensis*	Carolina poplar	BDL	FRPE
POSA	DN	*Populus sargentii*	Plains cottonwood	BDL	POSA
PO	DE	*Populus* species	Cottonwood	BDL	FRPE
POTR1	DO	*Populus tremuloides*	Quaking aspen	BDM	ACPL
PRPA	DR	*Prunus padus*	European bird cherry	BDS	MA2
PR	DP	*Prunus* species	Plum	BDS	PR
PRVI	DS	*Prunus virginiana*	Common chokecherry	BDS	MA2
PSME	DT	*Pseudotsuga menziesii*	Douglas fir	CEL	PIPU
PY	DU	*Pyrus* species	Pear	BDM	PY
QUBI	DW	*Quercus bicolor*	Swamp white oak	BDL	FRPE
QUCO	DX	*Quercus coccinea*	Scarlet oak	BDL	FRPE
QUMA1	DY	*Quercus macrocarpa*	Bur oak	BDL	QUMA1
QUMU	DZ	*Quercus muehlenbergii*	Chinkapin oak	BDL	FRPE
QUPA	EA	*Quercus palustris*	Pin oak	BDL	FRPE
QURO	EB	*Quercus robur*	English oak	BDL	FRPE
QURU	EC	*Quercus rubra*	Northern red oak	BDL	FRPE
QUSH	EE	*Quercus shumardii*	Shumard oak	BDL	FRPE
QU	DV	*Quercus* species	Oak	BDL	FRPE
RHSP	EH	*Rhus* species	Sumac	BDS	MA2
RHTY	EI	*Rhus typhina*	Staghorn sumac	BDS	MA2

North					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ROPS	EJ	*Robinia pseudoacacia*	Black locust	BDL	FRPE
SAAL4	EL	*Salix alba*	White willow	BDL	FRPE
SADI	EM	*Salix discolor*	Pussy willow	BDS	MA2
SAFR	EN	*Salix fragilis*	Crack willow	BDL	FRPE
SA	EK	*Salix* species	Willow	BDL	FRPE
SO	EO	*Sorbus* species	Mountain ash	BDS	MA2
SYRE	EU	*Syringa reticulata*	Japanese tree lilac	BDS	MA2
SYSP	EV	*Syringa* species	Lilac	BDS	MA2
THPL	EX	*Thuja plicata*	Western redcedar	CEL	PIPU
TH9	EW	*Thuja* species	Red cedar	CEL	PIPU
TIAM	EZ	*Tilia americana*	American basswood	BDL	TIAM
TICO	FA	*Tilia cordata*	Littleleaf linden	BDL	TICO
TI	EY	*Tilia* species	Basswood	BDL	FRPE
ULAM	FB	*Ulmus americana*	American elm	BDL	ULAM
ULPU	FD	*Ulmus pumila*	Siberian elm	BDL	ULPU
ULS	FE	*Ulmus* species	Elm	BDL	FRPE
WISI	FI	*Wisteria sinensis*	Purple wisteria	BDS	MA2
ABBA	AA	*Abies balsamea*	Balsam fir	CEL	CEL OTHER
ACGI	AE	*Acer ginnala*	Amur maple	BDS	BDS OTHER
ACRU	AI	*Acer rubrum*	Red maple	BDL	BDL OTHER
ACTA	AL	*Acer tataricum*	Tatar maple	BDS	BDS OTHER
BENI	AZ	*Betula nigra*	River birch	BDL	BDL OTHER
BEPA	BA	*Betula papyrifera*	Paper birch	BDL	BDL OTHER
BEPE	BB	*Betula pendula*	European white birch	BDL	BDL OTHER
CASP	BG	*Catalpa speciosa*	Northern catalpa	BDL	BDL OTHER
MAPU	CJ	*Malus pumila*	Paradise apple	BDM	BDM OTHER
MORU	CL	*Morus rubra*	Red mulberry	BDL	BDL OTHER
PIAB	CO	*Picea abies*	Norway spruce	CEL	CEL OTHER
PI2	CN	*Pinus* species	Pine	CEM	CEM OTHER
PIFL	CT	*Pinus flexilis*	Limber pine	CEL	CEL OTHER
PIST	DB	*Pinus strobus*	Eastern white pine	CEL	CEL OTHER
POBA	DJ	*Populus balsamifera*	Balsam poplar	BDL	BDL OTHER
POFR	DL	*Populus fremontii*	Fremont cottonwood	BDL	BDL OTHER
PONI	DM	*Populus nigra*	Black poplar	BDL	BDL OTHER
PRCE	DQ	*Prunus cerasifera*	Cherry plum	BDS	BDS OTHER
RHCA	EF	*Rhamnus cathartica*	European buckthorn	BDS	BDS OTHER
RHGL	EG	*Rhus glabra*	Smooth sumac	BDS	BDS OTHER
SOAM	EP	*Sorbus americana*	American mountain ash	BDS	BDS OTHER
SOAU	EQ	*Sorbus aucuparia*	European mountain ash	BDS	BDS OTHER
ULPA	FC	*Ulmus parvifolia*	Chinese elm	BDL	BDL OTHER
BDL OTHER	AS	Broadleaf Deciduous Large	Broadleaf Deciduous Large	BDL	FRPE
BDM OTHER	AT	Broadleaf Deciduous Medium	Broadleaf Deciduous Medium	BDM	ACPL
BDS	AU	Broadleaf Deciduous Small	Broadleaf Deciduous Small	BDS	MA2

North					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
OTHER					
BEL OTHER	AW	Broadleaf Evergreen Large	Broadleaf Evergreen Large	BEL	QUNI
BEM OTHER	AY	Broadleaf Evergreen Medium	Broadleaf Evergreen Medium	BEM	MAGR
BEL OTHER	AX	Broadleaf Evergreen Small	Broadleaf Evergreen Small	BES	ILOP
CEL OTHER	BI	Conifer Evergreen Large	Conifer Evergreen Large	CEL	PIPU
CEM OTHER	BJ	Conifer Evergreen Medium	Conifer Evergreen Medium	CEM	PINI
CES OTHER	BL	Conifer Evergreen Small	Conifer Evergreen Small	CES	PICO5
VOIDS	FH	NEEDS PREP SMALL	Void small	NONTREE	NONTREE
VOIDM	FG	NEEDS PREP MEDIUM	Void medium	NONTREE	NONTREE
VOIDL	FF	NEEDS PREP LARGE	Void large	NONTREE	NONTREE
AVPSS	AR	NO PREP SMALL	Available planting site small	NONTREE	NONTREE
AVPSM	AQ	NO PREP MEDIUM	Available planting site medium	NONTREE	NONTREE
AVPSL	AP	NO PREP LARGE	Available planting site large	NONTREE	NONTREE
STUMPS	ET	REMOVE STUMP PLANT LARGE	Stump present small planting site	NONTREE	NONTREE
STUMPM	ES	REMOVE STUMP PLANT MEDIUM	Stump present medium planting site	NONTREE	NONTREE
STUMPL	ER	REMOVE STUMP PLANT LARGE	Stump present large planting site	NONTREE	NONTREE

Pacific Northwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ABCO	AB	*Abies concolor*	White fir	CEL	PIPU
ABGR	AA	*Abies grandis*	Grand fir	CEL	CEL OTHER
ABLA	AB	*Abies lasiocarpa*	Subalpine fir	CEL	CEL OTHER
ABMA	AC	*Abies magnifica*	California red fir	CEL	CEL OTHER
ABPI	AD	*Abies pinsapo*	Abeto de espaÑa	CES	CES OTHER
ABPR	AE	*Abies procera*	Noble fir	CEL	CEL OTHER
ACBU	AG	*Acer buergerianum*	Trident maple	BDS	ACPL
ACCI	AH	*Acer circinatum*	Vine maple	BDS	ACPL
ACMA	AI	*Acer macrophyllum*	Bigleaf maple	BDL	ACMA
ACNE	AJ	*Acer negundo*	Boxelder	BDL	ACMA
ACPA	AK	*Acer palmatum*	Japanese maple	BDS	ACPL
ACPADI	AL	*Acer palmatum* 'Dissectum'	Lace-leaf maple	BDS	ACPL
ACPL	AM	*Acer platanoides*	Norway maple	BDM	ACPL

Pacific Northwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ACPLFA	AN	*Acer platanoides* 'Fairview'	Norway maple 'Fairveiw'	BDM	ACPL
ACPLQE	AO	*Acer platanoides* 'Queen Eliz'	Norway maple 'Queen Elizabeth'	BDM	ACPL
ACPLSC	AP	*Acer platanoides* 'Schwedleri'	Norway maple 'Schwedler'	BDM	ACPL
ACPS	AQ	*Acer pseudoplatanus*	Sycamore maple	BDM	ACPL
ACRU	AR	*Acer rubrum*	Red maple	BDM	ACRU
ACRUMO	AS	*Acer rubrum* 'Morgan'	Red maple 'Morgan'	BDM	ACRU
ACSA1	AT	*Acer saccharinum*	Silver maple	BDL	ACPL
ACSA2	AU	*Acer saccharum*	Sugar maple	BDL	ACSA2
AC	AF	*Acer* species	Maple	BDM	ACPL
AEHI	AV	*Aesculus hippocastanum*	Horsechestnut	BDL	BDL OTHER
AIAL	AW	*Ailanthus altissima*	Tree of heaven	BDM	BDM OTHER
ALJU	AX	*Albizia julibrissin*	Mimosa	BDM	BDM OTHER
ALRU2	AY	*Alnus rubra*	Red alder	BDM	BDM OTHER
BENI	BE	*Betula nigra*	River birch	BDM	BEPE
BEPE	BF	*Betula pendula*	European white birch	BDM	BEPE
CADE2	BJ	*Calocedrus decurrens*	Incense cedar	CEM	CADE2
CACA3	BI	*Calodendrum capense*	Cape chesnut	BDM	BDM OTHER
CABEF	BH	*Carpinus betulus* 'Fastigiata'	Hornbeam 'Fastigiata'	BDM	CABEF
CAIL	BK	*Carya illinoinensis*	Pecan	BDL	BDL OTHER
CASP	BL	*Catalpa speciosa*	Northern catalpa	BDL	BDL OTHER
CEAT	BM	*Cedrus atlantica*	Atlas cedar	CEL	CEL OTHER
CEDE	BN	*Cedrus deodara*	Deodar cedar	CEL	CEL OTHER
CEOC	BR	*Celtis occidentalis*	Northern hackberry	BDL	BDL OTHER
CESI4	BT	*Celtis sinensis*	Chinese hackberry	BDM	BDM OTHER
CEJA	BO	*Cercidiphyllum japonicum*	Katsura tree	BDM	BDM OTHER
CHLA2	BU	*Chamaecyparis lawsoniana*	Port orford cedar	CEL	CEL OTHER
CHNO	BV	*Chamaecyparis nootkatensis*	Alaska cedar	CEL	CEL OTHER
CHOB	BW	*Chamaecyparis obtusa*	Hinoki cypress	CES	CES OTHER
CHPI	BX	*Chamaecyparis pisifera*	Sawara false cypress	CES	CES OTHER
CHTH	BY	*Chamaecyparis thyoides*	Atlantic white cedar	CES	CES OTHER
COFL	BZ	*Cornus florida*	Flowering dogwood	BDS	BDS OTHER
CONU2	CB	*Cornus nuttallii*	Pacific dogwood	BDM	BDM OTHER
COMA2	CA	*Corylus maxima var. purpurea*	Purpule giant filbert	BDS	BDS OTHER
CRDO	CC	*Crataegus douglasii*	Black hawthorn	BDS	CRLA80
CRLA80	CE	*Crataegus laevigata*	Smooth hawthorn	BDS	CRLA80
CRLA	CD	*Crataegus x lavallei*	Carriere hawthorn	BDS	CRLA80
CRPH	CF	*Crataegus phaenopyrum*	Washington hawthorn	BDS	CRLA80
CULA	CG	*Cunninghamia lanceolata*	Blue chinese fir	CEM	CEM OTHER
FASY	CH	*Fagus sylvatica*	European beech	BDL	FASYAT
FASYAT	CI	*Fagus sylvatica*	Purple leaf beech	BDL	FASYAT

Pacific Northwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
		'Atropunicea'			
FRAM	CJ	*Fraxinus americana*	White ash	BDM	FRLA
FRHO	CK	*Fraxinus holotricha*	Moraine ash	BDM	FRLA
FRLA	CL	*Fraxinus latifolia*	Oregon ash	BDL	FRLA
FROX	CM	*Fraxinus oxycarpa*	Caucasian ash	BDM	FRLA
FRPESG	CO	*Fraxinus pennsylvanica* 'Sherwood Glen'	Green ash 'Sherwood Glen'	BDM	FRLA
FRPEM	CN	*Fraxinus pennsylvanica* 'Marshall'	Marshal green ash	BDM	FRLA
FRVE	CP	*Fraxinus velutina*	Velvet ash	BDL	FRLA
GIBI	CQ	*Ginkgo biloba*	Ginkgo	BDL	BDL OTHER
GLTR	CR	*Gleditsia triacanthos*	Honeylocust	BDL	BDL OTHER
ILAQ	CS	*Ilex aquifolium*	English holly	BES	ILOP
ILOP	CT	*Ilex opaca*	American holly	BEM	ILOP
JURE	CV	*Juglans regia*	English walnut	BDM	BDM OTHER
JUCH	CU	*Juniperus chinensis*	Chinese juniper	CES	CES OTHER
KOPA	CW	*Koelreuteria paniculata*	Goldenrain tree	BDM	BDM OTHER
LAAN2	CX	*Laburnum anagyroides*	Golden chain tree	BDS	BDS OTHER
LADE	CY	*Larix decidua*	European larch	BDM	BDM OTHER
LADEWPE	CZ	*Larix decidua* 'Pendula'	European larch 'Pendula'	BDS	BDS OTHER
LIOR	DA	*Liquidambar orientalis*	Oriental sweetgum	BDM	BDM OTHER
LIST	DB	*Liquidambar styraciflua*	Sweetgum	BDM	BDM OTHER
LITU	DC	*Liriodendron tulipifera*	Tulip tree	BDL	BDL OTHER
MAGR	DE	*Magnolia grandiflora*	Southern magnolia	BES	BES OTHER
MAMA	DG	*Magnolia macrophylla*	Bigleaf magnolia	BDM	BDM OTHER
MASO	DI	*Magnolia x soulangiana*	Chinese magnolia; Saucer magnolia	BDS	BDS OTHER
PYAN	FC	*Malus angustifolia*	Southern crabapple	BDS	PYAN
MAFL80	DD	*Malus floribunda*	Japanese flowering crabapple	BDS	PYAN
MAIO	DF	*Malus ioensis var plena*	Bechtel crabapple	BDS	PYAN
MAPUEL	DH	*Malus x purpurea var eleyi*	Eleyi crapapple	BDS	PYAN
MASY2	DJ	*Malus sylvestris*	Common crabapple	BDS	PYAN
MOAL	DK	*Morus alba*	White mulberry	BDM	MOAL
PAPE	DL	*Parrotia persica*	Persian ironwood	BDM	BDM OTHER
PATO	DM	*Paulownia tomentosa*	Royal paulownia	BDM	BDM OTHER
PHCA	DQ	*Phoenix canariensis*	Canary island date palm	PEL	PHCA
PHDA4	DR	*Phoenix dactylifera*	Date palm	PEM	PHDA4
PHFR	DS	*Photinia x fraseri*	Fraser photinia	BES	BES OTHER
PIAB	DT	*Picea abies*	Norway spruce	CEL	CEL OTHER
PIGL1	DZ	*Picea glauca*	White spruce	CEL	CEL OTHER
PIPU	EE	*Picea pungens*	Blue spruce	CEL	CEL OTHER
PISI	EF	*Picea sitchensis*	Sitka spruce	CEL	CEL OTHER
PIAR	DU	*Pinus aristata*	Bristlecone pine	CES	CES OTHER
PICO	DV	*Pinus contorta*	Lodgepole pine	CES	PICO5

Pacific Northwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
PICO5	DW	*Pinus contorta var. bolanderi*	Bolander beach pine	CES	PICO5
PICO6	DX	*Pinus contorta var. latifolia*	Tall lodgepole pine	CES	PICO5
PIDE	DY	*Pinus densiflora*	Japanese red pine	CEL	CEL OTHER
PIMU	EA	*Pinus mugo*	Sweet mountain pine	CEM	CADE2
PIPI2	EB	*Pinus pinea*	Itailian stone pine	CEM	CADE2
PIPO	EC	*Pinus ponderosa*	Ponderosa pine	CEL	CEL OTHER
PISY	EG	*Pinus sylvestris*	Scotch pine	CEL	CEL OTHER
PITH	EH	*Pinus thunbergiana*	Japanese black pine	CEL	CEL OTHER
PLAC	EI	*Platanus hybrida*	London planetree	BDL	ACMA
POAL	EJ	*Populus alba*	White poplar	BDL	POTR2
POALPY	EK	*Populus alba* 'Pyramidalis'	White poplar 'Pyramidalis'	BDL	POTR2
PONI	EL	*Populus nigra*	Black poplar	BDL	POTR2
POTR1	EM	*Populus tremuloides*	Quaking aspen	BDM	POTR2
POTR2	EN	*Populus balsamifera ssp. trichocarpa*	Black cottonwood	BDL	POTR2
PRAV	EO	*Prunus avium*	Sweet cherry	BDM	PRSE2
PRBL	EP	*Prunus blieriana*	Blierana plum	BDS	PRSE2
PRCE	EQ	*Prunus cerasifera*	Cherry plum	BDS	PRCEKW
PRCEKW	ER	*Prunus cerasifera* 'Thundercloud'	Thundercloud purple plum	BDS	PRCEKW
PRDO	ES	*Prunus domestica*	Common plum	BDM	PRSE2
PRLA	ET	*Prunus laurocerasus*	Common cherry laurel	BES	PRSE2
PRPE2	EU	*Prunus persica*	Peach	BDS	PRSE2
PRSEAM	EW	*Prunus serrulata* 'Amanogawa'	Amanogawa cherry	BDS	PRSE2
PRSE2	EV	*Prunus serrulata*	Kwanzan cherry	BDS	PRSE2
PRSESH	EX	*Prunus serrulata* 'Shirofugen'	Shirofugen cherry	BDS	PRSE2
PRSESO	EY	*Prunus serrulata* 'Shirotae'	Shirotae cherry	BDS	PRSE2
PRSU	EZ	*Prunus subhirtella*	Higan cherry	BDS	PRSE2
PRYE	FA	*Prunus yedoensis*	Yoshino flowering cherry	BDM	BDM OTHER
PSME	FB	*Pseudotsuga menziesii*	Douglas fir	CEL	PSME
PYCACL	FD	*Pyrus calleryana* 'Cleveland'	Cleveland pear	BDS	PYKA
PYCO	FE	*Pyrus communis*	Common pear	BDM	PYKA
PYKA	FF	*Pyrus kawakamii*	Evergreen pear	BES	PYKA
QUAG	FG	*Quercus agrifolia*	Coastal live oak; California live oak	BEL	QUAG
QUAL	FH	*Quercus alba*	White oak	BDL	QURU
QUCO	FI	*Quercus coccinea*	Scarlet oak	BDL	QURU
QUMA1	FJ	*Quercus macrocarpa*	Bur oak	BDL	QURU
QUPA	FK	*Quercus palustris*	Pin oak	BDL	QURU
QURU	FL	*Quercus rubra*	Northern red oak	BDL	QURU
RHGL	FM	*Rhus glabra*	Smooth sumac	BDS	BDS OTHER
RHTY	FN	*Rhus hirta*	Staghorn sumac	BDS	BDS OTHER

Pacific Northwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ROPS	FO	*Robinia pseudoacacia*	Black locust	BDM	BDM OTHER
SAAM	FP	*Salix amygdaloides*	Peachleaf willow	BDM	BDM OTHER
SABA	FQ	*Salix x sepulcralis Simonkai*	Weeping willow	BDM	BDM OTHER
SAMA	FS	*Salix matsudana*	Corkscrew willow	BDM	BDM OTHER
SASC	FT	*Salix scouleriana*	Scouler willow	BDM	BDM OTHER
SACANE	FR	*Sambucus caerulea var neomexicana*	Neomexican blue elderberry	BDS	BDS OTHER
SCVE	FU	*Sciadopitys verticillata*	Umbrella pine	CEL	PSME
SESE	FW	*Sequoia sempervirens*	Coast redwood	CEL	PSME
SEGI	FV	*Sequoiadendron giganteum*	Giant sequoia	CEL	PSME
SOAU	FX	*Sorbus aucuparia*	European mountain ash	BDS	BDS OTHER
SYRE	FY	*Syringa reticulata*	Japanese tree lilac	BDS	BDS OTHER
SYVU	FZ	*Syringa vulgaris*	Common lilac	BDS	BDS OTHER
TADI	GC	*Taxodium distichum*	Baldcypress	BDL	BDL OTHER
TABA	GA	*Taxus baccata*	English yew	CES	CES OTHER
TABR	GB	*Taxus brevifolia*	Pacific yew	CEL	PSME
THOC	GD	*Thuja occidentalis*	Northern white cedar	CEL	PSME
THPL	GE	*Thuja plicata*	Western red cedar	CEL	PSME
TIAM	GF	*Tilia americana*	American basswood	BDM	TIAM
TICO	GG	*Tilia cordata*	Littleleaf linden	BDM	TICO
TIHE	GH	*Tilia americana var. heterophylla*	White basswood	BDM	TIAM
TSHE	GI	*Tsuga heterophylla*	Western hemlock	CEL	PSME
TSME	GJ	*Tsuga mertensiana*	Mountain hemlock	CES	CES OTHER
ULAM	GK	*Ulmus americana*	American elm	BDL	ULAM
ULAMLI	GL	*Ulmus american 'Liberty'*	Liberty elm	BDL	ULAM
ULPR	GM	*Ulmus procera*	English elm	BDM	ULAM
ULPU	GN	*Ulmus pumila*	Siberian elm	BDM	ULAM
UNKN	GO	Unknown species	Unknown	BDM	BDM OTHER
WARO	GP	*Washingtonia robusta*	Mexican fan palm	PES	WARO
WISI	GQ	*Wisteria sinensis*	Purple wisteria	BDS	BDS OTHER
BDL OTHER	AZ	Broadleaf Deciduous Large	BDL OTHER	BDL	ACMA
BDM OTHER	BA	Broadleaf Deciduous Medium	BDM OTHER	BDM	TICO
BDS OTHER	BB	Broadleaf Deciduous Small	BDS OTHER	BDS	PRSE2
BEL OTHER	BC	Broadleaf Evergreen Large	BEL OTHER	BEL	QUAG
BEM OTHER	BD	Broadleaf Evergreen Medium	BEM OTHER	BEM	ILOP
BES OTHER	BG	Broadleaf Evergreen Small	BES OTHER	BES	PYKA
CEL OTHER	BP	Conifer Evergreen Large	CEL OTHER	CEL	PSME
CEM	BQ	Conifer Evergreen Medium	CEM OTHER	CEM	CADE2

Pacific Northwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
OTHER					
CES OTHER	BS	Conifer Evergreen Small	CES OTHER	CES	PICO5
PEL OTHER	DN	Palm Evergreen Large	PEL OTHER	PEL	PHCA
PEM OTHER	DO	Palm Evergreen Medium	PEM OTHER	PEM	PHDA4
PES OTHER	DP	Palm Evergreen Small	PES OTHER	PES	WARO

Temperate Interior West					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
AB	AA	*Abies species*	Fir	CEL	CEL OTHER
ABAL	AB	*Abies alba*	Silver fir	CEL	CEL OTHER
ABCO	AC	*Abies concolor*	White fir	CEL	CEL OTHER
ABHO	AD	*Abies holophylla*	Manchurian fir	CEL	CEL OTHER
ABHO2	AE	*Abies homolepis*	Japanese fir	CEL	CEL OTHER
AC	AF	*Acer species*	Maple	BDM	ACSA1
ACCA	AG	*Acer campestre*	Hedge maple	BDS	ACPL
ACGI	AH	*Acer ginnala*	Amur maple	BDS	ACPL
ACGR	AI	*Acer griseum*	Paperbark maple	BDS	ACPL
ACGR3	AJ	*Acer grandidentatum*	Bigtooth maple	BDS	ACPL
ACNE	AK	*Acer negundo*	Boxelder	BDL	ACSA1
ACNI	AL	*Acer nigrum*	Black maple	BDL	ACSA1
ACPL	AM	*Acer platanoides*	Norway maple	BDM	ACPL
ACPS	AN	*Acer pseudoplatanus*	Sycamore maple	BDM	ACPL
ACRU	AO	*Acer rubrum*	Red maple	BDM	ACPL
ACSA1	AP	*Acer saccharinum*	Silver maple	BDL	ACSA1
ACSA2	AQ	*Acer saccharum*	Sugar maple	BDL	ACSA2
ACTR	AR	*Acer truncatum*	Purple blow maple	BDS	ACPL
AEGL	AS	*Aesculus glabra*	Ohio buckeye	BDM	BDM OTHER
AEHI	AT	*Aesculus hippocastanum*	Horsechestnut	BDM	BDM OTHER
AIAL	AU	*Ailanthus altissima*	Tree of heaven	BDL	BDL OTHER
ALCO2	AV	*Alnus cordata*	Italian alder	BDM	BDM OTHER
ALGL	AW	*Alnus glutinosa*	European alder	BDM	BDM OTHER
ALJU	AX	*Albizia julibrissin*	Mimosa	BDS	BDS OTHER
AMAR	AY	*Amelanchier arborea*	Downy serviceberry	BDS	BDS OTHER
BE	BC	*Betula species*	Birch	BDM	BDM OTHER
BENI	BD	*Betula nigra*	River birch	BDL	BDL OTHER
BEPA	BE	*Betula papyrifera*	Paper birch	BDL	BDL OTHER
BEPE	BF	*Betula pendula*	European white birch	BDM	BDM OTHER
CA1	BH	*Carya species*	Hickory	BDL	BDL OTHER

Temperate Interior West					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
CABE	BI	*Carpinus betulus*	European hornbeam	BDM	BDM OTHER
CABI	BJ	*Catalpa bignonioides*	Southern catalpa	BDM	BDL OTHER
CACA	BK	*Carpinus caroliniana*	American hornbeam	BDS	BDS OTHER
CADE	BL	*Castanea dentata*	American chestnut	BDL	BDL OTHER
CASP	BM	*Catalpa speciosa*	Northern catalpa	BDL	CASP
CE7	BN	*Cedrus species*	Cedar	CEM	CEM OTHER
CEAT	BO	*Cedrus atlantica*	Atlas cedar	CEM	CEM OTHER
CECA	BP	*Cercis canadensis*	Eastern redbud	BDS	BDS OTHER
CEDE	BQ	*Cedrus deodara*	Deodar cedar	CEL	CEL OTHER
CEJA	BR	*Cercidiphyllum japonicum*	Katsura tree	BDM	BDM OTHER
CEOC	BU	*Celtis occidentalis*	Northern hackberry	BDM	BDM OTHER
CLLU	BW	*Cladrastis lutea*	Yellowwood	BDS	BDS OTHER
CO1	BX	*Cornus species*	Dogwood	BDS	BDS OTHER
CO2	BY	*Corylus species*	Hazelnut	BDM	BDM OTHER
COCO1	BZ	*Cotinus coggygria*	Smoke tree	BDS	BDS OTHER
COCO2	CA	*Corylus colurna*	Turkish hazelnut	BDM	BDM OTHER
COFL	CB	*Cornus florida*	Flowering dogwood	BDS	BDS OTHER
COOB	CC	*Cotinus obovatus*	American smoketree	BDS	BDS OTHER
CR	CD	*Crataegus species*	Hawthorn	BDS	CR
CRLA80	CE	*Crataegus laevigata*	Smooth hawthorn	BDS	CR
CROX	CF	*Crataegus monogyna*	Oneseed hawthorn	BDS	CR
CRPH	CG	*Crataegus phaenopyrum*	Washington hawthorn	BDS	CR
CRVI	CH	*Crataegus viridis*	Green hawthorn	BDS	CR
CU	CI	*Cupressus species*	cypress	CEM	CEM OTHER
DIVI	CJ	*Diospyros virginiana*	Common persimmon	BDS	BDS OTHER
ELAN	CK	*Elaeagnus angustifolia*	Russian olive	BDS	BDS OTHER
EUUL	CL	*Eucommia ulmoides*	Hardy rubber tree	BDM	BDM OTHER
FA	CM	*Fagus species*	Beech	BDM	BDM OTHER
FASY	CN	*Fagus sylvatica*	European beech	BDM	BDM OTHER
FR	CO	*Fraxinus species*	Ash	BDL	FRPE
FRAM	CP	*Fraxinus americana*	White ash	BDL	FRAM
FREX	CQ	*Fraxinus excelsior*	European ash	BDM	FRPE
FRMA	CR	*Fraxinus mandshurica*	Manchurian ash	BDM	FRPE
FRNI	CS	*Fraxinus nigra*	Black ash	BDM	FRPE
FROR	CT	*Fraxinus ornus*	Flowering ash	BDM	FRPE
FROX	CU	*Fraxinus oxycarpa*	Caucasian ash	BDM	FRPE
FRPE	CV	*Fraxinus pennsylvanica*	Green ash	BDL	FRPE
FRQU	CW	*Fraxinus quadrangulata*	Blue ash	BDL	FRPE
GIBI	CX	*Ginkgo biloba*	Ginkgo	BDM	BDM OTHER
GLCA	CY	*Gleditsia caspica*	Caspian locust	BDM	GLTR
GLTR	CZ	*Gleditsia triacanthos*	Honeylocust	BDL	GLTR
GYDI	DA	*Gymnocladus dioicus*	Kentucky coffeetree	BDL	BDL OTHER
ILOP	DB	*Ilex opaca*	American holly	BES	ILOP
JU	DC	*Juniperus species*	Juniper	CEM	CEM OTHER

Temperate Interior West					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
JUNI	DD	*Juglans nigra*	Black walnut	BDL	JUNI
JURE	DE	*Juglans regia*	English walnut	BDM	JUNI
JUSC	DF	*Juniperus scopulorum*	Rocky mountain juniper	CES	CES OTHER
JUVI	DG	*Juniperus virginiana*	Eastern red cedar	CEM	CEM OTHER
KOPA	DH	*Koelreuteria paniculata*	Goldenrain tree	BDS	BDS OTHER
LADE	DI	*Larix decidua*	European larch	BDL	BDL OTHER
LAWA	DJ	*Laburnum x watereri*	Golden-chain tree	BDS	BDS OTHER
LIST	DK	*Liquidambar styraciflua*	Sweetgum	BDL	LIST
LITU	DL	*Liriodendron tulipifera*	Tulip tree	BDL	BDL OTHER
MA1	DM	*Magnolia species*	Magnolia	BDS	BDS OTHER
MA2	DN	*Malus species*	Crabapple	BDS	MA2
MAAC	DO	*Magnolia acuminata*	Cucumber tree	BDL	BDL OTHER
MAAM	DP	*Maackia amurensis*	Amur maackia	BDS	BDS OTHER
MAPU	DQ	*Malus pumila*	Paradise apple	BDS	MA2
MOAL	DR	*Morus alba*	White mulberry	BDM	BDM OTHER
MORU	DS	*Morus rubra*	Red mulberry	BDM	BDM OTHER
PHAM	DT	*Phellodendron amurense*	Amur corktree	BDM	BDM OTHER
PI1	DU	*Picea species*	Spruce	CEL	PIPU
PI2	DV	*Pinus species*	Pine	CEL	CEL OTHER
PIAB	DW	*Picea abies*	Norway spruce	CEL	CEL OTHER
PIAS	DX	*Picea asperata*	Chinese spruce	CEM	PIPU
PIAT	DY	*Pinus attenuata*	Knobcone pine	CEM	CEM OTHER
PICE2	DZ	*Pinus cembra*	Swiss stone pine	CEM	CEM OTHER
PICO2	EA	*Pinus coulteri*	Coulter pine	CEM	CEM OTHER
PIED	EB	*Pinus edulis*	Pinyon pine	CES	PIED
PIEN	EC	*Picea engelmannii*	Engelmann spruce	CEL	CEL OTHER
PIGL1	EE	*Picea glauca*	White spruce	CEM	PIPU
PIGL2	EF	*Pinus glabra*	Spruce pine	CEM	CEM OTHER
PIMA	EG	*Picea mariana*	Black spruce	CEL	CEL OTHER
PIMO3	EH	*Pinus monticola*	Western white pine	CEM	CEM OTHER
PIMU	EI	*Pinus mugo*	Sweet mountain pine	CES	CES OTHER
PINI	EJ	*Pinus nigra*	Austrian pine	CEM	CEM OTHER
PIOM	EK	*Picea omorika*	Serbian spruce	CEM	PIPU
PIOR	EL	*Picea orientalis*	Oriental spruce	CEM	PIPU
PIPO	EM	*Pinus ponderosa*	Ponderosa pine	CEL	CEL OTHER
PIPU	EN	*Picea pungens*	Blue spruce	CEL	PIPU
PISE	EO	*Pinus serotina*	Pond pine	CEL	CEL OTHER
PIST	EP	*Pinus strobus*	Eastern white pine	CEL	CEL OTHER
PISY	EQ	*Pinus sylvestris*	Scotch pine	CEM	PISY
PIWA3	ER	*Pinus wallichiana*	Himalayan pine	CEM	CEM OTHER
PLAC	ES	*Platanus acerifolia*	London planetree	BDL	PLAC
PLOC	ET	*Platanus occidentalis*	American sycamore	BDL	PLOC
PO	EU	*Poplar species*	Cottonwood	BDL	BDL OTHER
POAL	EV	*Populus alba*	White poplar	BDL	BDL OTHER

Temperate Interior West					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
POBA	EW	*Populus balsamifera*	Balsam poplar	BDL	BDL OTHER
POCA2	EX	*Populus x canadensis*	Carolina poplar	BDL	BDL OTHER
PODE	EY	*Populus deltoides*	Eastern cottonwood	BDL	BDL OTHER
POGR	EZ	*Populus grandidentata*	Bigtooth aspen	BDS	BDS OTHER
PONI	FA	*Populus nigra*	Black poplar	BDL	BDL OTHER
POTR1	FB	*Populus tremuloides*	Quaking aspen	BDM	BDM OTHER
POTR2	FC	*Populus trichocarpa*	Black cottonwood	BDL	BDL OTHER
PR	FD	*Prunus species*	Plum	BDS	MA2
PRAR	FE	*Prunus armeniaca*	Apricot	BDS	MA2
PRBL	FF	*Prunus blieriana*	Blierana plum	BDS	MA2
PRCE	FG	*Prunus cerasifera*	Cherry plum	BDS	MA2
PRPE2	FH	*Prunus persica*	Peach	BDS	MA2
PRSA	FI	*Prunus sargentii*	Sargent cherry	BDS	MA2
PRSE2	FJ	*Prunus serrulata*	Kwanzan cherry	BDS	MA2
PRTR	FK	*Prunus triloba*	Flowering plum	BDS	MA2
PRVI	FL	*Prunus virginiana*	Common chokecherry	BDS	MA2
PSME	FM	*Pseudotsuga menziesii*	Douglas fir	CEL	CEL OTHER
PTCO	FN	*Pterostyrax corymbosa*	Little epaulettetree	BDS	BDS OTHER
PTTR	FO	*Ptelea trifoliata*	Common hoptree	BDS	BDS OTHER
PYCA	FP	*Pyrus calleryana*	Callery pear	BDM	PYCA
PYCO	FQ	*Pyrus communis*	Common pear	BDS	PYCA
PYFA	FR	*Pyrus fauriei*	Korean sun pear	BDS	PYCA
PYIO	FS	*Malus ioensis*	Prairie crabapple	BDS	MA2
QU	FT	*Quercus species*	Oak	BDL	QURU
QUAC	FU	*Quercus acutissima*	Sawtooth oak	BDM	QURU
QUAL	FV	*Quercus alba*	White oak	BDL	QURU
QUAL3	FW	*Quercus aliena*	Oriental white oak	BDM	QURU
QUBI	FX	*Quercus bicolor*	Swamp white oak	BDL	QURU
QUCO	FY	*Quercus coccinea*	Scarlet oak	BDL	QURU
QUFA	FZ	*Quercus falcata*	Southern red oak	BDL	QURU
QUKE	GA	*Quercus kelloggii*	California black oak	BDM	QURU
QULA2	GB	*Quercus laurifolia*	Laurel oak	BDM	QURU
QUMA1	GC	*Quercus macrocarpa*	Bur oak	BDL	QURU
QUMU	GD	*Quercus muehlenbergii*	Chinkapin oak	BDM	QURU
QUPA	GE	*Quercus palustris*	Pin oak	BDL	QURU
QUPH	GF	*Quercus phellos*	Willow oak	BDL	QURU
QURO	GG	*Quercus robur*	English oak	BDL	QURU
QURU	GH	*Quercus rubra*	Northern red oak	BDL	QURU
QUSE	GI	*Quercus glandulifera*	Konara oak	BDM	QURU
QUVE	GJ	*Quercus velutina*	Black oak	BDL	QURU
QUVI	GK	*Quercus virginiana*	Live oak	BDM	QURU
RHSP	GL	*Rhus species*	Sumac	BDS	BDS OTHER
RHTY	GM	*Rhus typhina*	Staghorn sumac	BDS	BDS OTHER
ROPS	GN	*Robinia pseudoacacia*	Black locust	BDL	ROPS

Temperate Interior West					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
SA	GO	*Salix species*	Willow	BDM	BDM OTHER
SAMA	GP	*Salix matsudana*	Corkscrew willow	BDS	BDS OTHER
SANI	GQ	*Salix nigra*	Black willow	BDM	BDM OTHER
SCVE	GR	*Sciadopitys verticillata*	Umbrella pine	CEM	CEM OTHER
SEGI	GS	*Sequoiadendron giganteum*	Giant sequoia	CEL	CEL OTHER
SOAM	GT	*Sorbus americana*	American mountain ash	BDS	BDS OTHER
SOAU	GU	*Sorbus aucuparia*	European mountain ash	BDS	BDS OTHER
SOJA	GV	*Sophora japonica*	Japanese pagoda tree	BDM	BDM OTHER
SYRE	GW	*Syringa reticulata*	Japanese tree lilac	BDS	BDS OTHER
TADI	GX	*Taxodium distichum*	Baldcypress	BDL	BDL OTHER
THOC	GY	*Thuja occidentalis*	Northern white cedar	CEL	CEL OTHER
THPL	GZ	*Thuja plicata*	Western redcedar	CEL	CEL OTHER
TI	HA	*Tilia species*	Basswood	BDM	TIAM
TIAM	HB	*Tilia americana*	American basswood	BDL	TIAM
TICO	HC	*Tilia cordata*	Littleleaf linden	BDM	TIAM
TITO	HD	*Tilia tomentosa*	Silver linden	BDM	TIAM
TSCA	HE	*Tsuga canadensis*	Eastern hemlock	CEL	CEL OTHER
ULAM	HF	*Ulmus americana*	American elm	BDL	ULPU
ULGL	HG	*Ulmus glabra*	Wych elm	BDL	ULPU
ULPA	HH	*Ulmus parvifolia*	Chinese elm	BDL	ULPU
ULPR	HI	*Ulmus procera*	English elm	BDL	ULPU
ULPU	HJ	*Ulmus pumila*	Siberian elm	BDL	ULPU
ULS	HK	*Ulmus* species	Elm	BDL	ULPU
UNKWN	HL	Other species	Other species	BDM	BDM OTHER
BDL OTHER	AZ	Broadleaf Deciduous Large Other	Broadleaf Deciduous Large Other	BDL	FRPE
BDM OTHER	BA	Broadleaf Deciduous Medium Other	Broadleaf Deciduous Medium Other	BDM	ACPL
BDS OTHER	BB	Broadleaf Deciduous Small Other	Broadleaf Deciduous Small Other	BDS	MA2
CEL OTHER	BS	Conifer Evergreen Large Other	Conifer Evergreen Large Other	CEL	PIPU
CEM OTHER	BT	Conifer Evergreen Medium Other	Conifer Evergreen Medium Other	CEM	PISY
CES OTHER	BV	Conifer Evergreen Small Other	Conifer Evergreen Small Other	CES	PIED
BES OTHER	BG	Broadleaf Evergreen Small Other	Broadleaf Evergreen Small Other	BES	ILOP

Interior West					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ACNE	AA	*Acer negundo*	Boxelder	BDL	BDL OTHER
ACPL	AB	*Acer platanoides*	Norway maple	BDL	BDL OTHER
ACSA1	AC	*Acer saccharinum*	Silver maple	BDL	BDL OTHER
AIAL	AD	*Ailanthus altissima*	Tree of heaven	BDL	BDL OTHER
ALJU	AE	*Albizia julibrissin*	Mimosa	BDS	BDS OTHER
BDL OTHER	AF	Broadleaf Deciduous Large Other	Broadleaf Deciduous Large Other	BDL	FRAM
BDM OTHER	AG	Broadleaf Deciduous Medium Other	Broadleaf Deciduous Medium Other	BDM	FRAN2
BDS OTHER	AH	Broadleaf Deciduous Small Other	Broadleaf Deciduous Small Other	BDS	KOPA
BEL OTHER	AI	Broadleaf Evergreen Large Other	Broadleaf Evergreen Large Other	BEL	EUGL
BEM OTHER	AJ	Broadleaf Evergreen Medium Other	Broadleaf Evergreen Medium Other	BEM	EUMI2
BES OTHER	AK	Broadleaf Evergreen Small Other	Broadleaf Evergreen Small Other	BES	ILOP
CA3	AL	*Catalpa* spp.	Catalpa	BDL	BDL OTHER
CASP	AM	*Catalpa speciosa*	Western catalpa	BDL	BDL OTHER
CECA	AN	*Cercis canadensis*	Eastern redbud	BDS	BDS OTHER
CEDE	AO	*Cedrus deodara*	Deodar cedar	CEL	CEL OTHER
CEL OTHER	AP	Conifer Evergreen Large Other	Conifer Evergreen Large Other	CEL	PIPO
CEM OTHER	AQ	Conifer Evergreen Medium Other	Conifer Evergreen Medium Other	CEM	PINI
CERE2	AR	*Cercis reniformis*	Southwestern redbud	BDS	BDS OTHER
CES OTHER	AS	Conifer Evergreen Small Other	Conifer Evergreen Small Other	CES	PIED
CESI4	AT	*Celtis sinensis*	Chinese hackberry	BDM	BDM OTHER
CH31	AU	*Chitalpa* spp.	Chitalpa	BDS	BDS OTHER
CHLI	AV	*Chilopsis linearis*	Desert willow	BDS	CHLI
CR	AW	*Crataegus* spp.	Hawthorn	BDS	BDS OTHER
CUAR	AX	*Cupressus arizonica*	Arizona cypress	CEM	CEM OTHER
CULE	AY	*x Cupressocyparis leylandii*	Leyland cypress	CEL	CEL OTHER
ELAN	AZ	*Elaeagnus angustifolia*	Russian olive	BDS	ELAN
EUGL	BA	*Eucalyptus globulus*	Blue gum eucalyptus	BEL	EUGL
EUMI2	BB	*Eucalyptus microtheca*	Coolibah tree	BEM	EUMI2
FOPU2	BC	*Forestiera pubescens*	New Mexico olive	BDS	BDS OTHER
FRAM	BD	*Fraxinus americana*	White ash	BDL	FRAM
FRAN2	BE	*Fraxinus angustifolia*	Raywood ash	BDM	FRAN2
FRBE	BF	*Fraxinus berlandieriana*	Arizona ash	BDM	FRVE
FRPE	BG	*Fraxinus pennsylvanica*	Green ash	BDL	FRPE
FRPE2	BH	*Fraxinus pennsylvanica 'Patmore'*	Patmore ash	BDL	FRPE
FRPE3	BI	*Fraxinus pennsylvanica* 'Marshall'	Marshall ash	BDL	FRPE

Interior West					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
FRVE	BJ	*Fraxinus velutina*	Velvet ash	BDL	FRVE
FRVE_G	BK	*Fraxinus velutina* 'Modesto'	Modesto ash	BDL	FRVE
GLTR	BL	*Gleditsia triacanthos*	Honeylocust	BDL	GLTR
GYDI	BM	*Gymnocladus dioicus*	Kentucky coffeetree	BDL	BDL OTHER
ILOP	BN	*Ilex opaca*	American holly	BES	ILOP
JU	BO	*Juniperus* spp.	Juniper	CEM	CEM OTHER
JUSC	BP	*Juniperus scopulorum*	Rocky mountain juniper	CES	CES OTHER
KOPA	BQ	*Koelreuteria paniculata*	Goldenrain tree	BDM	KOPA
MA1	BR	*Magnolia* spp.	Magnolia	BES	BES OTHER
MA2	BS	*Malus* spp.	Apple	BDS	BDS OTHER
MAPO	BT	*Maclura pomifera*	Osage orange	BDM	BDM OTHER
MO	BU	*Morus* spp.	Mulberry	BDM	BDM OTHER
OTHER	BV	OTHER	OTHER	BDM	BDM OTHER
PEL OTHER	BW	Palm Evergreen Large Other	Palm Evergreen Large Other	PEL	PHCA
PEM OTHER	BX	Palm Evergreen Medium Other	Palm Evergreen Medium Other	PEM	PHDA4
PES OTHER	BY	Palm Evergreen Small Other	Palm Evergreen Small Other	PES	WARO
PHCA	BZ	*Phoenix canariensis*	Canary Island date palm	PEL	PHCA
PHDA4	CA	*Phoenix dactylifera*	Date palm	PEM	PHDA4
PI1	CB	*Picea* spp.	Spruce	CEL	CEL OTHER
PICH	CC	*Pistacia chinensis*	Chinese pistache	BDM	PICH
PIED	CD	*Pinus edulis*	Pinyon pine	CES	PIED
PIEL2	CE	*Pinus eldarica*	Afghan pine	CEL	CEL OTHER
PIFL	CF	*Pinus flexilis*	Limber pine	CEM	CEM OTHER
PINI	CG	*Pinus nigra*	Austrian pine	CEM	PINI
PIPO	CH	*Pinus ponderosa*	Ponderosa pine	CEL	PIPO
PIST2	CI	*Pinus strobiformis*	Southwestern white pine	CEL	CEL OTHER
PISY	CJ	*Pinus sylvestris*	Scotch pine	CEL	PISY
PLAC	CK	*Platanus hybrida*	London planetree	BDL	PLAC
PLWR	CL	*Platanus wrightii*	Arizona sycamore	BDL	BDL OTHER
PO	CM	*Populus* spp.	Cottonwood	BDL	POAN
POAN	CN	*Populus angustifolia*	Mountain cottonwood	BDL	POAN
POFR	CO	*Populus fremontii*	Valley cottonwood	BDL	POFR
PR	CP	*Prunus* spp.	Cherry	BDS	PRCE
PRCE	CQ	*Prunus cerasifera*	Purple leaf plum	BDS	PRCE
PY	CR	*Pyrus* spp.	Pear	BDS	PYCA
PYCA	CS	*Pyrus calleryana*	Callery pear	BDS	PYCA
QU	CT	*Quercus* spp.	Oak	BDL	BDL OTHER
QUMA1	CU	*Quercus macrocarpa*	Bur oak	BDL	BDL OTHER
QUSH	CV	*Quercus shumardii*	Shumard oak	BDL	BDL OTHER
ROPS	CW	*Robinia pseudoacacia*	Black locust	BDL	BDL OTHER
SAMA	CX	*Salix matsudana*	Corkscrew willow	BDL	BDL OTHER

Interior West					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
SO	CY	*Sorbus* spp.	Mountain ash	BDS	BDS OTHER
SOJA	CZ	*Sophora japonica*	Japanese pagoda tree	BDL	BDL OTHER
TI	DA	*Tilia* spp.	Basswood	BDL	BDL OTHER
ULAM	DB	*Ulmus americana*	American elm	BDL	ULPU
ULPA	DC	*Ulmus parvifolia*	Chinese elm	BDL	ULPU
ULPU	DD	*Ulmus pumila*	Siberian elm	BDL	ULPU
UNKN	DE	UNKN	UNKN	BDM	BDM OTHER
VI5	DF	*Vitex* spp.	Chastetree	BDS	BDS OTHER
WARO	DG	*Washingtonia robusta*	Mexican fan palm	PES	WARO
ZESE	DH	*Zelkova serrata*	Japanese zelkova	BDL	ULPU

Southwest Desert					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
VOIDS	ER	NEEDS PREP SMALL	Void small	NONTREE	NONTREE
VOIDM	EQ	NEEDS PREP MEDIUM	Void medium	NONTREE	NONTREE
VOIDL	EP	NEEDS PREP LARGE	Void large	NONTREE	NONTREE
AVPSS	AL	NO PREP SMALL	Available planting site small	NONTREE	NONTREE
AVPSM	AK	NO PREP MEDIUM	Available planting site medium	NONTREE	NONTREE
AVPSL	AJ	NO PREP LARGE	Available planting site large	NONTREE	NONTREE
STUMPS	EI	REMOVE STUMP PLANT LARGE	Stump present small planting site	NONTREE	NONTREE
STUMPM	EH	REMOVE STUMP PLANT MEDIUM	Stump present medium planting site	NONTREE	NONTREE
STUMPL	EG	REMOVE STUMP PLANT LARGE	Stump present large planting site	NONTREE	NONTREE
ACAN	AA	*Acacia aneura*	Mulga	BES	ACSA3
ACFA	AB	*Acacia farnesiana*	Sweet acacia	BDS	ACFA
ACMI	AC	*Acacia millefolia*	Milfoil wattle	BES	ACSA3
ACSA3	AE	*Acacia salicina*	Willow acacia	BEM	ACSA3
ACSA	AD	*Acacia saligna*	Orange wattle	BES	ACSA3
ACSP2	AF	*Acacia species*	Acacia	BES	ACSA3
ACST	AG	*Acacia stenophylla*	Shoestring acacia	BES	BES OTHER
ALJU	AH	*Albizia julibrissin*	Mimosa	BDM	BDM OTHER
ARRO	AI	*Arecastrum romanzoffianum*	Queen palm	PES	PES OTHER
BAVA	AM	*Bauhinia variegata*	Mountain ebony	BDS	BDS OTHER
BRPO	AU	*Brachychiton populneum*	Bottle tree	BEM	BRPO
BRAR	AT	*Brahea armata*	Mexican blue palm	PES	PES OTHER
CAVI	AX	*Callistemon viminalis*	Weeping bottlebrush	BES	BES OTHER
CAIL	AW	*Carya illinoinensis*	Pecan	BDL	BDL OTHER

Southwest Desert					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
CAEQ	AV	*Casuarina equisetifolia*	Australian pine	CEL	CEL OTHER
CESI3	BE	*Ceratonia siliqua*	Algarrobo europeo	BEM	BEM OTHER
CEFL	AY	*Parkinsonia florida*	Blue paloverde	BDM	CEFL
CEMI	BB	*Parkinsonia microphylla*	Yellow paloverde	BDS	CEFL
CEPR	BC	*Cercidium praecox*	Sonoran palo verde	BDS	CEFL
CHHU	BF	*Chamaerops humilis*	Mediterranean fan palm	BES	BES OTHER
CHLI	BG	*Chilopsis linearis*	Desert willow	BDS	CHLI
CISP	BH	*Citrus* species	Citrus	BES	BES OTHER
CUGU	BI	*Cupressus guadalupensis*	Guadaluoe cypress	CEL	CEL OTHER
CUSE	BJ	*Cupressus sempervirens*	Italian cypress	CEL	CEL OTHER
CYOB	BK	*Cydonia oblonga*	Quince	BDS	BDS OTHER
DASI	BL	*Dalbergia sissoo*	India rosewood	BEL	BEM OTHER
EBEB	BM	*Ebenopsis ebano*	Texas ebony	BES	BES OTHER
EUCA1	BO	*Eucalyptus camaldulensis*	Red gum eucalyptus	BEL	EUMI2
EULE	BP	*Eucalyptus leucoxylon*	White ironbark	BEL	EUMI2
EUMI2	BQ	*Eucalyptus microtheca*	Coolibah tree	BEL	EUMI2
EUPO	BR	*Eucalyptus polyanthemos*	Sliver dollar gum eucalyptus	BEL	BEL OTHER
EURU	BS	*Eucalyptus rudis*	Desert gum eucalyptus	BEL	EUMI2
EUSI	BT	*Eucalyptus sideroxylon*	Red ironbark	BEL	EUMI2
EUSP	BU	*Eucalyptus spathulata*	Narrow-leaved gimlet	BES	EUMI2
EU1	BN	*Eucalyptus* species	Gum	BEL	EUMI2
EUTO11	BV	*Eucalyptus torquata*	Coral gum	BEM	EUMI2
FIBE	BW	*Ficus benjamina*	Benjamin fig	BES	BES OTHER
FICA	BX	*Ficus carica*	Common fig	BDS	BDS OTHER
FIRE4	BY	*Ficus retusa* ssp. *nitida*	Indian laurel fig	BEM	BEM OTHER
FRUH	BZ	*Fraxinus uhdei*	Evergreen ash	BDL	FRUH
FRVE	CA	*Fraxinus velutina*	Velvet ash	BDM	FRVE
GEPA	CB	*Geijera parviflora*	Australian willow	BES	BES OTHER
GLTR	CC	*Gleditsia triacanthos*	Honeylocust	BDL	BDL OTHER
GRRO	CD	*Grevillea robusta*	Silk oak	BEL	BEL OTHER
JAMI	CE	*Jacaranda mimosifolia*	Jacaranda	BDM	BDM OTHER
JU	CF	*Juniperus* species	Juniper	CES	CES OTHER
LAIN	CG	*Lagerstroemia indica*	Common crapemyrtle	BDS	BDS OTHER
LILU	CH	*Ligustrum lucidum*	Chinese privet	BES	BES OTHER
LYMI	CI	*Lysiloma microphyllum*	Feather bush	BES	PRCH
MATI	CL	*Machaerium tipu*	Tipa	BDM	BDM OTHER
MAGR	CK	*Magnolia grandiflora*	Southern magnolia	BEM	BEM OTHER
MA2	CJ	*Malus* species	Apple	BDS	BDS OTHER
MEAZ	CM	*Melia azedarach*	Chinaberry	BDM	BDM OTHER
MOAL	CN	*Morus alba*	White mulberry	BDM	MOAL
MYCO	CO	*Myrtus communis*	Myrtle	BES	BES OTHER
NEOL	CP	*Nerium oleander*	Oleander	BES	BES OTHER
OLEU	CQ	*Olea europaea*	Olive	BES	OLEU

Southwest Desert					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
OLTE	CR	*Olneya tesota*	Tesota	BES	BES OTHER
OTHER	CS	Other	Other	BES	BES OTHER
PAAC	CT	*Parkinsonia aculeata*	Jerusalem thorn	BDM	PAAC
PHCA	CX	*Phoenix canariensis*	Canary Island date palm	PEL	PHCA
PHDA4	CY	*Phoenix dactylifera*	Date palm	PEL	PHDA4
PICA	DA	*Pinus canariensis*	Canary Island pine	CEL	CEL OTHER
PIEL2	DC	*Pinus eldarica*	Afghan pine	CEL	PIEL2
PIHA	DD	*Pinus halepensis*	Aleppo pine	CEL	PIHA
PIRO	DE	*Pinus roxburghii*	Chir pine	CEL	CEL OTHER
PI2	CZ	*Pinus* species	Pine	CEL	CEL OTHER
PICH	DB	*Pistacia chinensis*	Chinese pistache	BDM	PICH
PLRA	DF	*Platanus racemosa*	California sycamore	BDL	BDL OTHER
PLWR	DG	*Platanus wrightii*	Arizona sycamore	BDL	BDL OTHER
THOR	EL	*Platycladus orientalis*	Oriental arborvitae	BES	BES OTHER
PO	DH	*Populus* species	Cottonwood	BDL	BDL OTHER
POBAB2	DI	*Populus balsamifera* ssp. *balsamifera*	Balsam popular	BDL	BDL OTHER
POFR	DJ	*Populus fremontii*	Fremont cottonwood	BDL	BDL OTHER
PRAL2	DM	*Prosopis alba*	Argentine mesquite	BEM	BEM OTHER
PRCH	DP	*Prosopis chilensis*	Algarrobo	BDM	PRCH
PRGL2	DR	*Prosopis glandulosa*	Honey mesquite	BDS	PRCH
PRPU2	DT	*Prosopis pubescens*	Screwbean mesquite	BDS	PRCH
PR6	DL	*Prosopis* species	Mesquite	BDS	PRCH
PRVE	DU	*Prosopis velutina*	Velvet mesquite	BDS	PRCH
PRAR	DN	*Prunus armeniaca*	Apricot	BDS	BDS OTHER
PRCE	DO	*Prunus cerasifera*	Cherry plum	BDS	BDS OTHER
PRDU	DQ	*Prunus dulcis*	Sweet almond	BDS	BDS OTHER
PRPE2	DS	*Prunus persica*	Peach	BDS	BDS OTHER
PR	DK	*Prunus* species	Plum	BDS	BDS OTHER
PYCO	DV	*Pyrus communis*	Common pear	BDM	BDM OTHER
PYKA	DW	*Pyrus kawakamii*	Evergreen pear	BES	BES OTHER
QUMU	DX	*Quercus muehlenbergii*	Chinkapin oak	BDL	BDL OTHER
QUSU	DY	*Quercus suber*	Cork oak	BEL	BEL OTHER
QUVI	DZ	*Quercus virginiana*	Live oak	BEM	QUVI
RHLA	EA	*Rhus lancea*	African sumac	BES	RHLA
SA	EB	*Salix* species	Willow	BDS	BDS OTHER
SABA	EC	*Salix x sepulcralis Simonkai*	Weeping willow	BDM	BDM OTHER
SCMO	EE	*Schinus molle*	California peppertree	BEM	BEM OTHER
SOSE	EF	*Sophora secundiflora*	Mescalbean	BES	BES OTHER
TACH2	EJ	*Tamarix chinensis*	Fivestamen tamarisk	BDS	BDS OTHER
TAMU	EK	*Taxodium mucronatum*	Montezuma cypress	CEL	CEL OTHER
THPE3	EM	*Thevetia peruviana*	Luckynut	BES	BES OTHER
ULPA	EN	*Ulmus parvifolia*	Chinese elm	BDM	ULPA
VIAG	EO	*Vitex agnus-castus*	Chaste tree	BDS	BDS OTHER

Southwest Desert					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
WAFI	ES	*Washingtonia filifera*	California palm	PES	WAFI
WARO	ET	*Washingtonia robusta*	Mexican fan palm	PES	WARO
BDL OTHER	AN	Broadleaf Deciduous Large	Broadleaf Deciduous Large	BDL	FRUH
BDM OTHER	AO	Broadleaf Deciduous Medium	Broadleaf Deciduous Medium	BDM	PRCH
BDS OTHER	AP	Broadleaf Deciduous Small	Broadleaf Deciduous Small	BDS	ACFA
BEL OTHER	AQ	Broadleaf Evergreen Large	Broadleaf Evergreen Large	BEL	EUMI2
BEM OTHER	AR	Broadleaf Evergreen Medium	Broadleaf Evergreen Medium	BEM	BRPO
BES OTHER	AS	Broadleaf Evergreen Small	Broadleaf Evergreen Small	BES	RHLA
CEL OTHER	AZ	Conifer Evergreen Large	Conifer Evergreen Large	CEL	PIHA
CEM OTHER	BA	Conifer Evergreen Medium	Conifer Evergreen Medium	CEM	PIBR2
CES OTHER	BD	Conifer Evergreen Small	Conifer Evergreen Small	CES	PICO5
PEL OTHER	CU	Palm Evergreen Large	Palm Evergreen Large	PEL	PHCA
PEM OTHER	CV	Palm Evergreen Medium	Palm Evergreen Medium	PEM	PHDA4
PES OTHER	CW	Palm Evergreen Small	Palm Evergreen Small	PES	WARO

Inland Valleys					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
AC	AA	*Acer* species	Maple	BDM	ACSA1
ACBU	AB	*Acer buergerianum*	Trident maple	BDS	ACSA1
ACNE	AC	*Acer negundo*	Boxelder	BDL	ACSA1
ACPA	AD	*Acer palmatum*	Japanese maple	BDS	ACSA1
ACPL	AE	*Acer platanoides*	Norway maple	BDL	ACSA1
ACPL_CK	AF	*Acer platanoides* 'Crimson King'	Norway maple 'Crimson King'	BDL	ACSA1
ACPS_S	AG	*Acer pseudoplatanus* 'Spaethii'	Sycamore maple 'Spaethii'	BDM	ACSA1
ACRU	AH	*Acer rubrum*	Red maple	BDM	ACSA1
ACSA1	AI	*Acer saccharinum*	Silver maple	BDL	ACSA1
ACSP2	AJ	*Acacia* species	Acacia	BEM	BEL OTHER
AECA3_B	AK	*Aesculus carnea* 'Briottii'	Red horsechestnut 'Briotti'	BDM	BDM OTHER
AECA3_S	AL	*Aesculus carnea* 'Stafford'	Red horsechestnut 'Stafford '	BDM	BDM OTHER
AIAL	AM	*Ailanthus altissima*	Tree of heaven	BDM	BDM OTHER

Inland Valleys					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ALJU	AN	*Albizia julibrissin*	Mimosa	BDM	BDM OTHER
ALRH	AO	*Alnus rhombifolia*	White alder	BDM	BDM OTHER
ARRO	AP	*Arecastrum romanzoffianum*	Queen palm	PES	PES OTHER
BEPE	AY	*Betula pendula*	European white birch	BDM	BEPE
BRED	BA	*Brahea edulis*	Guadalupe palm	PEM	PEM OTHER
BRPA	BB	*Broussonetia papyrifera*	Paper mulberry	BDS	BDS OTHER
CABE	BC	*Carpinus betulus*	European hornbeam	BDM	BDM OTHER
CABE_F	BD	*Carpinus betulus* 'Fastigiate'	Fastigate hornbeam	BDM	BDM OTHER
CACI	BE	*Callistemon citrinus*	Lemon bottlebrush	BES	BES OTHER
CADE2	BF	*Calocedrus decurrens*	Incense cedar	CEL	CEL OTHER
CAIL	BG	*Carya illinoinensis*	Pecan	BDL	BDL OTHER
CE2	BH	*Celtis* species	Hackberry	BDL	BDL OTHER
CEAT	BI	*Cedrus atlantica*	Atlas cedar	CEL	CEL OTHER
CECA	BJ	*Cercis canadensis*	Eastern redbud	BDS	BDS OTHER
CEDE	BK	*Cedrus deodara*	Deodar cedar	CEL	CEL OTHER
CEOC	BN	*Celtis occidentalis*	Northern hackberry	BDL	BDL OTHER
CEOC3	BO	*Cercis canadensis var. texensis*	Western redbud	BDS	BDS OTHER
CESI2	BQ	*Cercis siliquastrum*	Arbol de judea	BDS	BDS OTHER
CESI3	BR	*Ceratonia siliqua*	Algarrobo europeo	BEM	BDL OTHER
CESI4	BS	*Celtis sinensis*	Chinese hackberry	BDL	CESI4
CHLI	BT	*Chilopsis linearis*	Desert willow	BDS	BDS OTHER
CICA	BU	*Cinnamomum camphora*	Camphor tree	BEM	CICA
CISP	BV	*Citrus* species	Citrus	BES	BES OTHER
COFL	BW	*Cornus florida*	Flowering dogwood	BES	BES OTHER
CR	BX	*Crataegus* species	Hawthorn	BDS	BDS OTHER
CRLA80	BY	*Crataegus laevigata*	Smooth hawthorn	BDS	BDS OTHER
CRPH	BZ	*Crataegus phaenopyrum*	Washington hawthorn	BDS	BDS OTHER
CU	CA	*Cupressus* species	Cypress	CEL	CEL OTHER
CULE	CB	*x Cupressocyparis leylandii*	Leyland cypress	CEL	CEL OTHER
CUMA	CC	*Cupressus macrocarpa*	Monterey cypress	CEL	CEL OTHER
CUSE	CD	*Cupressus sempervirens*	Italian cypress	CEL	CEL OTHER
DIKA	CE	*Diospyros kaki*	Japanese persimmon	BDM	BDM OTHER
ELAN	CF	*Elaeagnus angustifolia*	Russian olive	BDS	BDS OTHER
ERDE	CG	*Eriobotrya deflexa*	Bronze loquat	BES	BES OTHER
ERJA	CH	*Eriobotrya japonica*	Loquat tree	BES	BES OTHER
EU1	CI	*Eucalyptus* species	Gum	BEL	BEL OTHER
EUPO	CJ	*Eucalyptus polyanthemos*	Sliver dollar gum eucalyptus	BEL	BEL OTHER
FASY	CK	*Fagus sylvatica*	European beech	BDL	BDL OTHER
FICA	CL	*Ficus carica*	Common fig	BDS	BDS OTHER
FRAM	CM	*Fraxinus americana*	White ash	BDL	FRVE_G
FRAM_A	CN	*Fraxinus americana* 'Autumn Purple'	Autumn purple ash	BDL	FRVE_G

Inland Valleys					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
FRAM_R	CO	*Fraxinus americana* 'Rosehill'	Rosehill ash	BDL	FRVE_G
FREX	CQ	*Fraxinus excelsior*	European ash	BDL	FRVE_G
FREX_H	CR	*Fraxinus excelsior* 'Hessei'	Hesse ash	BDL	FREX_H
FREX_K	CS	*Fraxinus excelsior* 'Kimberly'	Kimberly ash	BDL	FREX_H
FRHO	CT	*Fraxinus holotricha*	Moraine ash	BDM	FRHO
FROX_F	CU	*Fraxinus oxycarpa* 'Flame'	Flame ash	BDM	FRAN_R
FRAN_R	CP	*Fraxinus angustifolia* 'Raywood'	Raywood ash	BDM	FRAN_R
FRPE	CV	*Fraxinus pennsylvanica*	Green ash	BDM	FRPE_M
FRPE_S	CY	*Fraxinus pennsylvanica* 'Summit'	Summit ash	BDM	FRPE_M
FRPE_P	CX	*Fraxinus pennsylvanica* 'Patmore'	Patmore ash	BDM	FRPE_M
FRPE_M	CW	*Fraxinus pennsylvanica* 'Marshall'	Marshall ash	BDM	FRPE_M
FRUH	CZ	*Fraxinus uhdei*	Evergreen ash	BDL	FRPE_M
FRVE	DA	*Fraxinus velutina*	Velvet ash	BDL	FRVE_G
FRVE_FW	DB	*Fraxinus velutina 'Fan West'*	Velvet ash	BDM	FRVE_G
FRVE_G	DC	*Fraxinus velutina* 'Modesto'	Modesto ash	BDL	FRVE_G
GIBI	DD	*Ginkgo biloba*	Ginkgo	BDM	GIBI
GIBI_AG	DE	*Ginkgo biloba* 'Autumn Gold'	Ginkgo 'Autumn Gold'	BDM	GIBI
GIBI_F	DF	*Ginkgo biloba* 'Fairmont'	Ginkgo 'Fairmont'	BDM	GIBI
GL3	DG	*Gleditsia* species	Locust	BDL	GLTR
GLTR	DH	*Gleditsia triacanthos*	Honeylocust	BDL	GLTR
GLTR_S	DI	*Gleditsia triancanthos* 'Sunburst'	Sunburst honeylocust	BDL	GLTR
GRRO	DJ	*Grevillea robusta*	Silk oak	BEL	BEL OTHER
HISY	DK	*Hibiscus syriacus*	Rose-of-sharon	BDS	BDS OTHER
JU1	DL	*Juglans* species	Walnut	BDL	BDL OTHER
JUHI	DM	*Juglans hindsii*	Hind walnut	BDL	BDL OTHER
JUNI	DN	*Juglans nigra*	Black walnut	BDL	BDL OTHER
KOPA	DO	*Koelreuteria paniculata*	Goldenrain tree	BDM	KOPA
KOPA_F	DP	*Koelreuteria paniculata* 'Fastigiata'	Goldenrain 'Fastigiata'	BDM	KOPA
LAIN	DQ	*Lagerstroemia indica*	Common crapemyrtle	BDS	LAIN
LANO	DR	*Laurus nobilis*	Laurel de olor	BEM	BEM OTHER
LIFO	DS	*Liquidambar formosana*	Chinese sweet gum	BDM	LIST
LILU	DT	*Ligustrum lucidum*	Chinese privet	BES	BES OTHER
LIST	DU	*Liquidambar styraciflua*	Sweetgum	BDL	LIST
LITU	DV	*Liriodendron tulipifera*	Tulip tree	BDL	LIST
MA1	DW	*Magnolia* species	Magnolia	BEM	MAGR
MA2	DX	*Malus* species	Apple	BDS	BDS OTHER
MABO	DY	*Maytenus boaria*	Mayten tree	BEM	BEM OTHER

Inland Valleys					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
MAFL80	DZ	*Malus floribunda*	Japanese flowering crabapple	BDS	BDS OTHER
MAGR	EA	*Magnolia grandiflora*	Southern magnolia	BEM	MAGR
MASO	EB	*Magnolia x soulangiana*	Chinese magnolia; Saucer magnolia	BDS	MAGR
MASO_G	EC	*Magnolia soulangiana* 'Galaxy'	Galaxy magnolia	BDS	MAGR
MEAZ	EE	*Melia azedarach*	Chinaberry	BDM	BDM OTHER
MOAL	EF	*Morus alba*	White mulberry	BDM	BDM OTHER
NEOL	EG	*Nerium oleander*	Oleander	BES	BES OTHER
NYSY	EH	*Nyssa sylvatica*	Black tupelo	BDM	BDM OTHER
OLEU	EI	*Olea europaea*	Olive	BEM	BEM OTHER
OSVI	EJ	*Ostrya virginiana*	Eastern hophornbeam	BDM	BDM OTHER
PHCA	EN	*Phoenix canariensis*	Canary island date palm	PEL	PHCA
PHDA4	EO	*Phoenix dactylifera*	Date palm	PEM	PHDA4
PHFR	EP	*Photinia x fraseri*	Fraser photinia	BES	BES OTHER
PHSE	EQ	*Photinia serratifolia*	Taiwanese photinia	BES	BES OTHER
PHSP2	ER	*Photinia* species	Chokeberry	BES	BES OTHER
PI1	ES	*Picea* species	Spruce	CEL	CEL OTHER
PI2	ET	*Pinus* species	Pine	CEL	CEL OTHER
PI23	EU	*Pittosporum* species	Cheesewood	BES	BES OTHER
PIAT4	EV	*Pistacia atlantica*	Mt. atlas mastic tree	BDM	PICH
PIBR2	EW	*Pinus brutia*	Turkish pine	CEM	PIBR2
PICH	EX	*Pistacia chinensis*	Chinese pistache	BDM	PICH
PICH_PS	EY	*Pistacia chinensis* 'Pearl Street'	Chinese pistache 'Pearl street'	BDM	PICH
PICO5	EZ	*Pinus contorta* 'bolanderi'	Bolander beach pine	CES	PICO5
PINI	FA	*Pinus nigra*	Austrian pine	CEM	CEM OTHER
PIPA4	FB	*Pinus patula*	NCN	CEL	CEL OTHER
PIPI2	FC	*Pinus pinea*	Itailian stone pine	CEL	CEL OTHER
PIPU	FD	*Picea pungens*	Blue spruce	CEL	CEL OTHER
PIRA	FE	*Pinus radiata*	Montery pine	CEL	PIRA
PISY	FF	*Pinus sylvestris*	Scotch pine	CEL	CEL OTHER
PITH	FG	*Pinus thunbergiana*	Japanese black pine	CEL	PITH
PIUN	FH	*Pittosporum undulatum*	Victorian box	BES	BES OTHER
PLAC	FI	*Platanus hybrida*	London planetree	BDL	PLAC
PLAC_B	FJ	*Platanus acerifolia* 'Bloodgood'	London planetree 'Bloodgood'	BDL	PLAC
PLAC_C	FK	*Platanus acerifolia* 'Columbia'	London planetree 'Columbia'	BDL	PLAC
PLOC	FL	*Platanus occidentalis*	American sycamore	BDL	PLAC
PLOR	FM	*Platanus orientalis*	Oriental planetree	BDL	PLAC
PO	FN	*Populus* species	Cottonwood	BDL	BDL OTHER
POGR2	FO	*Podocarpus gracilior*	Fern pine	BEL	BEL OTHER
PR	FP	*Prunus* species	Plum	BDS	BDS OTHER
PRAM2	FQ	*Prunus amygdalus*	Almendro	BDS	BDS OTHER

Inland Valleys					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
PRAR	FR	*Prunus armeniaca*	Apricot	BDM	BDM OTHER
PRAV	FS	*Prunus avium*	Sweet cherry	BDM	BDM OTHER
PRBL	FT	*Prunus blieriana*	Blierana plum	BDS	BDS OTHER
PRCE	FU	*Prunus cerasifera*	Cherry plum	BDS	BDS OTHER
PRPE2	FV	*Prunus persica*	Peach	BDS	BDS OTHER
PRSU	FW	*Prunus subhirtella*	Higan cherry	BDS	BDS OTHER
PUGR	FX	*Punica granatum*	Pomegranate	BDS	BDS OTHER
PY	FY	*Pyrus* species	Pear	BDM	BDM OTHER
PYCA_A	FZ	*Pyrus calleryana* 'Aristocrat'	Callery pear 'Aristocrat'	BDM	BDM OTHER
PYCA_B	GA	*Pyrus calleryana* 'Bradford'	Callery pear 'Bradford'	BDM	PYCA_B
PYCA_C	GB	*Pyrus calleryana* 'Capital'	Callery pear 'Capital'	BDM	BDM OTHER
PYCA_CH	GC	*Pyrus calleryana* 'Chanticleer'	Callery pear 'Chanticleer'	BDM	BDM OTHER
PYCA_R	GD	*Pyrus calleryana* 'Red Spire'	Callery pear 'Redspire'	BDM	BDM OTHER
PYCA_T	GE	*Pyrus calleryana* 'Trinity'	Callery pear 'Trinity'	BDM	BDM OTHER
PYCA_W	GF	*Pyrus calleryana* 'Whitehouse'	Callery pear 'Whitehouse'	BDM	BDM OTHER
PYKA	GG	*Pyrus kawakamii*	Evergreen pear	BDM	BDM OTHER
QU	GH	*Quercus* species	Oak	BDL	BEL OTHER
QUAG	GI	*Quercus agrifolia*	Coastal live oak; California live oak	BEL	BEL OTHER
QUCO	GJ	*Quercus coccinea*	Scarlet oak	BDL	BEL OTHER
QUIL2	GK	*Quercus ilex*	Roble negro	BEL	QUIL2
QULO	GL	*Quercus lobata*	California white oak	BDL	BEL OTHER
QUPA	GM	*Quercus palustris*	Pin oak	BDL	BEL OTHER
QURU	GN	*Quercus rubra*	Northern red oak	BDL	BEL OTHER
QUSU	GO	*Quercus suber*	Cork oak	BEL	BEL OTHER
QUWI	GP	*Quercus wislizeni*	Interior live oak	BEL	BEL OTHER
RHLA	GQ	*Rhus lancea*	African sumac	BES	BES OTHER
ROPS	GR	*Robinia pseudoacacia*	Black locust	BDM	GLTR
ROPS_PR	GS	*Robinia pseudoacacia* 'Purple Robe'	Black locust 'Purple robe'	BDM	GLTR
SA	GT	*Salix* species	Willow	BDM	BDM OTHER
SAMA	GU	*Salix matsudana*	Corkscrew willow	BDS	BDS OTHER
SAPE12	GV	*Salix x pendulina Wenderoth*	Wisconsin weeping willow	BDL	BDL OTHER
SCMO	GW	*Schinus molle*	California peppertree	BEM	BEM OTHER
SEGI	GX	*Sequoiadendron giganteum*	Giant sequoia	CEL	CEL OTHER
SESE	GY	*Sequoia sempervirens*	Coast redwood	CEL	CEL OTHER
SOHUCF	GZ	*Sorbus hupehensis var coral fire*	Mountain ash 'Coral Fire'	BDS	BDS OTHER
SOHUCQ	HA	*Sorbus hupehensis var columbia queen*	Mountain ash 'Columbia Queen'	BDS	BDS OTHER
SOJA	HB	*Sophora japonica*	Japanese pagoda tree	BDM	PICH

Inland Valleys					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
TADI	HF	*Taxodium distichum*	Baldcypress	BDL	CEL OTHER
TI	HG	*Tilia* species	Basswood	BDM	BDM OTHER
TRFO	HH	*Trachycarpus fortunei*	Windmill palm	PEM	PEM OTHER
TRLA	HI	*Tristaniopsis laurina*	Water gum; kanooka	BES	BES OTHER
TRLA_E	HJ	*Tristania laurina* 'Elegans'	Water gum 'Elegans'	BES	BES OTHER
TRSE6	HK	*Triadica sebifera*	Tallowtree	BDM	BDM OTHER
ULPA	HL	*Ulmus parvifolia*	Chinese elm	BDL	ZESE
ULS	HM	*Ulmus* species	Elm	BDL	ZESE
UMCA	HN	*Umbellularia californica*	California laurel	BEL	BEL OTHER
UNKNB	HO	Broadleaf miscellaneous	Misc Broadleaf	BDM	BDM OTHER
UNKNC	HP	Conifer miscellaneous	Misc Conifer	CEM	CEM OTHER
WAFI	HT	*Washingtonia filifera*	California palm	CES	PES OTHER
WARO	HU	*Washingtonia robusta*	Mexican fan palm	CES	WARO
ZESE	HV	*Zelkova serrata*	Japanese zelkova	BDM	ZESE
ZESE_V	HW	*Zelkova serrata* 'Village Green'	Japanese zelkova 'Village Green'	BDM	ZESE
BDL OTHER	AT	Broadleaf Deciduous Large	Broadleaf Deciduous Large	BDL	CESI4
BDM OTHER	AU	Broadleaf Deciduous Medium	Broadleaf Deciduous Medium	BDM	PYCA_B
BDS OTHER	AV	Broadleaf Deciduous Small	Broadleaf Deciduous Small	BDS	LAIN
BEL OTHER	AW	Broadleaf Evergreen Large	Broadleaf Evergreen Large	BEL	QUIL2
BEM OTHER	AX	Broadleaf Evergreen Medium	Broadleaf Evergreen Medium	BEM	CICA
BES OTHER	AZ	Broadleaf Evergreen Small	Broadleaf Evergreen Small	BES	PYKA
CEL OTHER	BL	Conifer Evergreen Large	Conifer Evergreen Large	CEL	PIRA
CEM OTHER	BM	Conifer Evergreen Medium	Conifer Evergreen Medium	CEM	PIBR2
CES OTHER	BP	Conifer Evergreen Small	Conifer Evergreen Small	CES	PICO5
PEL OTHER	EK	Palm Evergreen Large	Palm Evergreen Large	PEL	PHCA
PEM OTHER	EL	Palm Evergreen Medium	Palm Evergreen Medium	PEM	PHDA4
PES OTHER	EM	Palm Evergreen Small	Palm Evergreen Small	PES	WARO
VOIDS	HS	NEEDS PREP SMALL	Void small	NONTREE	NONTREE
VOIDM	HR	NEEDS PREP MEDIUM	Void medium	NONTREE	NONTREE
VOIDL	HQ	NEEDS PREP LARGE	Void large	NONTREE	NONTREE
AVPSS	AS	NO PREP SMALL	Available planting site small	NONTREE	NONTREE
AVPSM	AR	NO PREP MEDIUM	Available planting site medium	NONTREE	NONTREE
AVPSL	AQ	NO PREP LARGE	Available planting site large	NONTREE	NONTREE

Inland Valleys					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
STUMPS	HE	REMOVE STUMP PLANT LARGE	Stump present small planting site	NONTREE	NONTREE
STUMPM	HD	REMOVE STUMP PLANT MEDIUM	Stump present medium planting site	NONTREE	NONTREE
STUMPL	HC	REMOVE STUMP PLANT LARGE	Stump present large planting site	NONTREE	NONTREE

Inland Empire					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ABPR	AA	*Abies procera*	Noble fir	CEL	CEL OTHER
ACBA2	AB	*Acacia baileyana*	Bailey acacia	BEM	BEM OTHER
ACDE	AC	*Acacia decurrens*	Green acacia	BEM	BEM OTHER
ACLO	AD	*Acacia longifolia*	Sydney golden wattle	BEM	BEM OTHER
ACMA	AE	*Acer macrophyllum*	Bigleaf maple	BDL	BDL OTHER
ACME	AF	*Acacia melanoxylon*	Black acacia	BEM	BEM OTHER
ACOB	AG	*Acer oblongum*	Evergreen maple	BEM	BEM OTHER
ACPA	AH	*Acer palmatum*	Japanese maple	BDL	BDL OTHER
ACRU	AI	*Acer rubrum*	Red maple	BDL	BDL OTHER
ACSA1	AJ	*Acer saccharinum*	Silver maple	BDL	BDL OTHER
AECA2	AK	*Aesculus californica*	California buckeye	BES	BES OTHER
AECA3	AL	*Aesculus carnea*	Red horsechestunt	BDS	BDS OTHER
AGFL	AM	*Agonis flexuosa*	Peppermint tree; astralian willow myrtle	BES	BES OTHER
AIAL	AN	*Ailanthus altissima*	Tree of heaven	BDM	BDM OTHER
ALCO2	AO	*Alnus cordata*	Italian alder	BDM	BDM OTHER
ALGL	AP	*Alnus glutinosa*	European alder	BDL	BDL OTHER
ALJU	AQ	*Albizia julibrissin*	Mimosa	BDS	BDS OTHER
ALRH	AR	*Alnus rhombifolia*	White alder	BDM	BDM OTHER
ARCU	AS	*Archontophoenix cunninghamiana*	King palm	PES	PES OTHER
ARHE	AT	*Araucaria heterophylla*	NCN	CEL	CEL OTHER
ARMA2	AU	*Arbutus var. marina*	Marina arbutus	BES	BES OTHER
ARRO	AV	*Arecastrum romanzoffianum*	Queen palm	PES	PES OTHER
ARUN	AW	*Arbutus unedo*	Strawberry tree	BES	BES OTHER
BAFO	AX	*Bauhinia forficata*	Bauhinia	BDS	BDS OTHER
BAVA	AY	*Bauhinia variegata*	Mountain ebony	BDS	BDS OTHER
BEPE	BE	*Betula pendula*	European white birch	BDM	BDM OTHER
BRAC2	BG	*Brachychiton acerifolium*	Arbol de la llama	BDM	BDM OTHER
BRAR	BH	*Brahea armata*	Mexican blue palm	PES	PES OTHER
BRBR	BI	*Brahea brandegeei*	San jose hesper palm	PES	PES OTHER
BRDI9	BJ	*Brachychiton discolor*	Pink flame tree	BDM	BDM OTHER

Inland Empire					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
BRED	BK	*Brahea edulis*	Guadalupe palm	PES	PES OTHER
BRPO	BL	*Brachychiton populneum*	Kurrajong	BEM	BRPO
BUCA	BM	*Butia capitata*	Jelly palm	PES	PES OTHER
CACA3	BN	*Calodendrum capense*	Cape chesnut	BEM	BEM OTHER
CACI	BO	*Callistemon citrinus*	Lemon bottlebrush	BES	BES OTHER
CADE	BP	*Castanea dentata*	American chestnut	BDL	BDL OTHER
CADE2	BQ	*Calocedrus decurrens*	Incense cedar	CEL	CEL OTHER
CAED	BR	*Casimiroa edulis*	White sapote	BEL	BEL OTHER
CAIL	BS	*Carya illinoinensis*	Pecan	BDL	BDL OTHER
CALE	BT	*Cassia leptophylla*	Gold medallion tree	BES	BES OTHER
CASP	BU	*Catalpa speciosa*	Northern catalpa	BDL	BDL OTHER
CATW	BV	*Calliandra tweedii*	Trinidad flame bush	BES	BES OTHER
CAVI	BW	*Callistemon viminalis*	Weeping bottlebrush	BES	BES OTHER
CEAT	BX	*Cedrus atlantica*	Atlas cedar	CEL	CEL OTHER
CEAU	BY	*Celtis australis*	European hackberry	BDL	BDL OTHER
CECA	BZ	*Cercis canadensis*	Eastern redbud	BDS	BDS OTHER
CEDE	CA	*Cedrus deodara*	Deodar cedar	CEL	CEL OTHER
CEFL	CB	*Parkinsonia florida*	Blue paloverde	BDM	BDM OTHER
CEOC	CE	*Celtis occidentalis*	Northern hackberry	BDL	BDL OTHER
CEOC3	CF	*Cercis canadensis var. texensis*	Western redbud	BDS	BDS OTHER
CESI3	CH	*Ceratonia siliqua*	Algarrobo europeo	BEM	BEM OTHER
CESI4	CI	*Celtis sinensis*	Chinese hackberry	BDL	BDL OTHER
CHHU	CJ	*Chamaerops humilis*	Mediterranean fan palm	PES	PES OTHER
CHLI	CK	*Chilopsis linearis*	Desert willow	BDS	BDS OTHER
CHRE	CL	*Chionanthus retusus*	Chinese fringe tree	BDS	BDS OTHER
CHSP	CM	*Chorisia speciosa*	Palo borracho	BEM	BEM OTHER
CHTA	CN	*Chitalpa tashkentensis*	Chitalpa	BDS	BDS OTHER
CICA	CO	*Cinnamomum camphora*	Camphor tree	BEL	CICA
CILI	CP	*Citrus limon*	Lemon	BES	BES OTHER
CISI	CQ	*Citrus sinensis*	Orange	BES	BES OTHER
COAU	CR	*Cordyline australis*	Giant dracaena	PES	PES OTHER
COLA	CS	*Cocculus laurifolius*	Laurel-leafed snailseed	BES	BES OTHER
CRPA	CT	*Crinodendron patagua*	Patagua	BES	BES OTHER
CRRU	CU	*Cryptocarya rubra*	Cryptocarya	BES	BES OTHER
CUAN	CV	*Cupaniopsis anacardioides*	Carrotwood	BES	BES OTHER
CUAR	CW	*Cupressus arizonica*	Arizona cypress	CEM	CEM OTHER
CULE	CX	*x Cupressocyparis leylandii*	Leyland cypress	CES	CES OTHER
CUSE	CY	*Cupressus sempervirens*	Italian cypress	CEL	CEL OTHER
DIVI	CZ	*Diospyros virginiana*	Common persimmon	BDS	BDS OTHER
DOVI	DA	*Dodonaea viscosa*	Florida hopbush	BES	BES OTHER
ELDE	DB	*Elaeocarpus decipiens*	Japanese blueberry tree	BDS	BDS OTHER
ERCA	DC	*Erythrina caffra*	Kaffirboom coral tree	BEL	BEL OTHER
ERDE	DD	*Eriobotrya deflexa*	Bronze loquat	BES	BES OTHER

Inland Empire					
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ERJA	DE	*Eriobotrya japonica*	Loquat tree	BES	BES OTHER
EUCA1	DF	*Eucalyptus camaldulensis*	Red gum eucalyptus	BEL	EUSI
EUCI	DG	*Eucalyptus cinerea*	Silver dollar eucalyptus	BEM	EUSI
EUCI2	DH	*Eucalyptus citriodora*	Lemonscented gum	BEL	EUSI
EUCL	DI	*Eucalyptus cladocalyx*	Sugargum	BEL	EUSI
EUCO3	DJ	*Eucalyptus cornuta*	Yate	BEL	EUSI
EUCR	DK	*Eucalyptus crebra*	Narrowleaf red ironbark	BEL	EUSI
EUFI81	DL	*Eucalyptus ficifolia*	Redflower gum	BEL	EUSI
EUGL	DM	*Eucalyptus globulus*	Blue gum eucalyptus	BEL	EUSI
EUGLCO	DN	*Eucalyptus globulus var compacta*	Dwarf blue gum	BEL	EUSI
EUGR	DO	*Eucalyptus grandis*	Flooded gum eucalyptus	BEL	EUSI
EULE	DP	*Eucalyptus leucoxylon*	White ironbark	BEM	EUSI
EULE2	DQ	*Eucalyptus lehmannii*	Bushy yate	BES	EUSI
EUMA23	DR	*Eucalyptus maculata*	Spotted gum	BEL	EUSI
EUNI	DS	*Eucalyptus nicholii*	Willow-leaved gimlet	BEM	EUSI
EUPO	DT	*Eucalyptus polyanthemos*	Sliver dollar gum eucalyptus	BEL	EUSI
EURO	DU	*Eucalyptus robusta*	Beakpod euclayptus	BEL	EUSI
EURU	DV	*Eucalyptus rudis*	Desert gum eucalyptus	BEL	EUSI
EUSI	DW	*Eucalyptus sideroxylon*	Red ironbark	BEL	EUSI
EUTE	DX	*Eucalyptus tereticornis*	Horn cap eucalyptus	BEL	EUSI
EUTO11	DY	*Eucalyptus torquata*	Coral gum	BEM	EUSI
EUVI	DZ	*Eucalyptus viminalis*	Ribbon gum eucalyptus	BEL	EUSI
FICA	EA	*Ficus carica*	Common fig	BDS	BDS OTHER
FIMA2	EB	*Ficus macrophylla*	Morton Bay fig	BEL	BEL OTHER
FIMINI	EC	*Ficus microcarpa nitida var green gem*	Green gem indian laurel fig	BES	BES OTHER
FISI	EE	*Firmiana simplex*	Chinese parasoltree	BDS	BDS OTHER
FRANR	EF	*Fraxinus oxycarpa 'Raywood'*	Raywood ash	BDM	FRUH
FROR2	EG	*Fraxinus oregana*	Oregon ash	BDL	FRUH
FRUH	EH	*Fraxinus uhdei*	Evergreen ash	BDL	FRUH
FRVE	EI	*Fraxinus velutina*	Velvet ash	BDL	FRUH
FRVEG	EJ	*Fraxinus velutina 'Modesto'*	Modesto ash	BDM	FRVEG
GEPA	EK	*Geijera parviflora*	Wilga; australian willow	BES	BES OTHER
GIBI	EL	*Ginkgo biloba*	Ginkgo	BDL	GIBI
GLTR	EM	*Gleditsia triacanthos*	Honeylocust	BDM	BDM OTHER
GRRO	EN	*Grevillea robusta*	Silk oak	BEL	BEL OTHER
HASU	EO	*Hakea suaveolens*	Sweet hakea; scented hakea	CES	CES OTHER
HEAR	EP	*Heteromeles arbutifolia*	Christmasberry	BES	BES OTHER
HYFL	EQ	*Hymenosporum flavum*	Sweetshade; australian fragipani	BES	BES OTHER
ILAL	ER	*Ilex altaclarensis*	Wilson holly	BES	BES OTHER

Inland Empire					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ILVO	ES	*Ilex vomitoria*	Yaupon	BES	BES OTHER
JAMI	ET	*Jacaranda mimosifolia*	Jacaranda	BDM	JAMI
JUCA2	EU	*Juglans californica*	Southern california walnut	BDL	BDL OTHER
JUCH	EV	*Juniperus chinensis*	Chinese juniper	CES	CES OTHER
JURE	EW	*Juglans regia*	English walnut	BDM	BDM OTHER
KOBI	EX	*Koelreuteria bipinnata*	Chinese flame tree	BDM	BDM OTHER
KOEL	EY	*Koelreuteria elegans*	Flamegold	BDM	BDM OTHER
KOPA	EZ	*Koelreuteria paniculata*	Goldenrain tree	BDS	BDS OTHER
LAIN	FA	*Lagerstroemia indica*	Common crapemyrtle	BDS	LAIN
LANO	FB	*Laurus nobilis*	Laurel de olor	BEM	BEM OTHER
LELA12	FC	*Leptospermum laevigata*	Coastal teatree	BES	BES OTHER
LIFO	FD	*Liquidambar formosana*	Chinese sweet gum	BDM	LIST
LILU	FE	*Ligustrum lucidum*	Chinese privet	BEM	BEM OTHER
LIOV	FF	*Ligustrum ovalifolium*	California privet	BES	BES OTHER
LIST	FG	*Liquidambar styraciflua*	Sweetgum	BDL	LIST
LITU	FH	*Liriodendron tulipifera*	Tulip tree	BDL	LITU
LYAS	FI	*Lyonothamnus f. asplenifol*	Fernleaf catalina ironwood	BEM	BEM OTHER
MA2	FJ	*Malus species*	Apple	BDS	BDS OTHER
MABO	FK	*Maytenus boaria*	Mayten	BEM	BEM OTHER
MAFL80	FL	*Malus floribunda*	Japanese flowering crabapple	BDS	BDS OTHER
MAGR	FM	*Magnolia grandiflora*	Southern magnolia	BEM	MAGR
MALA6	FN	*Malosma laurina*	Laurel sumac	BDS	BDS OTHER
MASO	FO	*Magnolia x soulangiana*	Chinese magnolia; Saucer magnolia	BDS	MAGR
MASY2	FP	*Malus sylvestris*	Common crabapple	BDS	BDS OTHER
MATE	FQ	*Macadamia tetraphylla*	Rough-shell macadamia	BES	BES OTHER
MATI	FR	*Machaerium tipu*	Tipa	BDS	BDS OTHER
MEAZ	FS	*Melia azedarach*	Chinaberry	BDM	BDM OTHER
MEGL	FT	*Metasequoia glyptostroboides*	Dawn redwood	BDL	BDL OTHER
MELI7	FU	*Melaleuca linariifolia*	Cajeput tree	BES	BES OTHER
MEQU	FV	*Melaleuca quinquenervia*	Cajeput tree	BEM	BEM OTHER
MOAL	FW	*Morus alba*	White mulberry	BDL	BDL OTHER
MORU	FX	*Morus rubra*	Red mulberry	BDM	BDM OTHER
NEOL	FY	*Nerium oleander*	Oleander	BES	BES OTHER
OLEU	FZ	*Olea europaea*	Olive	BES	BES OTHER
OLEU2	GA	*Olea europaea* 'Swan Hill'	Swan hill olive	BES	BES OTHER
PAAC	GB	*Parkinsonia aculeata*	Jerusalem thorn	BDM	BDM OTHER
PEAM	GC	*Persea americana*	Avocado	BDS	BDS OTHER
PHCA	GG	*Phoenix canariensis*	Canary island date palm	PEL	PEL OTHER
PHDA4	GH	*Phoenix dactylifera*	Date palm	PEM	PEM OTHER
PHFR	GI	*Photinia x fraseri*	Fraser photinia	BES	BES OTHER
PHRO	GJ	*Phoenix roebelenii*	Pygmy date palm	PEM	PEM OTHER

Inland Empire					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
PIAT	GK	*Pinus attenuata*	Knobcone pine	CEL	CEL OTHER
PIBR2	GL	*Pinus brutia*	Turkish pine; east mediterranean pine	CEM	PIBR2
PICA	GM	*Pinus canariensis*	Canary island pine	CEL	PICA
PICH	GN	*Pistacia chinensis*	Chinese pistache	BDM	PICH
PICO2	GO	*Pinus coulteri*	Coulter pine	CEL	CEL OTHER
PICO5	GP	*Pinus contorta var. bolanderi*	Bolander beach pine	CES	PICO5
PIED	GQ	*Pinus edulis*	Pinyon pine	CES	CES OTHER
PIEL2	GR	*Pinus eldarica*	Afghan pine	CEL	CEL OTHER
PIHA	GS	*Pinus halepensis*	Aleppo pine	CEL	CEL OTHER
PIMU2	GT	*Pinus muricata*	Bishop pine	CEM	CEM OTHER
PINI	GU	*Pinus nigra*	Austrian pine	CEL	CEL OTHER
PIPH2	GV	*Pittosporum phillyraeoides*	Pittosporum willow	BES	BES OTHER
PIPI2	GW	*Pinus pinea*	Itailian stone pine	CEL	CEL OTHER
PIPU	GX	*Picea pungens*	Blue spruce	CEL	CEL OTHER
PIRA	GY	*Pinus radiata*	Montery pine	CEL	CEL OTHER
PIRH	GZ	*Pittosporum rhombifolium*	Queensland pittosporum	BEM	BEM OTHER
PIRO	HA	*Pinus roxburghii*	Chir pine	CEL	CEL OTHER
PITA	HB	*Pinus taeda*	Loblolly pine	CEL	CEL OTHER
PITH	HC	*Pinus thunbergiana*	Japanese black pine	CES	CES OTHER
PITO	HD	*Pittosporum tobira*	Japanese pittosporum	BEM	BEM OTHER
PITO2	HE	*Pinus torreyana*	Torrey pine	CEL	CEL OTHER
PIUN	HF	*Pittosporum undulatum*	Victorian box	BEM	BEM OTHER
PIVI5	HG	*Pittosporum viridiflorum*	Cape cheesewood	BEM	BEM OTHER
PLAC	HH	*Platanus hybrida*	London planetree	BDL	PLAC
PLOC	HI	*Platanus occidentalis*	American sycamore	BDL	PLRA
PLRA	HJ	*Platanus racemosa*	California sycamore	BDL	PLRA
POCA2	HK	*Populus x canadensis*	Carolina poplar	BDL	BDL OTHER
POGR2	HL	*Podocarpus gracilior*	Fern pine	BEL	BEL OTHER
POMA	HM	*Podocarpus macrophyllus*	Yew podocarpus	BES	BES OTHER
PONI	HN	*Populus nigra*	Black poplar	BDL	BDL OTHER
PRAR	HO	*Prunus armeniaca*	Apricot	BDS	BDS OTHER
PRBL	HP	*Prunus blieriana*	Blierana plum	BDS	BDS OTHER
PRCA	HQ	*Prunus caroliniana*	Carolina laurelcherry	BES	BES OTHER
PRCE	HR	*Prunus cerasifera*	Cherry plum	BDS	BDS OTHER
PRCEKV	HS	*Prunus cerasifera* 'Krauter Vesuvius'	Krauter vesuvius plum	BDS	BDS OTHER
PRCH	HT	*Prosopis chilensis*	Algarrobo	BDM	BDM OTHER
PRDO	HU	*Prunus domestica*	Common plum	BDS	BDS OTHER
PRDU	HV	*Prunus dulcis*	Sweet almond	BDS	BDS OTHER
PRIL	HW	*Prunus ilicifolia*	Hollyleaf cherry	BDS	BDS OTHER
PRLY	HX	*Prunus ilicifolia ssp. lyonii*	Catalina cherry	BDS	BDS OTHER
PRPE2	HY	*Prunus persica*	Peach	BDS	BDS OTHER
PRSE2	HZ	*Prunus serrulata*	Kwanzan cherry	BDS	BDS OTHER

Inland Empire					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
PSME	IA	*Pseudotsuga menziesii*	Douglas fir	CEL	CEL OTHER
PTST	IB	*Pterocarya stenoptera*	Chinese wingnut	BDL	BDL OTHER
PUGR	IC	*Punica granatum*	Pomegranate	BDS	BDS OTHER
PYCA	ID	*Pyrus calleryana*	Callery pear	BDM	PYCA
PYCA_A	IE	*Pyrus calleryana* 'Aristocrat'	Callery pear 'Aristocrat'	BDM	PYCA
PYCA_B	IF	*Pyrus calleryana* 'Bradford'	Callery pear 'Bradford'	BDM	PYCA
PYKA	IG	*Pyrus kawakamii*	Evergreen pear	BES	BES OTHER
QUAG	IH	*Quercus agrifolia*	Coastal live oak; California live oak	BEL	QUAG
QUCO	II	*Quercus coccinea*	Scarlet oak	BDL	QUAG
QUEN	IJ	*Quercus engelmannii*	Engelmann oak	BDM	QUAG
QUIL2	IK	*Quercus ilex*	Roble negro	BEL	QUIL2
QUKE	IL	*Quercus kelloggii*	California black oak	BEL	QUAG
QULO	IM	*Quercus lobata*	California white oak	BDL	QUAG
QUPA	IN	*Quercus palustris*	Pin oak	BDL	QUAG
QURO	IO	*Quercus robur*	English oak	BDL	QUAG
QURU	IP	*Quercus rubra*	Northern red oak	BDL	QUAG
QUSU	IQ	*Quercus suber*	Cork oak	BEL	QUAG
QUVI	IR	*Quercus virginiana*	Live oak	BEL	QUAG
RHIN	IS	*Rhus integrifolia*	Lemonade berry	BDS	BDS OTHER
ROAMI	IT	*Robinia x ambigua* 'Idahoenis'	Idaho locust	BDM	BDM OTHER
ROPS	IU	*Robinia pseudoacacia*	Black locust	BDL	BDL OTHER
SAALT	IV	*Salix alba* 'Tristis'	Golden weeping willow	BDL	BDL OTHER
SACANE	IW	*Sambucus caerulea var neomexicana*	Neomexican blue elderberry	BDS	BDS OTHER
SAMA	IX	*Salix matsudana*	Corkscrew willow	BDL	BDL OTHER
SCMO	IY	*Schinus molle*	California peppertree	BEM	SCMO
SCPO	IZ	*Schinus polygamus*	Huingan	BES	SCMO
SCTE	JA	*Schinus terebinthifolius*	Brazilian pepper	BES	SCTE
SECO9	JB	*Senna corymbosa*	Argentine senna	BES	BES OTHER
SEGI	JC	*Sequoiadendron giganteum*	Giant sequoia	CEL	CEL OTHER
SESE	JD	*Sequoia sempervirens*	Coast redwood	CEL	CEL OTHER
SOJA	JE	*Sophora japonica*	Japanese pagoda tree	BDM	BDM OTHER
STSI	JF	*Stenocarpus sinuatus*	Firewheel tree	BES	BES OTHER
SYPA2	JG	*Syzygium paniculatum*	Brush cherry	BEM	BEM OTHER
TAAV	JH	*Tabebuia avellanedae*	Ipe-roxo	BES	BES OTHER
TACH3	JI	*Tabebuia chrysotricha*	Ipe-amarelo	BES	BES OTHER
THOC	JJ	*Thuja occidentalis*	Northern white cedar	CEL	CEL OTHER
THOR	JK	*Platycladus orientalis*	Oriental arbor vitae	CES	CES OTHER
TRAC	JL	*Trithrinax acanthocoma*	Brizilian needle palm	PES	PES OTHER
TRCO	JM	*Tristaniopsis conferta*	Brisbane box	BES	BES OTHER
TRFO	JN	*Trachycarpus fortunei*	Windmill palm	PES	PES OTHER
TRSE6	JO	*Triadica sebifera*	Tallowtree	BDM	BDM OTHER

Inland Empire					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ULAM	JP	*Ulmus americana*	American elm	BDL	BDL OTHER
ULPA	JQ	*Ulmus parvifolia*	Chinese elm	BEL	BEL OTHER
ULPU	JR	*Ulmus pumila*	Siberian elm	BEL	BEL OTHER
UMCA	JS	*Umbellularia californica*	California laurel	BEL	BEL OTHER
WAFI	JT	*Washingtonia filifera*	California palm	PES	PES OTHER
WARO	JU	*Washingtonia robusta*	Mexican fan palm	PES	WARO
XYCO	JV	*Xylosma congestum*	Shiny xylosma	PES	PES OTHER
YUGL2	JW	*Yucca gloriosa*	Moundlily yucca	PES	PES OTHER
YUGU	JX	*Yucca guatemalensis*	Bluestem yucca	PES	PES OTHER
ZESE	JY	*Zelkova serrata*	Japanese zelkova	BDL	BDL OTHER
ZESE_V	JZ	*Zelkova serrata 'Village Green'*	Japanese zelkova 'Village Green'	BDL	BDL OTHER
BDL OTHER	AZ	Broadleaf Deciduous Large	BDL OTHER	BDL	FRUH
BDM OTHER	BA	Broadleaf Deciduous Medium	BDM OTHER	BDM	PYCA
BDS OTHER	BB	Broadleaf Deciduous Small	BDS OTHER	BDS	LAIN
BEL OTHER	BC	Broadleaf Evergreen Large	BEL OTHER	BEL	CICA
BEM OTHER	BD	Broadleaf Evergreen Medium	BEM OTHER	BEM	MAGR
BES OTHER	BF	Broadleaf Evergreen Small	BES OTHER	BES	SCTE
CEL OTHER	CC	Conifer Evergreen Large	CEL OTHER	CEL	PICA
CEM OTHER	CD	Conifer Evergreen Medium	CEM OTHER	CEM	PIBR2
CES OTHER	CG	Conifer Evergreen Small	CES OTHER	CES	PICO5
PEL OTHER	GD	Palm Evergreen Large	PEL OTHER	PEL	PHCA
PEM OTHER	GE	Palm Evergreen Medium	PEM OTHER	PEM	PHDA4
PES OTHER	GF	Palm Evergreen Small	PES OTHER	PES	WARO

Southern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
EUFI81	EN	*Eucalyptus ficifolia*	Redflower gum	BEL	EUFI81
EUGL	EO	*Eucalyptus globulus*	Blue gum eucalyptus	BEL	BEL OTHER
EUGR	EP	*Eucalyptus grandis*	Flooded gum eucalyptus	BEL	BEL OTHER
EULE	EQ	*Eucalyptus leucoxylon*	White ironbark	BEM	BEM OTHER
EULE2	ER	*Eucalyptus lehmannii*	Bushy yate	BES	BES OTHER
EUMA23	ES	*Eucalyptus maculata*	Spotted gum	BEL	BEL OTHER

Southern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
EUNI	ET	*Eucalyptus nicholii*	Willow-leaved gimlet	BEM	BEM OTHER
EUOC9	EU	*Eucalyptus occidentalis*	Flat-top yate	BEL	BEL OTHER
EUPO	EV	*Eucalyptus polyanthemos*	Sliver dollar gum eucalyptus	BEL	BEL OTHER
EURU	EW	*Eucalyptus rudis*	Desert gum eucalyptus	BEL	BEL OTHER
EUSI	EX	*Eucalyptus sideroxylon*	Red ironbark	BEL	BEL OTHER
EUSM	EY	*Eugenia smithii*	Lilly-pilly tree	BES	BES OTHER
EUTO11	EZ	*Eucalyptus torquata*	Coral gum	BEM	BEM OTHER
EUVI	FA	*Eucalyptus viminalis*	Ribbon gum eucalyptus	BEL	BEL OTHER
FESE	FB	*Feijoa sellowiana*	Pineapple guava	BES	BES OTHER
FI1	FC	*Ficus* species	Fig	BEM	BEM OTHER
FIAL5	FD	*Ficus binnendijkii*	Alii ficus	BES	BES OTHER
FIBE	FE	*Ficus benjamina*	Benjamin fig	BEM	BEM OTHER
FICA	FF	*Ficus carica*	Common fig	BDS	BDS OTHER
FIEL	FG	*Ficus elastica*	Rubber plant	BEM	BEM OTHER
FILY	FH	*Ficus lyrata*	Fiddle leaf fig	BES	BES OTHER
FIMA2	FI	*Ficus macrophylla*	Morton Bay fig	BEL	BEL OTHER
FIMI	FJ	*Ficus thonningii*	Figueira benjamin	BEM	FIMI
FIRE4	FK	*Ficus microcarpa var. nitida*	Indian laurel fig	BEM	BEM OTHER
FIRE4	FL	*Ficus retusa* ssp. *nitida*	Indian laurel fig	BEM	BEM OTHER
FIRU	FM	*Ficus rubiginosa*	Rustyleaf fig	BEM	BEM OTHER
FISI	FN	*Firmiana simplex*	Chinese parasoltree	BDM	BDM OTHER
FIWA	FO	*Ficus watkinsiana*	Watkins fig	BEL	BEL OTHER
FRMA6	FP	*Fraxinus malacophylla*	Ash	BDM	BDM OTHER
FRUH	FQ	*Fraxinus uhdei*	Evergreen ash	BEL	BEL OTHER
FRVE	FR	*Fraxinus velutina*	Velvet ash	BEL	BEL OTHER
GEPA	FS	*Geijera parviflora*	Wilga; Australian willow	BES	BES OTHER
GIBI	FT	*Ginkgo biloba*	Ginkgo	BDM	BDM OTHER
GRRO	FU	*Grevillea robusta*	Silk oak	BEL	BEL OTHER
AC	AA	*Acer* species	Maple	BDL	BDL OTHER
ACBA2	AB	*Acacia baileyana*	Bailey acacia	BEM	BEM OTHER
ACBU	AC	*Acer buergerianum*	Trident maple	BDS	BDS OTHER
ACDE	AD	*Acacia decurrens*	Green acacia	BEM	BEM OTHER
ACLO	AE	*Acacia longifolia*	Sydney golden wattle	BEM	BEM OTHER
ACME	AF	*Acacia melanoxylon*	Black acacia	BEL	BEL OTHER
ACNE	AG	*Acer negundo*	Boxelder	BDL	BDL OTHER
ACOB	AH	*Acer oblongum*	Evergreen maple	BDS	BDS OTHER
ACPA	AI	*Acer palmatum*	Japanese maple	BDL	BDL OTHER
ACPE1	AJ	*Acacia pendula*	Weeping myall	BDL	BDL OTHER
ACRU	AK	*Acer rubrum*	Red maple	BDL	BDL OTHER
ACSA1	AL	*Acer saccharinum*	Silver maple	BDL	BDL OTHER
AGFL	AM	*Agonis flexuosa*	Peppermint tree; Australian willow myrtle	BES	BES OTHER
ALCO2	AN	*Alnus cordata*	Italian alder	BDM	BDM OTHER
ALEX	AO	*Acmena smithii*	Lilly-pilly tree	BES	BES OTHER
ALEX	AP	*Alectryon excelsus*	Titoki	BES	BES OTHER
ALJU	AQ	*Albizia julibrissin*	Mimosa	BDS	BDS OTHER

Southern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ALRH	AR	*Alnus rhombifolia*	White alder	BDM	BDM OTHER
ANCH4	AS	*Annona cherimola*	Cherimoya	BES	BES OTHER
ARBI	AT	*Araucaria bidwillii*	Bunya bunya	CEL	CEL OTHER
ARCO24	AU	*Araucaria columnaris*	Coral reef araucaria	CEL	CEL OTHER
ARCU	AV	*Archontophoenix cunninghamiana*	King palm	PES	PES OTHER
ARHE	AW	*Araucaria heterophylla*	Araucaria	CEL	CEL OTHER
ARRO	AX	*Arecastrum romanzoffianum*	Queen palm	PES	WARO
ARUN	AY	*Arbutus unedo*	Strawberry tree	BES	BES OTHER
BABL	BC	*Bauhinia x blakeana*	Blake's bauhinia	BES	BES OTHER
BAPU	BD	*Bauhinia purpurea*	Orchid tree	BES	BES OTHER
BAVA	BE	*Bauhinia variegata*	Mountain ebony	BDS	BDS OTHER
BE	BI	*Betula* species	Birch	BDM	BDM OTHER
BENI	BL	*Betula nigra*	River birch	BDM	BDM OTHER
BEPE	BM	*Betula pendula*	European white birch	BDM	BDM OTHER
BERE	BN	*Beaucarnea recurvata*	Pony-tail palm	PES	PES OTHER
BIJA	BP	*Bischofia javanica*	Toog	BEL	BEL OTHER
BR	BQ	*Brahea* species	Palm(brahea)	PES	PES OTHER
BR1	BR	*Brachychiton* species	Brachychiton	BDM	BDM OTHER
BRAC	BS	*Schefflera actinophylla*	Schefflera	BES	BES OTHER
BRAC2	BT	*Brachychiton acerifolium*	Arbol de la llama	BDM	BDM OTHER
BRAR	BU	*Brahea armata*	Mexican blue palm	PES	PES OTHER
BRED	BV	*Brahea edulis*	Guadalupe palm	PES	PES OTHER
BROC	BW	*Brachychiton populneum*	Kurrajong	BEM	BEM OTHER
BRPA	BX	*Broussonetia papyrifera*	Paper mulberry	BDM	BDM OTHER
BRPO	BY	*Brachychiton populneum*	Kurrajong	BEM	CICA
BUCA	BZ	*Butia capitata*	Jelly palm	PES	PES OTHER
CA4	CA	*Castanea* species	Chestnut	BDL	BDL OTHER
CA52	CB	*Casuarina* species	Sheoak	CEL	CEL OTHER
CACA3	CC	*Calodendrum capense*	Cape chesnut	BEM	BEM OTHER
CACI	CD	*Callistemon citrinus*	Lemon bottlebrush	BES	CACI
CACU8	CE	*Casuarina cunninghamiana*	River sheoak	CEL	CEDE
CADE2	CF	*Calocedrus decurrens*	Incense cedar	CEL	CEL OTHER
CAED	CG	*Casimiroa edulis*	White sapote	BEL	BEL OTHER
CAEX	CH	*Cassia excelsa*	Crown of gold tree	BES	BES OTHER
CALE	CI	*Cassia leptophylla*	Gold medallion tree	BES	BES OTHER
CASA5	CJ	*Callistemon salignus*	White bottlebrush	BES	BES OTHER
CASP11	CK	*Caesalpinia spinosa*	Spiny holdback	BES	BES OTHER
CAST	CL	*Casuarina stricta*	Coast beefwood	CEL	CEL OTHER
CATW	CM	*Calliandra tweedii*	Trinidad flame bush	BES	BES OTHER
CAVI	CN	*Callistemon viminalis*	Weeping bottlebrush	BES	BES OTHER
CE2	CO	*Celtis* species	Hackberry	BDL	BDL OTHER
CEAT	CP	*Cedrus atlantica*	Atlas cedar	CEL	CEDE
CECA	CQ	*Cercis canadensis*	Eastern redbud	BDS	BDS OTHER
CEDE	CR	*Cedrus deodara*	Deodar cedar	CEL	CEDE
CEFI2	CS	*Cedrela fissilis*	Brazilian cedar wood	BDM	BDM OTHER

Southern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
CEOC3	CV	*Cercis canadensis var. texensis*	Western redbud	BDS	BDS OTHER
CEOC3	CW	*Cercis occidentalis*	Western redbud	BDS	BDS OTHER
CESI3	CY	*Ceratonia siliqua*	Algarrobo europeo	BEM	CESI3
CH	CZ	*Chamaecyparis* species	Cedar	CEL	CEL OTHER
CHHU	DA	*Chamaerops humilis*	Mediterranean fan palm	PES	PES OTHER
CHSP	DB	*Chorisia speciosa*	Palo borracho	BEM	BEM OTHER
CICA	DC	*Cinnamomum camphora*	Camphor tree	BEM	CICA
CILI	DD	*Citrus limon*	Lemon	BES	BES OTHER
CISI	DE	*Citrus sinensis*	Orange	BES	BES OTHER
COAU	DF	*Cordyline australis*	Giant dracaena	PES	PES OTHER
COLA	DG	*Cocculus laurifolius*	Laurel-leafed snailseed	BES	BES OTHER
COLA18	DH	*Cotoneaster lacteus*	Milkflower cotoneaster	BES	BES OTHER
CRJA	DI	*Cryptomeria japonica*	Japanese red cedar	CEL	CEL OTHER
CRPA	DJ	*Crinodendron patagua*	Patagua	BDS	BDS OTHER
CRRU	DK	*Cryptocarya rubra*	Cryptocarya	BES	BES OTHER
CU	DL	*Cupressus* species	Cypress	CEL	CEL OTHER
CUAN	DM	*Cupaniopsis anacardioides*	Carrotwood	BES	CUAN
CULE	DN	*Cupressocyparis leylandii*	Leyland cypress	CES	CES OTHER
CUMA	DO	*Cupressus macrocarpa*	Monterey cypress	CEL	CEL OTHER
CUSE	DP	*Cupressus sempervirens*	Italian cypress	CEL	CEL OTHER
CYRE11	DQ	*Cycas revoluta*	Sago palm	CES	CES OTHER
DIVI	DR	*Diospyros virginiana*	Common persimmon	BDS	BDS OTHER
DOVI	DS	*Dodonaea viscosa*	Florida hopbush	BES	BES OTHER
DRDR	DT	*Dracaena draco*	Dragon tree	PES	PES OTHER
DUER	DU	*Duranta erecta*	Golden dewdrops	BES	BES OTHER
ERBI	DV	*Erythrina bidwillii*	Bidwill's coral tree	BEL	BEL OTHER
ERCA	DW	*Erythrina caffra*	Kaffirboom coral tree	BEL	BEL OTHER
ERCO	DX	*Erythrina coralloides*	Naked coral tree	BEL	BEL OTHER
ERDE	DY	*Eriobotrya deflexa*	Bronze loquat	BES	BES OTHER
ERFA	DZ	*Erythrina falcata*	Corticeira-da-serra	BEM	BEM OTHER
ERHU4	EA	*Erythrina humeana*	Natal coral tree	BDS	BDS OTHER
ERJA	EB	*Eriobotrya japonica*	Loquat tree	BES	BES OTHER
ERLY	EC	*Erythrina lysistemon*	Lysistemon coral tree	BEL	BEL OTHER
EU1	EE	*Eucalyptus* species	Gum	BEL	BEL OTHER
EUCA	EF	*Eucalyptus calophylla*	Redgum	BEL	BEL OTHER
EUCA1	EG	*Eucalyptus camaldulensis*	Red gum eucalyptus	BEL	BEL OTHER
EUCI	EH	*Eucalyptus cinerea*	Silver dollar eucalyptus	BEM	BEM OTHER
EUCI2	EI	*Eucalyptus citriodora*	Lemonscented gum	BEL	BEL OTHER
EUCL	EJ	*Eucalyptus cladocalyx*	Sugargum	BEL	BEL OTHER
EUCO24	EK	*Euphorbia cotinifolia*	Mexican shrubby spurge	BES	BES OTHER
EUCO3	EL	*Eucalyptus cornuta*	Yate	BEL	BEL OTHER
EUER	EM	*Eucalyptus erythrocorys*	Red-cap gum	BEM	BEM OTHER
HACA3	FV	*Harpephyllum caffrum*	Kaffir plum	BES	BES OTHER
HACA4	FW	*Harpephyllum caffrum*	Kaffir plum	BES	BES OTHER
HALA	FX	*Hakea laurina*	Pincushion tree	BES	BES OTHER

Southern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
HASU	FY	*Hakea suaveolens*	Sweet hakea; Scented hakea	CES	CES OTHER
HEAR	FZ	*Heteromeles arbutifolia*	Christmasberry	BES	BES OTHER
HIRO-SI	GA	*Hibiscus rosa-sinensis*	Chinese hibiscus	BES	BES OTHER
HOFO	GB	*Howea forsteriana*	Forster sentry palm	PEM	PEM OTHER
HYFL	GC	*Hymenosporum flavum*	Sweetshade; Australian fragipani	BES	BES OTHER
ILAL	GD	*Ilex altaclarensis*	Wilson holly	BES	BES OTHER
JAMI	GE	*Jacaranda mimosifolia*	Jacaranda	BDS	JAMI
JUCH	GF	*Juniperus chinensis*	Chinese juniper	CES	CES OTHER
JUHI	GG	*Juglans hindsii*	Hind walnut	BDL	BDL OTHER
JURE	GH	*Juglans regia*	English walnut	BDM	BDM OTHER
KOBI	GI	*Koelreuteria bipinnata*	Chinese flame tree	BDM	BDM OTHER
KOPA	GJ	*Koelreuteria paniculata*	Goldenrain tree	BDM	BDM OTHER
LAIN	GK	*Lagerstroemia indica*	Common crapemyrtle	BDS	BDS OTHER
LAPA	GL	*Lagunaria patersonii*	Primrose tree; cow itch tree	BEM	BEM OTHER
LE14	GM	*Leptospermum* species	Teatree	BES	BES OTHER
LELA12	GN	*Leptospermum laevigata*	Coastal teatree	BES	BES OTHER
LIAU9	GO	*Livistona australis*	Australian fan palm	BDM	BDM OTHER
LILU	GP	*Ligustrum lucidum*	Chinese privet	BEM	BEM OTHER
LIOR	GQ	*Liquidambar orientalis*	Oriental sweetgum	BDM	BDM OTHER
LIST	GR	*Liquidambar styraciflua*	Sweetgum	BDM	LIST
LITU	GS	*Liriodendron tulipifera*	Tulip tree	BDL	BDL OTHER
MABO	GT	*Maytenus boaria*	Mayten	BEM	BEM OTHER
MAFL80	GU	*Malus floribunda*	Japanese flowering crabapple	BDS	BDS OTHER
MAGR	GV	*Magnolia grandiflora*	Southern magnolia	BEM	MAGR
MAIN8	GW	*Macadamia integrifolia*	Macadamia nut	BES	BES OTHER
MALU4	GX	*Markhamia hildebrandtii*	Siala	BDS	BDS OTHER
MALU4	GY	*Markhamia lutea*	Siala	BDS	BDS OTHER
MAPU	GZ	*Malus sylvestris*	Apple	BDS	BDS OTHER
MASO	HA	*Magnolia x soulangiana*	Chinese magnolia; Saucer magnolia	BDS	BDS OTHER
MASY2	HB	*Malus sylvestris*	Apple	BDS	BDS OTHER
MATE	HC	*Macadamia tetraphylla*	Rough-shell macadamia	BES	BES OTHER
MATI	HD	*Machaerium tipu*	Tipa	BDS	BDS OTHER
MATI	HE	*Machaerium tipu*	Tipa	BDS	BDS OTHER
MATI	HF	*Tipuana tipu*	Tipa	BDS	BDS OTHER
MEAR	HG	*Melaleuca armillaris*	Drooping melaleuca	BES	BES OTHER
MEBR9	HH	*Melaleuca bracteata*	River teatree	BES	BES OTHER
MEBR9	HI	*Melaleuca genistifolia*	River teatree	BES	BES OTHER
MEEX	HJ	*Metrosideros excelsus*	New Zealand Christmas tree	BEM	MEEX
MENE	HK	*Melaleuca nesophila*	Pink melaleuca	BES	BES OTHER
MEQU	HL	*Melaleuca quinquenervia*	Cajeput tree	BEM	MEQU
MEST	HM	*Melaleuca styphelioides*	Melaleuca	BEM	BEM OTHER
MOAL	HN	*Morus alba*	White mulberry	BDL	BDL OTHER

Southern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
MU5	HO	*Musa* species	Banana	BES	BES OTHER
MYCO	HP	*Myrtus communis*	Myrtle	BES	BES OTHER
MYLA	HQ	*Myoporum laetum*	Mioporo	BES	BES OTHER
NEOL	HR	*Nerium oleander*	Oleander	BES	CACI
OLEU	HS	*Olea europaea*	Olive	BES	BES OTHER
OLEU	HT	*Olea europaea*	Olive	BES	BES OTHER
PALO8	HU	*Paraserianthes lophantha*	Plume albizia	BDS	BDS OTHER
PALO8	HV	*Albizia distachya*	Plume albizia	BDS	BDS OTHER
PALO8	HW	*Paraserianthes lophantha*	Plume albizia	BDS	BDS OTHER
PEAM	HX	*Persea americana*	Avocado	BDS	BDS OTHER
PEBO	HY	*Persea borbonia*	Redbay	BDS	BDS OTHER
PEIN17	HZ	*Persea indica*	Indian bay	BES	BES OTHER
PHCA	ID	*Phoenix canariensis*	Canary island date palm	PEL	PHCA
PHDA4	IE	*Phoenix dactylifera*	Date palm	PEM	PHDA4
PHFR	IF	*Photinia x fraseri*	Fraser photinia	BES	BES OTHER
PHRE	IG	*Phoenix reclinata*	Senegal date palm	PEM	PEM OTHER
PHRO	IH	*Phoenix roebelenii*	Pygmy date palm	PEM	PEM OTHER
PI1	IJ	*Picea* species	Spruce	CEL	CEL OTHER
PIBR2	IK	*Pinus brutia*	Turkish pine; East Mediterranean pine	CEL	PIBR2
PICA	IL	*Pinus canariensis*	Canary Island pine	CEL	PICA
PICH	IM	*Pistacia chinensis*	Chinese pistache	BDM	BDM OTHER
PICO5	IN	*Pinus contorta 'bolanderi'*	Bolander beach pine	CES	PICO5
PICR	IO	*Pittosporum crassifolium*	Stiffleaf cheesewood	BEM	BEM OTHER
PIDE	IP	*Pinus densiflora*	Japanese red pine	CEL	CEL OTHER
PIED	IQ	*Pinus edulis*	Pinyon pine	CES	CES OTHER
PIHA	IR	*Pinus halepensis*	Aleppo pine	CEL	CEL OTHER
PIPI2	IS	*Pinus pinea*	Italian stone pine	CEL	CEL OTHER
PIPI6	IT	*Pinus pinaster*	Maritime pine	CEL	CEL OTHER
PIRA	IU	*Pinus radiata*	Montery pine	CEL	CEL OTHER
PIRH	IV	*Pittosporum rhombifolium*	Queensland pittosporum	BEM	BEM OTHER
PIRO	IW	*Pinus roxburghii*	Chir pine	BES	BES OTHER
PITH	IX	*Pinus thunbergiana*	Japanese black pine	CES	CES OTHER
PITO	IY	*Pittosporum tobira*	Japanese pittosporum	BEM	BEM OTHER
PITO2	IZ	*Pinus torreyana*	Torrey pine	CEL	CEL OTHER
PIUN	JA	*Pittosporum undulatum*	Victorian box	BEM	PIUN
PIVI5	JB	*Pittosporum viridiflorum*	Cape cheesewood	BEM	BEM OTHER
PLAC	JC	*Platanus hybrida*	London planetree	BDL	PLAC
PLAC	JD	*Platanus acerifolia*	London planetree	BDL	BDL OTHER
PLAC	JE	*Platanus hybrida*	London planetree	BDL	BDL OTHER
PLRA	JF	*Platanus racemosa*	California sycamore	BDL	BDL OTHER
POAL	JG	*Populus alba*	White poplar	BDL	BDL OTHER
POGR2	JH	*Podocarpus gracilior*	Fern pine	BEL	POMA
POHE2	JI	*Podocarpus henkelii*	Long-leafed yellowwood	BES	BES OTHER
POMA	JK	*Podocarpus macrophyllus*	Yew podocarpus	BES	POMA
PONI	JL	*Populus nigra*	Black poplar	BDL	BDL OTHER

Southern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
PONI	JM	*Populus nigra*	Black poplar	BDL	BDL OTHER
PONI	JN	*Populus nigra var. italica*	Black poplar	BDL	BDL OTHER
PR	JO	*Prunus* species	Plum	BDS	BDS OTHER
PRAM2	JP	*Prunus amygdalus*	Almendro	BDS	BDS OTHER
PRAR	JQ	*Prunus armeniaca*	Apricot	BDS	BDS OTHER
PRCA	JR	*Prunus caroliniana*	Carolina laurelcherry	BES	BES OTHER
PRCA2	JS	*Prunus campanulata*	Taiwan cherry	BDS	BDS OTHER
PRCE	JT	*Prunus cerasifera*	Cherry plum	BDS	BDS OTHER
PRDO	JU	*Prunus domestica*	Common plum	BDS	BDS OTHER
PRDU	JV	*Prunus amygdalus*	Almendro	BDS	BDS OTHER
PRLY	JW	*Prunus ilicifolia ssp. lyonii*	Catalina cherry	BDS	BDS OTHER
PRLY	JX	*Prunus ilicifolia ssp. lyonii*	Catalina cherry	BDS	BDS OTHER
PRLY	JY	*Prunus lyonii*	Catalina cherry	BDS	BDS OTHER
PRPE2	JZ	*Prunus persica*	Peach	BDS	BDS OTHER
PRSE2	KA	*Prunus serrulata*	Kwanzan cherry	BDS	BDS OTHER
PSCA	KB	*Psidium cattleianum*	Strawberry guava	BES	BES OTHER
PSME	KC	*Pseudotsuga menziesii*	Douglas fir	CEL	CEL OTHER
PYCA	KD	*Pyrus calleryana*	Callery pear	BES	BES OTHER
PYCO	KE	*Pyrus communis*	Common pear	BES	BES OTHER
PYKA	KF	*Pyrus kawakamii*	Evergreen pear	BES	BES OTHER
QUAG	KG	*Quercus agrifolia*	Coastal live oak; California live oak	BEL	BEL OTHER
QUIL2	KH	*Quercus ilex*	Roble negro	BEL	BEL OTHER
QURU	KI	*Quercus rubra*	Northern red oak	BDL	BDL OTHER
QUSA2	KJ	*Quillaja saponaria*	Quillay	BES	BES OTHER
QUSU	KK	*Quercus suber*	Cork oak	BEL	BEL OTHER
QUVI	KL	*Quercus virginiana*	Live oak	BEL	BEL OTHER
RARI	KM	*Ravenea rivularis*	Majesty palm	BES	BES OTHER
RASA5	KN	*Rauvolfia samarensis*	Rauvolfia	BEL	BEL OTHER
RHBA7	KO	*Rhopalostylis baueri*	Norfolk Island palm	PES	PES OTHER
RHLA	KP	*Rhus lancea*	African sumac	BES	BES OTHER
ROPS	KQ	*Robinia pseudoacacia*	Black locust	BDL	BDL OTHER
SAMA	KR	*Salix matsudana*	Corkscrew willow	BDL	BDL OTHER
SAPE12	KS	*Salix x pendulina Wenderoth*	Wisconsin weeping willow	BDL	BDL OTHER
SASA	KT	*Sapindus saponaria*	Wingleaf soapberry	BES	BES OTHER
SCMO	KU	*Schinus molle*	California peppertree	BEM	BEM OTHER
SCPO	KV	*Schinus polygamus*	Huingan	BES	BES OTHER
SCTE	KW	*Schinus terebinthifolius*	Brazilian pepper	BES	SCTE
SESE	KX	*Sequoia sempervirens*	Coast redwood	CEL	CEL OTHER
SO1	KY	*Lycianthes rantonnei*	Paraguay nightshade	BES	BES OTHER
SPCA	KZ	*Spathodea campanulata*	African tulip tree	BEL	BEL OTHER
STNI	LA	*Strelitzia nicolai*	Bird of paradise tree	BES	BES OTHER
STSI	LB	*Stenocarpus sinuatus*	Firewheel tree	BES	BES OTHER
STUMP	LC	Stump	Stump		
SYPA2	LG	*Syzygium paniculatum*	Brush cherry	BEM	BEM OTHER
TACH3	LH	*Tabebuia chrysotricha*	Ipe-amarelo	BDM	BDM OTHER

Southern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
TAMU	LI	*Taxodium mucronatum*	Montezuma cypress	BDL	BDL OTHER
THOR	LJ	*Platycladus orientalis*	Oriental arbor vitae	CES	CES OTHER
THPE3	LK	*Thevetia peruviana*	Luckynut	BES	BES OTHER
TRCO	LL	*Tristaniopsis conferta*	Brisbane box	BES	TRCO
TRCO	LM	*Tristania conferta*	Brisbane box	BES	BES OTHER
TRCO	LN	*Tristaniopsis conferta*	Brisbane box	BES	BES OTHER
TRFO	LO	*Trachycarpus fortunei*	Windmill palm	PES	PES OTHER
TRLA	LP	*Tristaniopsis laurina*	Water gum; kanooka	BES	BES OTHER
TRLA	MA	*Tristania laurina*	Water gum; kanooka	BES	BES OTHER
TRLA	MB	*Tristaniopsis laurina*	Water gum; kanooka	BES	BES OTHER
TUCA	MC	*Tupidanthus calyptratus*	Tupidanthus	BES	BES OTHER
UKNW	MD	Unknown species	Unknown species	BEL	BEL OTHER
ULAM	ME	*Ulmus americana*	American elm	BDL	BDL OTHER
ULPA	MF	*Ulmus parvifolia*	Chinese elm	BEL	BEL OTHER
ULPU	MG	*Ulmus pumila*	Siberian elm	BEL	BEL OTHER
UMCA	MH	*Umbellularia californica*	California laurel	BEL	BEL OTHER
UNSUIT	MI	Unsuitable site	Unsuitable site		
VACANT	MJ	Vacant site	Vacant site		
VILU6	MK	*Vitex lucens*	Puriri	BEL	BEL OTHER
VITI2	ML	*Viburnum tinus*	Laurustinus	BES	BES OTHER
WAFI	MP	*Washingtonia filifera*	California palm	PES	WARO
WARO	MQ	*Washingtonia robusta*	Mexican fan palm	PES	WARO
XYCO	MR	*Xylosma congestum*	Shiny xylosma	BES	BES OTHER
YU1	MS	*Yucca* species	Yucca	BES	BES OTHER
YUGL2	MT	*Yucca gloriosa*	Moundlily yucca	BES	BES OTHER
YUGU	MU	*Yucca guatemalensis*	Bluestem yucca	BES	BES OTHER
YUGU	MV	*Yucca elephantipes*	Bluestem yucca	BES	BES OTHER
YUGU	MW	*Yucca guatemalensis*	Bluestem yucca	BES	BES OTHER
BDL OTHER	BF	Broadleaf Deciduous Large	Broadleaf Deciduous Large	BDL	PLAC
BDM OTHER	BG	Broadleaf Deciduous Medium	Broadleaf Deciduous Medium	BDM	LIST
BDS OTHER	BH	Broadleaf Deciduous Small	Broadleaf Deciduous Small	BDS	JAMI
BEL OTHER	BJ	Broadleaf Evergreen Large	Broadleaf Evergreen Large	BEL	EUFI181
BEM OTHER	BK	Broadleaf Evergreen Medium	Broadleaf Evergreen Medium	BEM	CICA
BES OTHER	BO	Broadleaf Evergreen Small	Broadleaf Evergreen Small	BES	POMA
CEL OTHER	CT	Conifer Evergreen Large	Conifer Evergreen Large	CEL	CEDE
CEM OTHER	CU	Conifer Evergreen Medium	Conifer Evergreen Medium	CEM	PIBR2
CES OTHER	CX	Conifer Evergreen Small	Conifer Evergreen Small	CES	PICO5
PEL OTHER	IA	Palm Evergreen Large	Palm Evergreen Large	PEL	PHCA
PEM OTHER	IB	Palm Evergreen Medium	Palm Evergreen Medium	PEM	PHDA4
PES OTHER	IC	Palm Evergreen Small	Palm Evergreen Small	PES	WARO
VOIDS	MO	NEEDS PREP SMALL	Void small	NONTREE	NONTREE
VOIDM	MN	NEEDS PREP MEDIUM	Void medium	NONTREE	NONTREE
VOIDL	MM	NEEDS PREP LARGE	Void large	NONTREE	NONTREE
AVPSS	BB	NO PREP SMALL	Available planting site small	NONTREE	NONTREE

Southern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
AVPSM	BA	NO PREP MEDIUM	Available planting site medium	NONTREE	NONTREE
AVPSL	AZ	NO PREP LARGE	Available planting site large	NONTREE	NONTREE
STUMPS	LF	REMOVE STUMP PLANT LARGE	Stump present small planting site	NONTREE	NONTREE
STUMPM	LE	REMOVE STUMP PLANT MEDIUM	Stump present medium planting site	NONTREE	NONTREE
STUMPL	LD	REMOVE STUMP PLANT LARGE	Stump present large planting site	NONTREE	NONTREE

Northern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
AB	AA	*Abies* species	Fir	CEL	CEL OTHER
ACBA2	AC	*Acacia baileyana*	Bailey acacia	BEM	ACME
ACDE2	AF	*Acacia dealbata*	Aromo del paÍs	BEM	ACME
ACDE	AE	*Acacia decurrens*	Green acacia	BEM	ACME
ACLO	AG	*Acacia longifolia*	Sydney golden wattle	BEM	ACME
ACME	AI	*Acacia melanoxylon*	Black acacia	BEM	ACME
ACVE2	AQ	*Acacia verticillata*	Prickly moses	BES	ACME
ACBU	AD	*Acer buergerianum*	Trident maple	BDS	BDS OTHER
ACMA	AH	*Acer macrophyllum*	Bigleaf maple	BDL	BDL OTHER
ACNE	AJ	*Acer negundo*	Boxelder	BDL	BDL OTHER
ACPA	AK	*Acer palmatum*	Japanese maple	BDS	ACPA
ACPL	AL	*Acer platanoides*	Norway maple	BDL	BDL OTHER
ACPS	AM	*Acer pseudoplatanus*	Sycamore maple	BDM	BDM OTHER
ACRU	AN	*Acer rubrum*	Red maple	BDM	BDM OTHER
ACSA1	AO	*Acer saccharinum*	Silver maple	BDL	BDL OTHER
ACSA2	AP	*Acer saccharum*	Sugar maple	BDL	BDL OTHER
AC	AB	*Acer* species	Maple	BDM	BDM OTHER
AECA2	AR	*Aesculus californica*	California buckeye	BES	BES OTHER
AEHI	AS	*Aesculus hippocastanum*	Horsechestnut	BES	BES OTHER
AGFL	AT	*Agonis flexuosa*	Peppermint tree	BES	BES OTHER
AIAL	AU	*Ailanthus altissima*	Tree of heaven	BDM	BDM OTHER
ALJU	AX	*Albizia julibrissin*	Mimosa	BDM	BDM OTHER
ALCO2	AW	*Alnus cordata*	Italian alder	BDM	BDM OTHER
ALRH	AY	*Alnus rhombifolia*	White alder	BDM	BDM OTHER
ALRU2	AZ	*Alnus rubra*	Red alder	BDM	BDM OTHER
ALAR	AV	*Aloe arborescens*	Tree aloe	PES	PES OTHER
ARHE	BB	*Araucaria heterophylla*	Araucaria	CEL	CEL OTHER
ARME	BC	*Arbutus menziesii*	Pacific madrone	BEM	BEM OTHER
ARUN	BE	*Arbutus unedo*	Strawberry tree	BES	BES OTHER
ARCU	BA	*Archontophoenix*	King palm	PES	PES OTHER

Northern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
		cunninghamiana			
ARRO	BD	*Arecastrum romanzoffianum*	Queen palm	PES	PES OTHER
BEAL2	BL	*Betula albo-sinensis*	Chinese birch	BDM	BDM OTHER
BENI	BO	*Betula nigra*	River birch	BDM	BDM OTHER
BEPE	BP	*Betula pendula*	European white birch	BDM	BDM OTHER
BRED	BS	*Brahea edulis*	Guadalupe palm	PES	PES OTHER
BRPA	BT	*Broussonetia papyrifera*	Paper mulberry	BDM	BDM OTHER
BUCA	BU	*Butia capitata*	Jelly palm	PES	PES OTHER
CACI	BX	*Callistemon citrinus*	Lemon bottlebrush	BES	BES OTHER
CASA5	CD	*Callistemon salignus*	White bottlebrush	BES	BES OTHER
CAVI	CF	*Callistemon viminalis*	Weeping bottlebrush	BES	BES OTHER
CADE2	BY	*Calocedrus decurrens*	Incense cedar	CEL	CEL OTHER
CACA3	BW	*Calodendrum capense*	Cape chesnut	BDM	BDM OTHER
CAJA9	CB	*Camellia japonica*	Camellia	BES	BES OTHER
CABE	BV	*Carpinus betulus*	European hornbeam	BDM	BDM OTHER
CALE	CC	*Cassia leptophylla*	Gold medallion tree	BES	BES OTHER
CAEQ	BZ	*Casuarina equisetifolia*	Australian pine	CEL	CEL OTHER
CAER	CA	*Catalpa erubescens*	Purple toned catalpa	BDM	BDM OTHER
CASP	CE	*Catalpa speciosa*	Northern catalpa	BDL	BDL OTHER
CETH	CT	*Ceanothus thyrsiflorus*	Blue blossom	BES	BES OTHER
CEAT	CG	*Cedrus atlantica*	Atlas cedar	CEL	CEL OTHER
CEDE	CJ	*Cedrus deodara*	Deodar cedar	CEL	CEL OTHER
CEAU	CH	*Celtis australis*	European hackberry	BDL	BDL OTHER
CEOC	CM	*Celtis occidentalis*	Northern hackberry	BDL	BDL OTHER
CERE	CO	*Celtis reticulata*	Western hackberry	BDS	BDS OTHER
CESI4	CS	*Celtis sinensis*	Chinese hackberry	BDL	BDL OTHER
CESI3	CR	*Ceratonia siliqua*	Algarrobo europeo	BEM	BEM OTHER
CECA	CI	*Cercis canadensis*	Eastern redbud	BDS	BDS OTHER
CEOC3	CN	*Cercis canadensis var. texensis*	Western redbud	BDS	BDS OTHER
CERE2	CP	*Cercis reniformis*	Southwestern redbud	BDS	BDS OTHER
CHFU	CU	*Chamaecyparis funebris*	Mourning cypress	CEL	CEL OTHER
CHLA2	CW	*Chamaecyparis lawsoniana*	Port orford cedar	CEL	CEL OTHER
CHHU	CV	*Chamaerops humilis*	Mediterranean fan palm	PES	PES OTHER
CHSP	CX	*Chorisia speciosa*	Palo borracho	CEL	CEL OTHER
CICA	CZ	*Cinnamomum camphora*	Camphor tree	BEM	CICA
CIAU	CY	*Citrus aurantifolia*	Lime	BES	BES OTHER
CILI	DA	*Citrus limon*	Lemon	BES	BES OTHER
CISI	DC	*Citrus sinensis*	Orange	BES	BES OTHER
CIPA	DB	*Citrus x paradisi*	Grapefruit	BES	BES OTHER
COAU	DD	*Cordyline australis*	Giant dracaena	PES	PES OTHER
CONU2	DG	*Cornus nuttallii*	Pacific dogwood	BDM	BDM OTHER
COCO1	DF	*Cotinus coggygria*	Smoke tree	BDS	BDS OTHER

Northern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
COBU	DE	*Cotoneaster buxifolius*	Cotoneaster	BES	BES OTHER
CRDO	DI	*Crataegus douglasii*	Black hawthorn	BDS	BDS OTHER
CRPH	DJ	*Crataegus phaenopyrum*	Washington hawthorn	BDS	BDS OTHER
CR	DH	*Crataegus* species	Hawthorn	BDS	BDS OTHER
CUAN	DK	*Cupaniopsis anacardioides*	Carrotwood	BES	BES OTHER
CULE	DM	*x Cupressocyparis leylandii*	Leyland cypress	CEM	CEM OTHER
CUAR	DL	*Cupressus arizonica*	Arizona cypress	CEM	CEM OTHER
CUMA	DN	*Cupressus macrocarpa*	Monterey cypress	CEL	CEL OTHER
CUSE	DO	*Cupressus sempervirens*	Italian cypress	CEM	CEM OTHER
CYSC4	DP	*Cytisus scoparius*	Scotchbroom	BDS	BDS OTHER
DAIM	DQ	*Dahlia imperialis*	Tree dahlia	BDS	BDS OTHER
DIVI	DR	*Diospyros virginiana*	Common persimmon	BDS	BDS OTHER
DOVI	DS	*Dodonaea viscosa*	Florida hopbush	BES	BES OTHER
DRDR	DT	*Dracaena draco*	Dragon tree	PES	PES OTHER
ERDE	DU	*Eriobotrya deflexa*	Bronze loquat	BES	BES OTHER
ERJA	DV	*Eriobotrya japonica*	Loquat tree	BES	BES OTHER
EUCI	DX	*Eucalyptus cinerea*	Silver dollar eucalyptus	BEM	EUGL
EUCI2	DY	*Eucalyptus citriodora*	Lemonscented gum	BEL	EUGL
EUFI81	DZ	*Eucalyptus ficifolia*	Redflower gum	BEM	EUGL
EUGL	EA	*Eucalyptus globulus*	Blue gum eucalyptus	BEL	EUGL
EUGU	EB	*Eucalyptus gunnii*	Cicer gum eucalyptus	BEL	EUGL
EULE2	EE	*Eucalyptus lehmannii*	Bushy yate	BES	EUGL
EULE	EC	*Eucalyptus leucoxylon*	White ironbark	BEM	EUGL
EUMA	EF	*Eucalyptus macrocarpa*	Bluebush	BES	EUGL
EUNI	EG	*Eucalyptus nicholii*	Willow-leaved gimlet	BEM	EUGL
EUPA26	EJ	*Eucalyptus parvifolia*	Kybean gum	BES	EUGL
EUPA26	EK	*Eucalyptus parvula*	Kybean gum	BES	EUGL
EUPO	EL	*Eucalyptus polyanthemos*	Sliver dollar gum eucalyptus	BEL	EUGL
EURU	EM	*Eucalyptus rudis*	Desert gum eucalyptus	BEL	EUGL
EUSI	EN	*Eucalyptus sideroxylon*	Red ironbark	BEL	EUGL
EU1	DW	*Eucalyptus* species	Gum	BEL	EUGL
EUTO11	EP	*Eucalyptus torquata*	Coral gum	BES	EUGL
EUNY	EH	*Eucryphia x nymansensis*	Namansay' eucryphia	BES	BES OTHER
EUPA2	EI	*Eugenia paniculata*	Brush cherry	BES	BES OTHER
EUSM	EO	*Eugenia smithii*	Lilly-pilly tree	BES	BES OTHER
FASY	EQ	*Fagus sylvatica*	European beech	BDL	BDL OTHER
FESE	ER	*Feijoa sellowiana*	Pineapple guava	BES	BES OTHER
FIBE	ES	*Ficus benjamina*	Benjamin fig	BEM	BEM OTHER
FICA	ET	*Ficus carica*	Common fig	BDS	BDS OTHER
FIEL	EU	*Ficus elastica*	Rubber plant	BES	BES OTHER
FIRE4	EV	*Ficus retusa ssp. nitida*	Indian laurel fig	BEM	BEM OTHER
FRAN2	EX	*Fraxinus angustifolia*	Raywood ash	BDM	FRVE
FR	EW	*Fraxinus* species	Ash	BDM	FRVE

Northern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
FRUH	FA	*Fraxinus uhdei*	Evergreen ash	BDL	BDL OTHER
FRVE	FB	*Fraxinus velutina*	Velvet ash	BDM	FRVE
FRCA6	EY	*Fremontodendron californicum*	California flannelbush	BES	BES OTHER
FRME2	EZ	*Fremontodendron mexicanum*	Mexican flannelbush	BES	BES OTHER
GAEL	FC	*Garrya elliptica*	Wavyleaf silktassel	BES	BES OTHER
GEPA	FD	*Geijera parviflora*	Wilga; australian willow	BEM	BEM OTHER
GIBI	FE	*Ginkgo biloba*	Ginkgo	BDM	GIBI
GLTR	FF	*Gleditsia triacanthos*	Honeylocust	BDM	ROPS
GRRO	FG	*Grevillea robusta*	Silk oak	BEL	BEL OTHER
HASU	FH	*Hakea suaveolens*	Sweet hakea; scented hakea	CES	CES OTHER
HEAR	FI	*Heteromeles arbutifolia*	Christmasberry	BES	BES OTHER
HISY	FJ	*Hibiscus syriacus*	Rose-of-sharon	BDS	BDS OTHER
HYFL	FK	*Hymenosporum flavum*	Sweetshade; Australian fragipani	BES	BES OTHER
ILAL	FL	*Ilex altaclarensis*	Wilson holly	BES	BES OTHER
ILCO2	FM	*Ilex cornuta*	Chinese holly	BES	BES OTHER
JAMI	FO	*Jacaranda mimosifolia*	Jacaranda	BDM	BDM OTHER
JA6	FN	*Jasminum* species	Jasmine	BES	BES OTHER
JUNI	FS	*Juglans nigra*	Black walnut	BDL	BDL OTHER
JURE	FU	*Juglans regia*	English walnut	BDM	BDM OTHER
JUCA1	FQ	*Juniperus californica*	California juniper	CEM	CEM OTHER
JUCH	FR	*Juniperus chinensis*	Chinese juniper	CES	CES OTHER
JUOC	FT	*Juniperus occidentalis*	Western juniper	CEL	CEL OTHER
JU	FP	*Juniperus* species	Juniper	CES	CES OTHER
KOBI	FV	*Koelreuteria bipinnata*	Chinese flame tree	BDM	BDM OTHER
KOEL	FW	*Koelreuteria elegans*	Flamegold	BDM	BDM OTHER
LAIN	FX	*Lagerstroemia indica*	Common crapemyrtle	BDS	BDS OTHER
LAPA	FZ	*Lagunaria patersonii*	Primrose tree; cow itch tree	BEM	BEM OTHER
LANO	FY	*Laurus nobilis*	Laurel de olor	BEM	BEM OTHER
LELA12	GA	*Leptospermum laevigata*	Coastal teatree	BES	BES OTHER
LIJA	GD	*Ligustrum japonicum*	Ligustro	BES	BES OTHER
LILU	GE	*Ligustrum lucidum*	Chinese privet	BEM	BEM OTHER
LIOV	GF	*Ligustrum ovalifolium*	California privet	BES	BES OTHER
LIFO	GC	*Liquidambar formosana*	Chinese sweet gum	BDM	BDM OTHER
LIST	GG	*Liquidambar styraciflua*	Sweetgum	BDM	LIST
LITU	GH	*Liriodendron tulipifera*	Tulip tree	BDL	LITU
LIDE	GB	*Lithocarpus densiflorus*	Tanoak	BEL	BEL OTHER
LYRA	GJ	*Lycianthes rantonnei*	Paraguay nightshade	BES	BES OTHER
LYFL	GI	*Lyonothamnus floribundus*	Lyontree	BEM	BEM OTHER
MATI	GR	*Machaerium tipu*	Tipa	BDS	BDS OTHER
MAGR	GM	*Magnolia grandiflora*	Southern magnolia	BEM	MAGR
MASO	GO	*Magnolia x soulangiana*	Chinese magnolia; Saucer	BDS	BDS OTHER

Northern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
			magnolia		
MAST	GP	*Magnolia stellata*	Star magnolia	BDS	BDS OTHER
PYIO	JP	*Malus ioensis*	Prairie crabapple	BDS	BDS OTHER
MAPU	GN	*Malus pumila*	Paradise apple	BDS	BDS OTHER
MA2	GK	*Malus* species	Apple	BDS	BDS OTHER
MASY2	GQ	*Malus sylvestris*	Common crabapple	BDS	BDS OTHER
MABO	GL	*Maytenus boaria*	Mayten	BEM	BEM OTHER
MELE	GV	*Melaleuca leucadendra*	Punk tree	BEM	BEM OTHER
MELI7	GW	*Melaleuca linariifolia*	Cajeput tree	BES	BES OTHER
MENE	GX	*Melaleuca nesophila*	Pink melaleuca	BES	BES OTHER
MEQU	GY	*Melaleuca quinquenervia*	Cajeput tree	BEM	BEM OTHER
MEST	GZ	*Melaleuca styphelioides*	Melaleuca	BEM	BEM OTHER
MEAZ	GS	*Melia azedarach*	Chinaberry	BDM	BDM OTHER
MEGL	GU	*Metasequoia glyptostroboides*	Dawn redwood	BDL	BDL OTHER
MEEX	GT	*Metrosideros excelsus*	New zealand christmas tree	BEM	BEM OTHER
MOAR	HB	*Montanoa arborescens*	Daisy tree	BES	BES OTHER
MYCA	HD	*Morella californica*	Pacific bayberry	BES	BES OTHER
MOAL	HA	*Morus alba*	White mulberry	BDM	BDM OTHER
MUPA3	HC	*Musa x paradisiaca*	French plantain	BES	BES OTHER
MYLA	HE	*Myoporum laetum*	Mioporo	BES	BES OTHER
NEOL	HF	*Nerium oleander*	Oleander	BES	BES OTHER
NIGL	HG	*Nicotiana glauca*	Tree tobacco	BES	BES OTHER
NYSY	HH	*Nyssa sylvatica*	Black tupelo	BDM	BDM OTHER
OLEU	HI	*Olea europaea*	Olive	BEM	BEM OTHER
OPFI	HJ	*Opuntia ficus-indica*	Tuna cactus	CES	CES OTHER
OTHER	HK	Other	Other	BDM	BDM OTHER
BR	BR	*Brahea* species	Palm(brahea)	PES	PES OTHER
PEAM	HL	*Persea americana*	Avocado	BEM	BEM OTHER
PHCA	HQ	*Phoenix canariensis*	Canary island date palm	PEL	PEL OTHER
PHDA4	HR	*Phoenix dactylifera*	Date palm	PEM	PHDA4
PHRO	HT	*Phoenix roebelenii*	Pygmy date palm	PES	PES OTHER
PHFR	HS	*Photinia x fraseri*	Fraser photinia	BES	BES OTHER
PH18	HP	*Phyllostachys* species	Bamboo	BES	BES OTHER
PIPU	IF	*Picea pungens*	Blue spruce	CEL	CEL OTHER
PICA	HW	*Pinus canariensis*	Canary island pine	CEL	PIRA
PICE	HX	*Pinus cembroides*	Mexican pinyon	CES	PIRA
PICO2	HZ	*Pinus coulteri*	Coulter pine	CEL	PIRA
PIHA	IC	*Pinus halepensis*	Aleppo pine	CEL	PIRA
PIPA4	ID	*Pinus patula*	NCN	CEL	PIRA
PIPI2	IE	*Pinus pinea*	Itailian stone pine	CEL	PIRA
PIRA	IG	*Pinus radiata*	Montery pine	CEL	PIRA
PI2	HU	*Pinus* species	Pine	CEM	PIRA
PITH	IJ	*Pinus thunbergiana*	Japanese black pine	CEL	PIRA

Northern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
PITO2	IL	*Pinus torreyana*	Torrey pine	CEL	PIRA
PICH	HY	*Pistacia chinensis*	Chinese pistache	BDM	PICH
PICR	IA	*Pittosporum crassifolium*	Stiffleaf cheesewood	BES	PIUN
PIEU	IB	*Pittosporum eugenioides*	Tarata	BES	PIUN
PIRH	IH	*Pittosporum rhombifolium*	Queensland pittosporum	BES	PIUN
PI23	HV	*Pittosporum* species	Cheesewood	BES	PIUN
PITO	IK	*Pittosporum tobira*	Japanese pittosporum	BES	PIUN
PIUN	IM	*Pittosporum undulatum*	Victorian box	BEM	PIUN
PIVI5	IN	*Pittosporum viridiflorum*	Cape cheesewood	BES	PIUN
PLAC	IO	*Platanus hybrida*	London planetree	BDL	PLAC
PLRA	IP	*Platanus racemosa*	California sycamore	BDL	BDL OTHER
POGR2	IT	*Podocarpus gracilior*	Fern pine	BEL	BEL OTHER
POMA	IU	*Podocarpus macrophyllus*	Yew podocarpus	BES	BES OTHER
POAL	IQ	*Populus alba*	White poplar	BDL	BDL OTHER
POBA	IR	*Populus balsamifera*	Balsam poplar	BDL	BDL OTHER
POFR	IS	*Populus fremontii*	Fremont cottonwood	BDL	BDL OTHER
PONI	IV	*Populus nigra*	Black poplar	BDL	BDL OTHER
POTR1	IW	*Populus tremuloides*	Quaking aspen	BDM	BDM OTHER
PRAM2	IY	*Prunus amygdalus*	Almendro	BDS	BDS OTHER
PRAR	IZ	*Prunus armeniaca*	Apricot	BDS	BDS OTHER
PRBL	JA	*Prunus blieriana*	Blierana plum	BDS	BDS OTHER
PRCA	JB	*Prunus caroliniana*	Carolina laurelcherry	BDS	BDS OTHER
PRCE	JC	*Prunus cerasifera*	Cherry plum	BDS	PRCE
PRDO	JD	*Prunus domestica*	Common plum	BDS	BDS OTHER
PRIL	JE	*Prunus ilicifolia*	Hollyleaf cherry	BDS	BDS OTHER
PRLY	JF	*Prunus ilicifolia ssp. lyonii*	Catalina cherry	BDS	BDS OTHER
PRPE2	JG	*Prunus persica*	Peach	BDS	BDS OTHER
PRPI	JH	*Prunus pissardii*	Purpleleaf plum	BDS	BDS OTHER
PRSE2	JI	*Prunus serrulata*	Kwanzan cherry	BDS	BDS OTHER
PR	IX	*Prunus* species	Plum	BDS	BDS OTHER
PRYE	JK	*Prunus yedoensis*	Yoshino flowering cherry	BDS	BDS OTHER
PSME	JL	*Pseudotsuga menziesii*	Douglas fir	CEL	CEL OTHER
PTTR	JM	*Ptelea trifoliata*	Common hoptree	BDS	BDS OTHER
PYSP	JR	*Pyracantha* species	Firethorn	BES	BES OTHER
PYCA	JN	*Pyrus calleryana*	Callery pear	BDM	PYCA
PYCO	JO	*Pyrus communis*	Common pear	BDS	BDS OTHER
PYKA	JQ	*Pyrus kawakamii*	Evergreen pear	BES	PYKA
QUAG	JT	*Quercus agrifolia*	Coastal live oak; California live oak	BEL	QUAG
QUCH	JU	*Quercus chrysolepis*	Canyon live oak	BEL	QUAG
QUCO	JV	*Quercus coccinea*	Scarlet oak	BDL	QUAG
QUIL2	JW	*Quercus ilex*	Roble negro	BEL	QUAG
QUKE	JX	*Quercus kelloggii*	California black oak	BEL	QUAG
QULO	JY	*Quercus lobata*	California white oak	BDL	QUAG

Northern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
QUPA	JZ	*Quercus palustris*	Pin oak	BDL	QUAG
QURO	KA	*Quercus robur*	English oak	BDL	QUAG
QURU	KB	*Quercus rubra*	Northern red oak	BDL	QUAG
QU	JS	*Quercus* species	Oak	BDL	QUAG
QUSU	KC	*Quercus suber*	Cork oak	BEL	QUAG
QUVI	KD	*Quercus virginiana*	Live oak	BEL	QUAG
RHIN2	KE	*Rhaphiolepis*	Indian hawthorn	BES	BES OTHER
RHSP1	KH	*Rhododendron* species	Rhododendron	BES	BES OTHER
RHLA	KF	*Rhus lancea*	African sumac	BES	BES OTHER
RHOV	KG	*Rhus ovata*	Sugar sumac	BES	BES OTHER
ROPS	KI	*Robinia pseudoacacia*	Black locust	BDM	ROPS
SABA	KL	*Salix x sepulcralis Simonkai*	Weeping willow	BDM	BDM OTHER
SADI	KN	*Salix discolor*	Pussy willow	BDS	BDS OTHER
SALA1	KO	*Salix lasiolepis*	Arroya willow	BDS	BDS OTHER
SALU	KP	*Salix lucida*	Shining willow	BDS	BDS OTHER
SAMA	KQ	*Salix matsudana*	Corkscrew willow	BDM	BDM OTHER
SA	KJ	*Salix* species	Willow	BDM	BDM OTHER
SA12	KK	*Salvia* species	Sage	BDS	BDS OTHER
SACA	KM	*Sambucus nigra ssp. canadensis*	Common elderberry	BDS	BDS OTHER
SC3	KR	*Schefflera* species	Schefflera	BES	BES OTHER
SCMO	KS	*Schinus molle*	California peppertree	BEM	BEM OTHER
SCPO	KT	*Schinus polygamus*	Huingan	BES	BES OTHER
SCTE	KU	*Schinus terebinthifolius*	Brazilian pepper	BES	BES OTHER
SESE	KW	*Sequoia sempervirens*	Coast redwood	CEL	SESE
SEGI	KV	*Sequoiadendron giganteum*	Giant sequoia	CEL	CEL OTHER
SETR	KX	*Sesbania tripetii*	Scarlett wisteria	BDS	BDS OTHER
STNI	KY	*Strelitzia nicolai*	Bird of paradise tree	BES	BES OTHER
SYRE	LC	*Syringa reticulata*	Japanese tree lilac	BDS	BDS OTHER
TAIM	LF	*Tabebuia impetiginosa*	Pink trumpet tree	BES	BES OTHER
TACH2	LE	*Tamarix chinensis*	Fivestamen tamarisk	BDS	BDS OTHER
TABA	LD	*Taxus baccata*	English yew	BES	BES OTHER
THOC	LG	*Thuja occidentalis*	Northern white cedar	CEL	CEL OTHER
THPL	LH	*Thuja plicata*	Western red cedar	CEL	CEL OTHER
TIUR	LK	*Tibouchina urvilleana*	Princess-flower	BES	BES OTHER
TICO	LI	*Tilia cordata*	Littleleaf linden	BDM	BDM OTHER
TIEU	LJ	*Tilia x vulgaris*	Common linden	BDM	BDM OTHER
TRFO	LM	*Trachycarpus fortunei*	Windmill palm	PES	PES OTHER
TRSE6	LO	*Triadica sebifera*	Tallowtree	BDM	BDM OTHER
TRCO	LL	*Tristaniopsis conferta*	Brisbane box	BEL	BEL OTHER
TRLA	LN	*Tristaniopsis laurina*	Water gum; kanooka	BES	BES OTHER
ULAM	LP	*Ulmus americana*	American elm	BDL	ULAM
ULPA	MA	*Ulmus parvifolia*	Chinese elm	BDL	ULPA

Northern California Coast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ULPU	MB	*Ulmus pumila*	Siberian elm	BDL	ULAM
UMCA	MC	*Umbellularia californica*	California laurel	BEL	BEL OTHER
VIJA	MD	*Viburnum japonicum*	Japanese viburnum	BES	BES OTHER
WAFI	MH	*Washingtonia filifera*	California palm	PES	PES OTHER
WARO	MI	*Washingtonia robusta*	Mexican fan palm	PES	WARO
XYCO	MJ	*Xylosma congestum*	Shiny xylosma	BES	BES OTHER
YUAL	MK	*Yucca aloifolia*	Aloe yucca	BES	BES OTHER
YUGL2	ML	*Yucca gloriosa*	Moundlily yucca	BES	BES OTHER
YURE	MM	*Yucca recurvifolia*	Curveleaf yucca	BES	BES OTHER
YUTO	MN	*Yucca torreyi*	Torrey yucca	BES	BES OTHER
ZESE	MO	*Zelkova serrata*	Japanese zelkova	BDL	BDL OTHER
BDL OTHER	BI	Broadleaf Deciduous Large	Broadleaf Deciduous Large	BDL	PLAC
BDM OTHER	BJ	Broadleaf Deciduous Medium	Broadleaf Deciduous Medium	BDM	FRVE
BDS OTHER	BK	Broadleaf Deciduous Small	Broadleaf Deciduous Small	BDS	PRCE
BEL OTHER	BM	Broadleaf Evergreen Large	Broadleaf Evergreen Large	BEL	QUAG
BEM OTHER	BN	Broadleaf Evergreen Medium	Broadleaf Evergreen Medium	BEM	CICA
BES OTHER	BQ	Broadleaf Evergreen Small	Broadleaf Evergreen Small	BES	PYKA
CEL OTHER	CK	Conifer Evergreen Large	Conifer Evergreen Large	CEL	SESE
CEM OTHER	CL	Conifer Evergreen Medium	Conifer Evergreen Medium	CEM	PIBR2
CES OTHER	CQ	Conifer Evergreen Small	Conifer Evergreen Small	CES	PICO5
PEL OTHER	HM	Palm Evergreen Large	Palm Evergreen Large	PEL	PHCA
PEM OTHER	HN	Palm Evergreen Medium	Palm Evergreen Medium	PEM	PHDA4
PES OTHER	HO	Palm Evergreen Small	Palm Evergreen Small	PES	WARO
VOIDS	MG	NEEDS PREP SMALL	Void small	NONTREE	NONTREE
VOIDM	MF	NEEDS PREP MEDIUM	Void medium	NONTREE	NONTREE
VOIDL	ME	NEEDS PREP LARGE	Void large	NONTREE	NONTREE
AVPSS	BH	NO PREP SMALL	Available planting site small	NONTREE	NONTREE
AVPSM	BG	NO PREP MEDIUM	Available planting site medium	NONTREE	NONTREE
AVPSL	BF	NO PREP LARGE	Available planting site large	NONTREE	NONTREE
STUMPS	LB	REMOVE STUMP PLANT LARGE	Stump present small planting site	NONTREE	NONTREE
STUMPM	LA	REMOVE STUMP PLANT MEDIUM	Stump present medium planting site	NONTREE	NONTREE
STUMPL	KZ	REMOVE STUMP PLANT LARGE	Stump present large planting site	NONTREE	NONTREE

Northeast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ACPL	AL	*Acer platanoides*	Norway maple	BDL	ACPL
ACPLCO	AM	*Acer platanoides* 'columnare'	Columnare maple	BDL	ACPL
ACPLCR	AN	*Acer platanoides* 'Crimson king'	Crimson king maple	BDL	ACPL
ACPLSC	AO	*Acer platanoides* 'schwedleri'	Schwedleri Norway maple	BDL	ACPL
ACPS	AP	*Acer pseudoplatanus*	Sycamore maple	BDL	ACPL
ACSA1	AT	*Acer saccharinum*	Silver maple	BDL	ACSA1
ACSA2	AU	*Acer saccharum*	Sugar maple	BDL	ACSA2
ACSA2GR	AV	*Acer saccharum* 'green mountain'	Green mountain sugar maple	BDL	ACSA2
AEHI	AX	*Aesculus hippocastanum*	Horsechestnut	BDL	AEHI
AEOC	AY	*Aesculus octandra*	Yellow buckeye	BDL	AEHI
AIAL	AZ	*Ailanthus altissima*	Tree of heaven	BDL	BDL OTHER
BEAL	BL	*Betula alleghaniensis*	Yellow birch	BDL	BDL OTHER
BELE	BN	*Betula lenta*	Black birch	BDL	BDL OTHER
BENI	BP	*Betula nigra*	River birch	BDL	BDL OTHER
BEPA	BQ	*Betula papyrifera*	Paper birch	BDL	BDL OTHER
CA1	BX	*Carya* species	Hickory	BDL	BDL OTHER
CACO	CB	*Carya cordiformis*	Bitternut hickory	BDL	BDL OTHER
CADE	CC	*Castanea dentata*	American chestnut	BDL	BDL OTHER
CAGL	CE	*Carya glabra*	Pignut hickory	BDL	BDL OTHER
CAOV	CH	*Carya ovata*	Shagbark hickory	BDL	BDL OTHER
CATE	CK	*Carya texana*	Black hickory	BDL	BDL OTHER
CATO	CL	*Carya alba*	Mockernut hickory	BDL	BDL OTHER
CEOC	CS	*Celtis occidentalis*	Northern hackberry	BDL	BDL OTHER
COCO2	CZ	*Corylus colurna*	Turkish hazelnut	BDL	BDL OTHER
EUUL	DN	*Eucommia ulmoides*	Hardy rubber tree	BDL	BDL OTHER
FA	DO	*Fagus* species	Beech	BDL	BDL OTHER
FAGR	DP	*Fagus grandifolia*	American beech	BDL	BDL OTHER
FASY	DQ	*Fagus sylvatica*	European beech	BDL	BDL OTHER
FR	DR	*Fraxinus* species	Ash	BDL	FRPE
FRAM	DS	*Fraxinus americana*	White ash	BDL	FRPE
FRCA	DT	*Fraxinus caroliniana*	Carolina ash	BDL	FRPE
FRNI	DU	*Fraxinus nigra*	Black ash	BDL	FRPE
FRPE	DV	*Fraxinus pennsylvanica*	Green ash	BDL	FRPE
FRPES	DW	*Fraxinus pennsylvanica* 'summit'	Summit green ash	BDL	FRPE
GIBI	DX	*Ginkgo biloba*	Ginkgo	BDL	GIBI
GIBI(F)	DY	*Gingko biloba*, female	Female ginkgo	BDL	GIBI
GLTR	DZ	*Gleditsia triacanthos*	Honeylocust	BDL	GLTR
GYDI	EA	*Gymnocladus dioicus*	Kentucky coffeetree	BDL	BDL OTHER
JUCI	EI	*Juglans cinerea*	Butternut	BDL	BDL OTHER
JUNI	EJ	*Juglans nigra*	Black walnut	BDL	BDL OTHER

Northeast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
JURE	EK	*Juglans regia*	English walnut	BDL	BDL OTHER
LADE	EO	*Larix decidua*	European larch	BDL	BDL OTHER
LIST	EQ	*Liquidambar styraciflua*	Sweetgum	BDL	LIST
LITU	ER	*Liriodendron tulipifera*	Tulip tree	BDL	BDL OTHER
MEGL	FC	*Metasequoia glyptostroboides*	Dawn redwood	BDL	BDL OTHER
PLAC	GG	*Platanus hybrida*	London planetree	BDL	PLAC
PLOC	GH	*Platanus occidentalis*	American sycamore	BDL	PLAC
PO	GI	*Populus* species	Cottonwood	BDL	BDL OTHER
POAL	GJ	*Populus alba*	White poplar	BDL	BDL OTHER
POBA	GK	*Populus balsamifera*	Balsam poplar	BDL	BDL OTHER
POCA	GL	*Populus x canescens*	Gray poplar	BDL	BDL OTHER
PODE	GM	*Populus deltoides*	Eastern cottonwood	BDL	BDL OTHER
POGR	GN	*Populus grandidentata*	Bigtooth aspen	BDL	BDL OTHER
PONI	GO	*Populus nigra*	Black poplar	BDL	BDL OTHER
PONIIT	GP	*Populus nigra* 'italica'	Lombardy poplar	BDL	BDL OTHER
POTR1	GQ	*Populus tremuloides*	Quaking aspen	BDL	BDL OTHER
POTR2	GR	*Populus balsamifera* ssp. *trichocarpa*	Black cottonwood	BDL	BDL OTHER
PRSE1	HD	*Prunus serotina*	Black cherry	BDL	PRSE2
QU	HP	*Quercus* species	Oak	BDL	QUPA
QUAC	HQ	*Quercus acutissima*	Sawtooth oak	BDL	QUPA
QUAL	HR	*Quercus alba*	White oak	BDL	QUPA
QUAU	HS	*Quercus austrina*	Bluff oak	BDL	QUPA
QUBI	HT	*Quercus bicolor*	Swamp white oak	BDL	QUPA
QUCO	HU	*Quercus coccinea*	Scarlet oak	BDL	QUPA
QUEL	HV	*Quercus ellipsoidalis*	Northern pin oak	BDL	QUPA
QUFA	HW	*Quercus falcata*	Southern red oak	BDL	QUPA
QUIM	HX	*Quercus imbricaria*	Shingle oak	BDL	QUPA
QULY	HY	*Quercus lyrata*	Overcup oak	BDL	QUPA
QUMA1	HZ	*Quercus macrocarpa*	Bur oak	BDL	QUPA
QUMA2	IA	*Quercus marilandica*	Blackjack oak	BDL	QUPA
QUMU	IB	*Quercus muehlenbergii*	Chinkapin oak	BDL	QUPA
QUNI	IC	*Quercus nigra*	Water oak	BDL	QUPA
QUPA	ID	*Quercus palustris*	Pin oak	BDL	QUPA
QUPAFA	IE	*Quercus palustris fastigiata*	Fastigiate pin oak	BDL	QUPA
QUPH	IF	*Quercus phellos*	Willow oak	BDL	QUPH
QUPR	IG	*Quercus prinus*	Chestnut oak	BDL	QURU
QURO	IH	*Quercus robur*	English oak	BDL	QURU
QURU	IJ	*Quercus rubra*	Northern red oak	BDL	QURU
QUSH	IK	*Quercus shumardii*	Shumard oak	BDL	QURU
QUST	IL	*Quercus stellata*	Post oak	BDL	QURU
QUVE	IM	*Quercus velutina*	Black oak	BDL	QURU
QUVI	IN	*Quercus virginiana*	Live oak	BDL	QURU

Northeast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ROPS	IQ	*Robinia pseudoacacia*	Black locust	BDL	BDL OTHER
TADI	JE	*Taxodium distichum*	Baldcypress	BDL	BDL OTHER
TI	JG	*Tilia* species	Basswood	BDL	TITO
TIAM	JH	*Tilia americana*	American basswood	BDL	TITO
TIPL	JL	*Tilia platyphyllos*	Bigleaf linden	BDL	TITO
TITO	JM	*Tilia tomentosa*	Silver linden	BDL	TITO
ULAM	JP	*Ulmus americana*	American elm	BDL	ULAM
ULCAHO	JQ	*Ulmus carpinifolia* 'hollandica'	Smoothleaf elm	BDL	ULAM
ULPA	JR	*Ulmus parvifolia*	Chinese elm	BDL	ULAM
ULPR	JT	*Ulmus procera*	English elm	BDL	ULAM
ULPU	JU	*Ulmus pumila*	Siberian elm	BDL	ULAM
ULS	JW	Elm	Elm	BDL	ULAM
ULSE	JX	*Ulmus serotina*	September elm	BDL	ULAM
ZE	JZ	*Zelkova* species	Zelkova	BDL	ZESE
ZESE	KA	*Zelkova serrata*	Japanese zelkova	BDL	ZESE
BDL OTHER	BH	Broadleaf Deciduous Large Other	BDL OTHER	BDL	ZESE
AC	AE	*Acer* species	Maple	BDM	ACPL
ACCA	AG	*Acer campestre*	Hedge maple	BDM	ACPL
ACNE	AI	*Acer negundo*	Boxelder	BDM	ACPL
ACRU	AQ	*Acer rubrum*	Red maple	BDM	ACRU
ACRUAR	AR	*Acer rubrum* 'armstrong'	Scarlet maple	BDM	ACRU
ACRUOC	AS	*Acer rubrum* 'October glory'	October glory red maple	BDM	ACRU
AECA	AW	*Aesculus x carnea*	Red horsechestnut	BDM	AEHI
BE	BK	*Betula* species	Birch	BDM	BDM OTHER
BEPE	BR	*Betula pendula*	European white birch	BDM	BDM OTHER
BEPEGR	BS	*Betula pendula gracilis*	Weeping birch	BDM	BDM OTHER
BEPO	BT	*Betula populifolia*	Gray birch	BDM	BDM OTHER
BRPA	BV	*Broussonetia papyrifera*	Paper mulberry	BDM	BDM OTHER
CABE	BY	*Carpinus betulus*	European hornbeam	BDM	BDM OTHER
CABI	BZ	*Catalpa bignonioides*	Southern catalpa	BDM	BDM OTHER
CACA	CA	*Carpinus caroliniana*	American hornbeam	BDM	BDM OTHER
CAJA	CF	*Carpinus japonica*	Japanese hornbeam	BDM	BDM OTHER
CAMO	CG	*Castanea mollissima*	Chinese chestnut	BDM	BDM OTHER
CASP	CJ	*Catalpa speciosa*	Northern catalpa	BDM	BDM OTHER
CEJA	CP	*Cercidiphyllum japonicum*	Katsura tree	BDM	BDM OTHER
CLLU	CW	*Cladrastis kentukea*	Yellowwood	BDM	BDM OTHER
DIVI	DK	*Diospyros virginiana*	Common persimmon	BDM	BDM OTHER
MAAM9	EU	*Maackia amurensis*	Amur maackia	BDM	BDM OTHER
MOAL	FD	*Morus alba*	White mulberry	BDM	BDM OTHER
MORU	FE	*Morus rubra*	Red mulberry	BDM	BDM OTHER
NYSY	FG	*Nyssa sylvatica*	Black tupelo	BDM	BDM OTHER
OSVI	FH	*Ostrya virginiana*	Eastern hophornbeam	BDM	BDM OTHER

Northeast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
PATO	FI	*Paulownia tomentosa*	Royal paulownia	BDM	BDM OTHER
PHAM	FM	*Phellodendron amurense*	Amur corktree	BDM	BDM OTHER
PRAV	GV	*Prunus avium*	Sweet cherry	BDM	PRSE2
SA	IR	*Salix* species	Willow	BDM	BDM OTHER
SAAL	IS	*Sassafras albidum*	Sassafras	BDM	BDM OTHER
SABA	IT	*Salix x sepulcralis Simonkai*	Weeping willow	BDM	BDM OTHER
SAMA	IU	*Salix matsudana*	Corkscrew willow	BDM	BDM OTHER
SANI	IV	*Salix nigra*	Black willow	BDM	BDM OTHER
SOJA	JA	*Sophora japonica*	Japanese pagoda tree	BDM	BDM OTHER
STJA	JB	*Styrax japonicus*	Japanese snowbell	BDM	BDM OTHER
TICO	JI	*Tilia cordata*	Littleleaf linden	BDM	TICO
TICOGR	JK	*Tilia cordata 'greenspire'*	Greenspire littleleaf linden	BDM	TICO
ULAL	JO	*Ulmus alata*	Winged elm	BDM	ULAM
ULRU	JV	*Ulmus rubra*	Slippery elm	BDM	ULAM
BDM OTHER	BI	Broadleaf Deciduous Medium Other	BDM OTHER	BDM	ACRU
ACBU	AF	*Acer buergerianum*	Trident maple	BDS	ACPL
ACGI	AH	*Acer ginnala*	Amur maple	BDS	ACPL
ACPA	AJ	*Acer palmatum*	Japanese maple	BDS	ACPL
ACPE	AK	*Acer pensylvanicum*	Striped maple	BDS	ACPL
ALJU	BA	*Albizia julibrissin*	Mimosa	BDS	BDS OTHER
AM	BB	*Amelanchier* species	Serviceberry	BDS	BDS OTHER
AMAR	BC	*Amelanchier arborea*	Downy serviceberry	BDS	BDS OTHER
AMCA	BD	*Amelanchier canadensis*	Eastern service berry	BDS	BDS OTHER
ASTR	BG	*Asimina triloba*	Pawpaw	BDS	BDS OTHER
CAPU	CI	*Castanea pumila*	Alleghany chinkapin	BDS	BDS OTHER
CECA	CN	*Cercis canadensis*	Eastern redbud	BDS	BDS OTHER
CO1	CX	*Cornus* species	Dogwood	BDS	BDS OTHER
CO2	CY	*Corylus* species	Hazelnut	BDS	BDS OTHER
COFL	DA	*Cornus florida*	Flowering dogwood	BDS	BDS OTHER
COKO	DB	*Cornus kousa*	Kousa dogwood	BDS	BDS OTHER
COMA	DC	*Cornus mas*	Cornelian cherry	BDS	BDS OTHER
CR	DD	*Crataegus* species	Hawthorn	BDS	BDS OTHER
CRCR	DE	*Crataegus crus-galli*	Cockspur hawthorn	BDS	BDS OTHER
CRMO2	DG	*Crataegus mollis* 'scheele'	Arnold hawthorn	BDS	BDS OTHER
CRPH	DH	*Crataegus phaenopyrum*	Washington hawthorn	BDS	BDS OTHER
CRVI	DI	*Crataegus viridis*	Green hawthorn	BDS	BDS OTHER
ELAN	DL	*Elaeagnus angustifolia*	Russian olive	BDS	BDS OTHER
HADI	EB	*Halesia diptera*	Two-wing silverbell	BDS	BDS OTHER
HAVI	EC	*Hamamelis virginiana*	Witch hazel	BDS	BDS OTHER
HISY	EE	*Hibiscus syriacus*	Rose-of-sharon	BDS	BDS OTHER
KOEL	EM	*Koelreuteria elegans*	Flamegold	BDS	BDS OTHER
KOPA	EN	*Koelreuteria paniculata*	Goldenrain tree	BDS	BDS OTHER
MA2	ET	*Malus* species	Apple	BDS	MA2

Northeast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
MADE	EV	*Magnolia denudata*	Chinese magnolia	BDS	BDS OTHER
MAHA	EX	*Malus* 'harvest gold'	Crabapple harvest gold	BDS	MA2
MAIS	EY	*Malus* 'Indian summer'	Crabapple Indian summer	BDS	MA2
MAPU	EZ	*Malus pumila*	Paradise apple	BDS	MA2
MASO	FA	*Magnolia x soulangiana*	Chinese magnolia; Saucer magnolia	BDS	BDS OTHER
MAST	FB	*Magnolia stellata*	Star magnolia	BDS	BDS OTHER
PR	GS	*Prunus* species	Plum	BDS	PRSE2
PRAM	GU	*Prunus americana*	American plum	BDS	PRSE2
PRCE	GX	*Prunus cerasifera*	Cherry plum	BDS	PRSE2
PRCI	GY	*Prunus x cistena*	Purpleleaf sand cherry	BDS	PRSE2
PRMA	GZ	*Prunus maackii*	Amur chokecherry	BDS	PRSE2
PRPE1	HA	*Prunus pensylvanica*	Pin cherry	BDS	PRSE2
PRPE2	HB	*Prunus persica*	Peach	BDS	PRSE2
PRSA	HC	*Prunus sargentii*	Sargent cherry	BDS	PRSE2
PRSE2	HE	*Prunus serrulata*	Kwanzan cherry	BDS	PRSE2
PRSU	HF	*Prunus subhirtella*	Higan cherry	BDS	PRSE2
PRTR	HG	*Prunus triloba*	Flowering plum	BDS	PRSE2
PRVI	HH	*Prunus virginiana*	Common chokecherry	BDS	PRSE2
PRVISH	HI	*Prunus virginiana* 'Shubert'	Shubert chokecherry	BDS	PRSE2
PRYE	HJ	*Prunus yedoensis*	Yoshino flowering cherry	BDS	PRSE2
PTTR	HL	*Ptelea trifoliata*	Common hoptree	BDS	BDS OTHER
PYCA	HM	*Pyrus calleryana*	Callery pear	BDS	PYCA
PYCAAR	HN	*Pyrus calleryana* 'Aristocrat'	Aristocrat callery pear	BDS	PYCA
PYCO	HO	*Pyrus communis*	Common pear	BDS	PYCA
RHGL	IO	*Rhus glabra*	Smooth sumac	BDS	BDS OTHER
RHTY	IP	*Rhus hirta*	Staghorn sumac	BDS	BDS OTHER
SOAM	IY	*Sorbus americana*	American mountain ash	BDS	BDS OTHER
SOAU	IZ	*Sorbus aucuparia*	European mountain ash	BDS	BDS OTHER
SYRE	JC	*Syringa reticulata*	Japanese tree lilac	BDS	BDS OTHER
BDS OTHER	BJ	Broadleaf Deciduous Small Other	BDS OTHER	BDS	PRSE2
ULPA99	JS	*Ulmus parvifolia* evergreen	Chinese elm evergreen	BEL	ULPA99
BEL OTHER	BM	Broadleaf Evergreen Large Other	BEL OTHER	BEL	ULPA99
MA1	ES	*Magnolia* species	Magnolia	BEM	BEM OTHER
MAGR	EW	*Magnolia grandiflora*	Southern magnolia	BEM	MAGR
BEM OTHER	BO	Broadleaf Evergreen Medium Other	BEM OTHER	BEM	MAGR
CISP	CV	*Citrus* species	Citrus	BES	BES OTHER
ELUM	DM	*Elaeagnus umbellata*	Autumn olive	BES	BES OTHER
ILCA	EF	*Ilex cassine*	Dahoon	BES	BES OTHER
ILOP	EG	*Ilex opaca*	American holly	BES	ILOP

Northeast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ILSP	EH	*Ilex* species	Holly	BES	BES OTHER
LISP	EP	*Ligustrum* species	Privet	BES	BES OTHER
MYCE	FF	*Morella cerifera*	Southern bayberry	BES	BES OTHER
PRCA	GW	*Prunus caroliniana*	Carolina laurelcherry	BES	PRSE2
BES OTHER	BU	Broadleaf Evergreen Small Other	BES OTHER	BES	ILOP
AB	AA	*Abies* species	Fir	CEL	CEL OTHER
ABBA	AB	*Abies balsamea*	Balsam fir	CEL	CEL OTHER
ABCO	AC	*Abies concolor*	White fir	CEL	CEL OTHER
ABHO	AD	*Abies holophylla*	Manchurian fir	CEL	CEL OTHER
ARAR	BE	*Araucaria araucana*	Monkeypuzzle tree	CEL	CEL OTHER
AREX	BF	*Araucaria excelsa*	Norfolk island pine	CEL	CEL OTHER
CAEQ	CD	*Casuarina equisetifolia*	Australian pine	CEL	CEL OTHER
CEDE	CO	*Cedrus deodara*	Deodar cedar	CEL	CEL OTHER
CRJA	DF	*Cryptomeria japonica*	Japanese red cedar	CEL	CEL OTHER
CULE	DJ	*x Cupressocyparis leylandii*	Leyland cypress	CEL	CEL OTHER
PI1	FO	*Picea* species	Spruce	CEL	CEL OTHER
PI2	FP	*Pinus* species	Pine	CEL	CEL OTHER
PIAB	FQ	*Picea abies*	Norway spruce	CEL	CEL OTHER
PIEC	FU	*Pinus echinata*	Shortleaf pine	CEL	CEL OTHER
PIGL1	FV	*Picea glauca*	White spruce	CEL	CEL OTHER
PIGL2	FW	*Pinus glabra*	Spruce pine	CEL	CEL OTHER
PIMA	FX	*Picea mariana*	Black spruce	CEL	CEL OTHER
PINI	FY	*Pinus nigra*	Austrian pine	CEL	CEL OTHER
PIPUGL	FZ	*Picea pungens* 'glauca'	Blue spruce	CEL	CEL OTHER
PIRI	GA	*Pinus rigida*	Pitch pine	CEL	CEL OTHER
PISE	GB	*Pinus serotina*	Pond pine	CEL	CEL OTHER
PIST	GC	*Pinus strobus*	Eastern white pine	CEL	PIST
PISY	GD	*Pinus sylvestris*	Scotch pine	CEL	CEL OTHER
PITA	GE	*Pinus taeda*	Loblolly pine	CEL	CEL OTHER
PITH	GF	*Pinus thunbergiana*	Japanese black pine	CEL	CEL OTHER
PSME	HK	*Pseudotsuga menziesii*	Douglas fir	CEL	CEL OTHER
SESE	IX	*Sequoia sempervirens*	Coast redwood	CEL	CEL OTHER
ULTH	JY	*Ulmus thomasii*	Rock elm	CEL	ULAM
CEL OTHER	CQ	Conifer Evergreen Large Other	CEL OTHER	CEL	PIST
CEAT	CM	*Cedrus atlantica*	Atlas cedar	CEM	CEM OTHER
CHTH	CU	*Chamaecyparis thyoides*	Atlantic white cedar	CEM	CEM OTHER
JUVI	EL	*Juniperus virginiana*	Eastern red cedar	CEM	JUVI
PIBA	FR	*Pinus banksiana*	Jack pine	CEM	CEM OTHER
PICL	FS	*Pinus clausa*	Sand pine	CEM	CEM OTHER
THOC	JF	*Thuja occidentalis*	Northern white cedar	CEM	CEM OTHER
TSCA	JN	*Tsuga canadensis*	Eastern hemlock	CEM	CEM OTHER
CEM	CR	Conifer Evergreen Medium	CEM OTHER	CEM	JUVI

Northeast					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
OTHER		Other			
PICO5	FT	*Pinus contorta* var. *bolanderi*	Bolander beach pine	CES	PICO5
TA	JD	*Taxus* species	Yew	CES	CES OTHER
CES OTHER	CT	Conifer Evergreen Small Other	CES OTHER	CES	PICO5
PHCA	FN	*Phoenix canariensis*	Canary Island date palm	PEL	PHCA
PEL OTHER	FJ	Palm Evergreen Large Other	PEL OTHER	PEL	PHCA
SAPA	IW	*Sabal palmetto*	Cabbage palmetto	PEM	SAPA
PEM OTHER	FK	Palm Evergreen Medium Other	PEM OTHER	PEM	SAPA
BUCA	BW	*Butia capitata*	Jelly palm	PES	BUCA
PR2	GT	*Prestoea* species	Prestoea	PES	PES OTHER
PES OTHER	FL	Palm Evergreen Small Other	PES OTHER	PES	BUCA

Midwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
VOIDS	EH	NEEDS PREP SMALL	Void small	NONTREE	NONTREE
VOIDM	EG	NEEDS PREP MEDIUM	Void medium	NONTREE	NONTREE
VOIDL	EF	NEEDS PREP LARGE	Void large	NONTREE	NONTREE
AVPSS	AO	NO PREP SMALL	Available planting site small	NONTREE	NONTREE
AVPSM	AN	NO PREP MEDIUM	Available planting site medium	NONTREE	NONTREE
AVPSL	AM	NO PREP LARGE	Available planting site large	NONTREE	NONTREE
STUMPS	DR	REMOVE STUMP PLANT LARGE	Stump present small planting site	NONTREE	NONTREE
STUMPM	DQ	REMOVE STUMP PLANT MEDIUM	Stump present medium planting site	NONTREE	NONTREE
STUMPL	DP	REMOVE STUMP PLANT LARGE	Stump present large planting site	NONTREE	NONTREE
AC	AA	*Acer* species	Maple	BDL OTHER	FRPE
ACGI	AB	*Acer ginnala*	Amur maple	BDS OTHER	MA2
ACNE	AC	*Acer negundo*	Boxelder	BDM	ACNE
ACNI	AD	*Acer nigrum*	Black maple	BDL OTHER	FRPE
ACPL	AF	*Acer platanoides*	Norway maple	BDM	ACPL
ACRU	AG	*Acer rubrum*	Red maple	BDL	ACRU
ACSA1	AH	*Acer saccharinum*	Silver maple	BDL	ACSA1
ACSA2	AI	*Acer saccharum*	Sugar maple	BDL	ACSA2
AEGL	AJ	*Aesculus glabra*	Ohio buckeye	BDM OTHER	ACPL

Midwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
AL	AK	*Alnus* species	Alder	BDS OTHER	MA2
BE	AS	*Betula* species	Birch	BDM OTHER	ACPL
BENI	AV	*Betula nigra*	River birch	BDM OTHER	ACPL
BEPA	AW	*Betula papyrifera*	Paper birch	BDL OTHER	FRPE
CA1	AY	*Carya* species	Hickory	BDL OTHER	FRPE
CA3	AZ	*Catalpa* species	Catalpa	BDL OTHER	FRPE
CEOC	BF	*Celtis occidentalis*	Northern hackberry	BDL	CEOC
FR	BK	*Fraxinus* species	Ash	BDM OTHER	ACPL
FRAM	BL	*Fraxinus americana*	White ash	BDL	FRAM
FRNI	BM	*Fraxinus nigra*	Black ash	BDM OTHER	ACPL
FRPE	BN	*Fraxinus pennsylvanica*	Green ash	BDL	FRPE
GIBI	BO	*Ginkgo biloba*	Ginkgo	BDM	GIBI
GLTR	BP	*Gleditsia triacanthos*	Honeylocust	BDM	GLTR
GYDI	BQ	*Gymnocladus dioicus*	Kentucky coffeetree	BDL OTHER	FRPE
JU	BU	*Juniperus* species	Juniper	CES OTHER	PICO5
JUNI	BV	*Juglans nigra*	Black walnut	BDL OTHER	FRPE
MA2	BZ	*Malus* species	Apple	BDS	MA2
MO	CC	*Morus* species	Mulberry	BDS OTHER	MA2
OSVI	CE	*Ostrya virginiana*	Eastern hophornbeam	BDS OTHER	MA2
PHAM	CF	*Phellodendron amurense*	Amur corktree	BDM OTHER	ACPL
PI1	CG	*Picea* species	Spruce	CEL OTHER	PIPO
PIMA	CI	*Picea mariana*	Black spruce	CEM OTHER	PINI
PINI	CJ	*Pinus nigra*	Austrian pine	CEL OTHER	PIPO
PIPU	CK	*Picea pungens*	Blue spruce	CEM OTHER	PINI
PIRE	CL	*Pinus resinosa*	Red pine	CEL OTHER	PIPO
PIST	CM	*Pinus strobus*	Eastern white pine	CEL OTHER	PIPO
PISY	CN	*Pinus sylvestris*	Scotch pine	CEL OTHER	PIPO
PO	CQ	*Populus* species	Cottonwood	BDL OTHER	FRPE
PODE	CR	*Populus deltoides*	Eastern cottonwood	BDL OTHER	FRPE
POTR1	CT	*Populus tremuloides*	Quaking aspen	BDL OTHER	FRPE
PR	CU	*Prunus* species	Plum	BDS OTHER	MA2
PRVI	CY	*Prunus virginiana*	Common chokecherry	BDS OTHER	MA2
PY	CZ	*Pyrus* species	Pear	BDS OTHER	MA2
QU	DB	*Quercus* species	Oak	BDL OTHER	FRPE
QUAL	DC	*Quercus alba*	White oak	BDL OTHER	FRPE

Midwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
QUBI	DD	*Quercus bicolor*	Swamp white oak	BDM OTHER	ACPL
QUEL	DF	*Quercus ellipsoidalis*	Northern pin oak	BDM OTHER	ACPL
QUMA1	DG	*Quercus macrocarpa*	Bur oak	BDL OTHER	FRPE
QUPA	DH	*Quercus palustris*	Pin oak	BDL	QUPA
QURU	DI	*Quercus rubra*	Northern red oak	BDL	QURU
RHSP	DJ	*Rhus* species	Sumac	BDS OTHER	MA2
RHSP2	DK	*Rhamnus* species	Buckthorn	BDS OTHER	MA2
ROPS	DL	*Robinia pseudoacacia*	Black locust	BDM OTHER	ACPL
SA	DM	*Salix* species	Willow	BDM OTHER	ACPL
SO	DO	*Sorbus* species	Mountain ash	BDS OTHER	MA2
SYRE	DS	*Syringa reticulata*	Japanese tree lilac	BDS OTHER	MA2
SYSP	DT	*Syringa* species	Lilac	BDS OTHER	MA2
TI	DV	*Tilia* species	Basswood	BDL OTHER	FRPE
TIAM	DW	*Tilia americana*	American basswood	BDL	TIAM
TICO	DX	*Tilia cordata*	Littleleaf linden	BDM	TICO
ULAM	DZ	*Ulmus americana*	American elm	BDL	ULAM
ULPU	EB	*Ulmus pumila*	Siberian elm	BDM	ULPU
ULS	EC	*Ulmus* species	Elm	BDL OTHER	FRPE
UNKNOWN	EE	UNKNOWN	UNKNOWN	BDM OTHER	ACPL
ACPA	AE	*Acer palmatum*	Japanese maple	BDS	BDS OTHER
ALJU	AL	*Albizia julibrissin*	Mimosa	BDS	BDS OTHER
CADE	BA	*Castanea dentata*	American chestnut	BDL	BDL OTHER
CASP	BB	*Catalpa speciosa*	Northern catalpa	BDL	BDL OTHER
CECA	BC	*Cercis canadensis*	Eastern redbud	BDS	BDS OTHER
CLLU	BH	*Cladrastis kentukea*	Yellowwood	BDM	BDM OTHER
CO1	BI	*Cornus* species	Dogwood	BDS	BDS OTHER
COFL	BJ	*Cornus florida*	Flowering dogwood	BDS	BDS OTHER
HISY	BR	*Hibiscus syriacus*	Rose-of-sharon	BDS	BDS OTHER
ILSP	BT	*Ilex* species	Holly	BES	BES OTHER
ILOP	BS	*Ilex opaca*	American holly	BES	BES OTHER
JUVI	BW	*Juniperus virginiana*	Eastern red cedar	CES	CES OTHER
LIST	BX	*Liquidambar styraciflua*	Sweetgum	BDL	BDL OTHER
LITU	BY	*Liriodendron tulipifera*	Tulip tree	BDL	BDL OTHER
MAGR	CA	*Magnolia grandiflora*	Southern magnolia	BEM	BEM OTHER
MAVI	CB	*Magnolia virginiana*	Sweetbay	BES	BES OTHER
MOAL	CD	*Morus alba*	White mulberry	BDS	BDS OTHER
PIAB	CH	*Picea abies*	Norway spruce	CEL	CEL OTHER

Midwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
PIVI	CO	*Pinus virginiana*	Virginia pine	CEL	CEL OTHER
PLOC	CP	*Platanus occidentalis*	American sycamore	BDL	BDL OTHER
PONI	CS	*Populus nigra*	Black poplar	BDL	BDL OTHER
PRCE	CV	*Prunus cerasifera*	Cherry plum	BDS	BDS OTHER
PRSE1	CW	*Prunus serotina*	Black cherry	BDS	BDS OTHER
PRSE2	CX	*Prunus serrulata*	Kwanzan cherry	BDS	BDS OTHER
PYCA	DA	*Pyrus calleryana*	Callery pear	BDM	BDM OTHER
QUCO	DE	*Quercus coccinea*	Scarlet oak	BDL	BDL OTHER
SADI	DN	*Salix discolor*	Pussy willow	BDS	BDS OTHER
THOC	DU	*Thuja occidentalis*	Northern white cedar	CEL	CEL OTHER
TSCA	DY	*Tsuga canadensis*	Eastern hemlock	CEL	CEL OTHER
ULPA	EA	*Ulmus parvifolia*	Chinese elm	BDL	BDL OTHER
BDL OTHER	AP	Broadleaf Deciduous Large	Broadleaf Deciduous Large	BDL	FRPE
BDM OTHER	AQ	Broadleaf Deciduous Medium	Broadleaf Deciduous Medium	BDM	ACPL
BDS OTHER	AR	Broadleaf Deciduous Small	Broadleaf Deciduous Small	BDS	MA2
BEL OTHER	AT	Broadleaf Evergreen Large	Broadleaf Evergreen Large	BEL	QUNI
BEM OTHER	AU	Broadleaf Evergreen Medium	Broadleaf Evergreen Medium	BEM	MAGR
BES OTHER	AX	Broadleaf Evergreen Small	Broadleaf Evergreen Small	BES	ILOP
CEL OTHER	BD	Conifer Evergreen Large	Conifer Evergreen Large	CEL	PIPO
CEM OTHER	BE	Conifer Evergreen Medium	Conifer Evergreen Medium	CEM	PINI
CES OTHER	BG	Conifer Evergreen Small	Conifer Evergreen Small	CES	PICO5

Lower Midwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
AB	AA	*Abies* species	Fir	CEL	CEL OTHER
ABBA	AB	*Abies balsamea*	Balsam fir	CEL	CEL OTHER
ABCO	AC	*Abies concolor*	White fir	CEL	CEL OTHER
ABFR	AD	*Abies fraseri*	Fraser fir	CEL	CEL OTHER
AC	AE	*Acer* species	Maple	BDM	ACRU
ACCA	AF	*Acer campestre*	Hedge maple	BDM	ACRU
ACCAQE	AG	*Acer campestre* 'Queen Elizabeth'	Hedge maple 'Queen Elizabeth'	BDM	ACRU
ACGI	AH	*Acer ginnala*	Amur maple	BDS	ACRU
ACNE	AI	*Acer negundo*	Boxelder	BDM	ACRU
ACNI	AJ	*Acer nigrum*	Black maple	BDL	ACPL

Lower Midwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ACPA	AK	*Acer palmatum*	Japanese maple	BDS	ACRU
ACPL	AL	*Acer platanoides*	Norway maple	BDL	ACPL
ACPLC	AM	*Acer platanoides* 'Columnar'	Norway maple 'Columnar'	BDL	ACPL
ACPLCK	AN	*Acer platanoides* 'Crimson King'	Norway maple 'Crimson King'	BDL	ACPL
ACPS	AO	*Acer pseudoplatanus*	Sycamore maple	BDL	ACPL
ACRU	AP	*Acer rubrum*	Red maple	BDL	ACRU
ACRUA	AQ	*Acer rubrum* 'Armstrong'	Red maple 'Armstrong'	BDM	ACRU
ACRUG	AR	*Acer rubrum* 'Gerling'	Red maple 'Gerling'	BDM	ACRU
ACRUOG	AS	*Acer rubrum* 'October Glory'	Red maple 'October Glory'	BDM	ACRU
ACRURS	AT	*Acer rubrum* 'Red Sunset'	Red maple 'Red Sunset'	BDM	ACRU
ACSA1	AU	*Acer saccharinum*	Silver maple	BDL	ACSA1
ACSA2	AV	*Acer saccharum*	Sugar maple	BDL	ACSA2
AE	AW	*Aesculus* species	Buckeye	BDM	BDM OTHER
AEGL	AX	*Aesculus glabra*	Ohio buckeye	BDM	BDM OTHER
AEHI	AY	*Aesculus hippocastanum*	Horsechestnut	BDL	BDL OTHER
AIAL	AZ	*Ailanthus altissima*	Tree of heaven	BDL	BDL OTHER
ALGL	BA	*Alnus glutinosa*	European alder	BDL	BDL OTHER
ALJU	BB	*Albizia julibrissin*	Mimosa	BDS	BDS OTHER
AMCA	BC	*Amelanchier canadensis*	Eastern serviceberry	BDS	BDS OTHER
AMUT	BD	*Amelanchier x Grandiflora* 'Autumn'	Utah serviceberry	BDS	BDS OTHER
ARSP	BE	*Aralia spinosa*	Devils walking stick	BDS	BDS OTHER
ASTR	BF	*Asimina triloba*	Pawpaw	BDS	BDS OTHER
BDL OTHER	BG	Broadleaf Deciduous Large Other	Broadleaf Deciduous Large Other	BDL	FRPE
BDM OTHER	BH	Broadleaf Deciduous Medium Other	Broadleaf Deciduous Medium Other	BDM	TICO
BDS OTHER	BI	Broadleaf Deciduous Small Other	Broadleaf Deciduous Small Other	BDS	CECA
BE	BJ	*Betula* species	Birch	BDM	BDM OTHER
BEAL	BK	*Betula alleghaniensis*	Yellow birch	BDL	BDL OTHER
BEL OTHER	BL	Broadleaf Evergreen Large Other	Broadleaf Evergreen Large Other	BEL	QUIL2
BEM OTHER	BM	Broadleaf Evergreen Medium Other	Broadleaf Evergreen Medium Other	BEM	MAGR
BENI	BN	*Betula nigra*	River birch	BDL	BDL OTHER
BEPA	BO	*Betula papyrifera*	Paper birch	BDL	BDL OTHER
BES OTHER	BP	Broadleaf Evergreen Small Other	Broadleaf Evergreen Small Other	BES	ILOP
BUSP	BQ	*Buxus* species	Boxwood	BES	BES OTHER
CA40	BR	*Carpinus* species	Hornbeam	BDM	BDM OTHER
CABEF	BS	*Carpinus betulus* 'Fastigiata'	Hornbeam 'Fastigiata'	BDM	BDM OTHER
CACA	BT	*Carpinus caroliniana*	American hornbeam	BDM	BDM OTHER
CACO	BU	*Carya cordiformis*	Bitternut hickory	BDL	BDL OTHER
CAGL	BV	*Carya glabra*	Pignut hickory	BDL	BDL OTHER
CALA	BW	*Carya laciniosa*	Shellbark hickory	BDL	BDL OTHER
CAMO	BX	*Castanea mollissima*	Chinese chestnut	BDM	BDM OTHER

Lower Midwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
CAOV	BY	*Carya ovata*	Shagbark hickory	BDL	BDL OTHER
CASP	BZ	*Catalpa speciosa*	Northern catalpa	BDL	CASP
CECA	CA	*Cercis canadensis*	Eastern redbud	BDS	CECA
CEJA	CB	*Cercidiphyllum japonicum*	Katsura tree	BDL	BDL OTHER
CEL OTHER	CC	Conifer Evergreen Large Other	Conifer Evergreen Large Other	CEL	PIST
CEM OTHER	CD	Conifer Evergreen Medium Other	Conifer Evergreen Medium Other	CEM	PINI
CEOC	CE	*Celtis occidentalis*	Northern hackberry	BDL	CEOC
CES OTHER	CF	Conifer Evergreen Small Other	Conifer Evergreen Small Other	CES	PICO5
CLLU	CG	*Cladrastis kentukea*	Yellowwood	BDM	BDM OTHER
CO1	CH	*Cornus* species	Dogwood	BDS	BDS OTHER
COAM	CI	*Corylus americana*	American hazlenut	BDS	BDS OTHER
COCO1	CJ	*Cotinus coggygria*	Smoke tree	BDS	BDS OTHER
COFL	CK	*Cornus florida*	Flowering dogwood	BDS	BDS OTHER
CORA	CL	*Cornus racemosa*	Gray dogwood	BDS	BDS OTHER
CR	CM	*Crataegus* species	Hawthorn	BDS	BDS OTHER
CRCRI	CN	*Crataegus crusgalli* 'Inermis'	Cockspur hawthorn	BDS	BDS OTHER
CRLA	CO	*Crataegus x Lavallei*	Carriere hawthorn	BDS	BDS OTHER
CRPH	CP	*Crataegus phaenopyrum*	Washington hawthorn	BDS	BDS OTHER
CRVI	CQ	*Crataegus viridis* 'Winter King'	Green hawthorn	BDS	BDS OTHER
DIVI	CR	*Diospyros virginiana*	Common persimmon	BDM	BDM OTHER
EL1	CS	*Elaeagnus* species	Elaeagnus	BDS	BDS OTHER
ELAN	CT	*Elaeagnus angustifolia*	Russian olive	BDS	BDS OTHER
ELUM	CU	*Elaeagnus umbellata*	Autumn olive	BES	BES OTHER
EUSP	CV	*Euonymus* species	Narrow-leaved gimlet	BDS	BDS OTHER
EUUL	CW	*Eucommia ulmoides*	Hardy rubber tree	BDM	BDM OTHER
FA	CX	*Fagus* species	Beech	BDL	BDL OTHER
FAGR	CY	*Fagus grandifolia*	American beech	BDL	BDL OTHER
FASY	CZ	*Fagus sylvatica*	European beech	BDL	BDL OTHER
FASYP	DA	*Fagus sylvatica* 'Purpurea'	Copper Beech	BDL	BDL OTHER
FR	DB	*Fraxinus* species	Ash	BDL	FRPE
FRAM	DC	*Fraxinus americana*	White ash	BDL	FRAM
FRAMAA	DD	*Fraxinus americana* 'Autumn Applause'	Autumn applause ash	BDL	FRAM
FRAMCC	DE	*Fraxinus americana* 'Champaign County'	Champaign County Ash	BDL	FRAM
FREXH	DF	*Fraxinus excelsior* 'Hessei'	Hesse ash	BDL	FRAM
FRNI	DG	*Fraxinus nigra*	Black ash	BDL	FRAM
FROR	DH	*Fraxinus ornus*	Flowering ash	BDM	FRPE
FROXA	DI	*Fraxinus oxycarpa* 'Aureafolia'	Golden desert ash	BDM	FRPE
FRPE	DJ	*Fraxinus pennsylvanica*	Green ash	BDL	FRPE
FRPES	DK	*Fraxinus pennsylvanica* 'Summit'	Summit ash	BDL	FRPE
FRQU	DL	*Fraxinus quadrangulata*	Blue ash	BDL	FRPE

Lower Midwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
GIBI	DM	*Ginkgo biloba*	Ginkgo	BDL	BDL OTHER
GIBIF2	DN	*Ginkgo biloba* 'Fastigiata'	Sentry ginkgo	BDL	BDL OTHER
GLTR	DO	*Gleditsia triacanthos*	Honeylocust	BDL	GLTR
GLTRI	DP	*Gleditsia triacanthos* 'Imperial'	Imperial Honeylocust	BDL	GLTR
GLTRS	DQ	*Gleditsia triacanthos* 'Shademaster'	Shademaster honeylocust	BDL	GLTR
GLTRS1	DR	*Gleditsia triacanthos* 'Sunburst'	Sunburst Honeylocust	BDL	GLTR
GYDI	DS	*Gymnocladus dioicus*	Kentucky coffeetree	BDL	BDL OTHER
HISP	DT	*Hibiscus* species	Rosemallow	BDS	BDS OTHER
ILOP	DU	*Ilex opaca*	American holly	BES	ILOP
JU	DV	*Juniperus* species	Juniper	CES	CES OTHER
JU1	DW	*Juglans* species	Walnut	BDM	JUNI
JUCI	DX	*Juglans cinerea*	Butternut	BDM	JUNI
JUCO3	DY	*Juniperus conferta*	Shore juniper	CES	CES OTHER
JUNI	DZ	*Juglans nigra*	Black walnut	BDL	JUNI
JUPR	EA	*Juniperus procumbens*	Japanese garden juniper	CES	CES OTHER
JURE	EB	*Juglans regia*	English walnut	BDM	JUNI
JUVI	EC	*Juniperus virginiana*	Eastern red cedar	CEM	CEM OTHER
KOPA	EE	*Koelreuteria paniculata*	Goldenrain tree	BDS	BDS OTHER
LA10	EF	*Larix* species	Larch	BDL	BDL OTHER
LADE	EG	*Larix decidua*	European larch	BDL	BDL OTHER
LISP	EH	*Ligustrum* species	Privet	BES	BES OTHER
LIST	EI	*Liquidambar styraciflua*	Sweetgum	BDL	BDL OTHER
LITU	EJ	*Liriodendron tulipifera*	Tulip tree	BDL	BDL OTHER
LOSP	EK	*Lonicera* species	Honeysuckle	BDS	BDS OTHER
MA1	EL	*Magnolia* species	Magnolia	BDS	BDS OTHER
MA2	EM	*Malus* species	Apple	BDS	MA2
MAAC	EN	*Magnolia acuminata*	Cucumber tree	BDL	BDL OTHER
MAGR	EO	*Magnolia grandiflora*	Southern magnolia	BEM	MAGR
MAPO	EP	*Maclura pomifera*	Osage orange	BDL	BDL OTHER
MAPY	EQ	*Magnolia soulangiana*	Pyramid magnolia	BDS	BDS OTHER
MAST	ER	*Magnolia stellata*	Star magnolia	BDS	BDS OTHER
MEGL	ES	*Metasequoia glyptostroboides*	Dawn redwood	BDL	BDL OTHER
MO	ET	*Morus* species	Mulberry	BDM	MO
NYSY	EU	*Nyssa sylvatica*	Black tupelo	BDM	BDM OTHER
OSVI	EV	*Ostrya virginiana*	Eastern hophornbeam	BDM	BDM OTHER
OXAR	EW	*Oxydendrum arboreum*	Sourwood	BDL	BDL OTHER
PA19	EX	*Paulownia* species	Paulownia	BDL	BDL OTHER
PATO	EY	*Paulownia tomentosa*	Royal paulownia	BDM	BDM OTHER
PEL OTHER	EZ	Palm Evergreen Large Other	Palm Evergreen Large Other	PEL	PHCA
PEM OTHER	FA	Palm Evergreen Medium Other	Palm Evergreen Medium Other	PEM	PHDA4
PES OTHER	FB	Palm Evergreen Small Other	Palm Evergreen Small Other	PES	WARO
PHAM	FC	*Phellodendron amurense*	Amur corktree	BDM	BDM OTHER

Lower Midwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
PHCA	FD	*Phoenix canariensis*	Canary island date palm	PEL	PHCA
PHDA4	FE	*Phoenix dactylifera*	Date palm	PEM	PHDA4
PI1	FF	*Picea* species	Spruce	CEL	PIPU
PI2	FG	*Pinus* species	Pine	CEL	CEL OTHER
PIAB	FH	*Picea abies*	Norway spruce	CEL	PIPU
PIBA	FI	*Pinus banksiana*	Jack pine	CEL	CEL OTHER
PICO5	FJ	*Pinus contorta var. bolanderi*	Bolander beach pine	CES	PICO5
PIGL1	FK	*Picea glauca*	White spruce	CEL	PIPU
PIMA	FL	*Picea mariana*	Black spruce	CEL	PIPU
PIMU	FM	*Pinus mugo*	Sweet mountain pine	CES	CES OTHER
PINI	FN	*Pinus nigra*	Austrian pine	CEM	PINI
PIPO	FO	*Pinus ponderosa*	Ponderosa pine	CEL	CEL OTHER
PIPU	FP	*Picea pungens*	Blue spruce	CEL	PIPU
PIRE	FQ	*Pinus resinosa*	Red pine	CEL	CEL OTHER
PIRU	FR	*Picea rubens*	Red spruce	CEL	PIPU
PIST	FS	*Pinus strobus*	Eastern white pine	CEL	PIST
PISY	FT	*Pinus sylvestris*	Scotch pine	CEL	CEL OTHER
PIVI	FU	*Pinus virginiana*	Virginia pine	CEL	CEL OTHER
PL3	FV	*Platanus* species	Sycamore	BDL	BDL OTHER
PLAC	FW	*Platanus hybrida*	London planetree	BDL	BDL OTHER
PLOC	FX	*Platanus occidentalis*	American sycamore	BDL	BDL OTHER
PO	FY	*Populus* species	Cottonwood	BDL	PODE
POAL	FZ	*Populus alba*	White poplar	BDL	PODE
PODE	GA	*Populus deltoides*	Eastern cottonwood	BDL	PODE
PONI	GB	*Populus nigra*	Black poplar	BDL	PODE
PR	GC	*Prunus* species	Plum	BDS	BDS OTHER
PRHAJO	GD	*Prunus hally*	Hally Jolivette Cherry	BDS	BDS OTHER
PRPE1	GE	*Prunus pennsylvanica*	Pin cherry	BDS	BDS OTHER
PRSE1	GF	*Prunus serotina*	Black cherry	BDL	BDL OTHER
PRSE2	GG	*Prunus shrubs*	Kwanzan cherry	BDS	BDS OTHER
PRSU	GH	*Prunus subhirtella*	Higan cherry	BDS	BDS OTHER
PSME	GI	*Pseudotsuga menziesii*	Douglas fir	CEL	CEL OTHER
PY	GJ	*Pyrus* species	Pear	BDL	PYCA
PYCA	GK	*Pyrus calleryana*	Callery pear	BDM	PYCA
PYCA_B	GL	*Pyrus calleryana* 'Bradford'	Callery pear 'Bradford'	BDM	PYCA
PYCAA	GM	*Pyrus calleryana* 'Aristocrat'	Callery pear 'Aristocrat'	BDM	PYCA
QU	GN	*Quercus* species	Oak	BDL	QURU
QUAL	GO	*Quercus alba*	White oak	BDL	QURU
QUBI	GP	*Quercus bicolor*	Swamp white oak	BDL	QURU
QUCO	GQ	*Quercus coccinea*	Scarlet oak	BDL	QURU
QUIL2	GR	*Quercus ilex*	Roble negro	BEL	QUIL2
QUIM	GS	*Quercus imbricaria*	Shingle oak	BDL	QURU
QUMA1	GT	*Quercus macrocarpa*	Bur oak	BDL	QURU
QUMU	GU	*Quercus muehlenbergii*	Chinkapin oak	BDL	QURU
QUPA	GV	*Quercus palustris*	Pin oak	BDL	QURU

Lower Midwest					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
QUPR	GW	*Quercus prinus*	Chestnut oak	BDL	QURU
QURO	GX	*Quercus robur*	English oak	BDL	QURU
QUROF	GY	*Quercus robur* 'Fastigiato'	English oak 'Fastigiato'	BDL	QURU
QURU	GZ	*Quercus rubra*	Northern red oak	BDL	QURU
QUVE	HA	*Quercus velutina*	Black oak	BDL	QURU
RHCA	HB	*Rhamnus cathartica*	European buckthorn	BDS	BDS OTHER
RHFR	HC	*Frangula alnus*	Glossy buckthorn	BDS	BDS OTHER
RHTR	HD	*Rhus typhina*	Skunkbush sumac	BDS	BDS OTHER
ROPS	HE	*Robinia pseudoacacia*	Black locust	BDL	BDL OTHER
ROVI	HF	*Robinia viscosa*	Clammy locust	BDS	BDS OTHER
SA	HG	*Salix* species	Willow	BDM	BDM OTHER
SAAL	HH	*Sassafras albidum*	Sassafras	BDM	BDM OTHER
SOAL	HI	*Sorbus alnifolia*	Korean mountain ash	BDM	BDM OTHER
SOJA	HJ	*Sophora japonica*	Japanese pagoda tree	BDM	BDM OTHER
SPVA2	HK	*Spirea* species	Van houtt's spirea	BDS	BDS OTHER
SYSP	HL	*Syringa* species	Lilac	BDS	BDS OTHER
TA	HM	*Taxus* species	Yew	CES	CES OTHER
TACA	HN	*Taxus canadensis*	Canada yew	CES	CES OTHER
TADI	HO	*Taxodium distichum*	Baldcypress	BDL	BDL OTHER
THOC	HP	*Thuja occidentalis*	Northern white cedar	CEM	CEM OTHER
TI	HQ	*Tilia* species	Basswood	BDL	TICO
TIAM	HR	*Tilia americana*	American basswood	BDL	BDL OTHER
TICO	HS	*Tilia cordata*	Littleleaf linden	BDM	TICO
TICOG	HT	*Tilia cordata* 'Greenspire'	Littleleaf linden 'Greenspire'	BDM	TICO
TITO	HU	*Tilia tomentosa*	Silver linden	BDL	TICO
TITOSS	HV	*Tilia tomentosa* 'Sterling Silver'	Sterling silver linden	BDL	TICO
TSCA	HW	*Tsuga canadensis*	Eastern hemlock	CEM	CEM OTHER
ULAM	HX	*Ulmus americana*	American elm	BDL	ULPU
ULPA	HY	*Ulmus parvifolia*	Chinese elm	BDL	ULPU
ULPU	HZ	*Ulmus pumila*	Siberian elm	BDL	ULPU
ULRU	IA	*Ulmus rubra*	Slippery elm	BDM	ULPU
ULS	IB	*Ulmus* species	Elm	BDL	ULPU
UNKNL	IC	Unknown large	Unknown large	BDL	BDL OTHER
UNKNM	ID	Unknown medium	Unknown medium	BDM	BDM OTHER
UNKNS	IE	Unknown small	Unknown small	BDS	BDS OTHER
VISP2	IF	*Viburnum* species	Viburnum	BDS	BDS OTHER
WARO	IG	*Washingtonia robusta*	Mexican fan palm	PES	WARO
ZESE	IH	*Zelkova serrata*	Japanese zelkova	BDL	BDL OTHER

South					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
AB	AA	*Abies* spp	Fir	CEL	CEL OTHER
ABCO	AB	*Abies concolor*	White fir	CEL	CEL OTHER
ACBA2	AC	*Acacia baileyana*	Bailey acacia	BES	BES OTHER
ACBU	AD	*Acer buergeranum*	Trident maple	BDS	BDS OTHER
ACCA	AE	*Acer campestre*	Hedge maple	BDM	BDM OTHER
ACFR	AF	*Acer x freemanii*	Freeman maple	BDL	BDL OTHER
ACGI	AG	*Acer ginnala*	Amur maple	BDS	BDS OTHER
ACGR	AH	*Acer griseum*	Paperbark maple	BDS	BDS OTHER
ACMA	AI	*Acer macrophyllum*	Bigleaf maple	BDL	BDL OTHER
ACNE	AJ	*Acer negundo*	Boxelder	BDM	BDM OTHER
ACNI	AK	*Acer nigrum*	Black maple	BDL	BDL OTHER
ACPA	AL	*Acer palmatum*	Japanese maple	BDS	BDS OTHER
ACPL	AM	*Acer platanoides*	Norway maple	BDL	BDL OTHER
ACRU	AN	*Acer rubrum*	Red maple	BDM	ACRU
ACSA1	AO	*Acer saccharinum*	Silver maple	BDL	ACSA1
ACSA2	AP	*Acer saccharum*	Sugar maple	BDL	ACSA2
ACTR	AQ	*Acer truncatum*	Purple blow maple	BDS	BDS OTHER
AEFL	AR	*Aesculus octandra*	Yellow buckeye	BDL	BDL OTHER
AEGL	AS	*Aesculus glabra*	Ohio buckeye	BDL	BDL OTHER
AEHI	AT	*Aesculus hippocastanum*	Horsechestnut	BDL	BDL OTHER
AEPA	AU	*Aesculus pavia*	Red buckeye	BDS	BDS OTHER
AIAL	AV	*Ailanthus altissima*	Tree of heaven	BDL	BDL OTHER
ALJU	AW	*Albizia julibrissin*	Mimosa	BDS	BDS OTHER
AM	AX	*Amelanchier* spp	Service berry	BDS	BDS OTHER
AMAR	AY	*Amelanchier arborea*	Downy serviceberry	BDS	BDS OTHER
ARAR	AZ	*Araucaria araucana*	Monkeypuzzle tree	CEL	CEL OTHER
ASTR	BA	*Asimina triloba*	Pawpaw	BDS	BDS OTHER
AU1	BB	*Aucuba* spp	Acuba	BES	BES OTHER
BELE	BJ	*Betula lenta*	Black birch	BDM	BDM OTHER
BENI	BL	*Betula nigra*	River birch	BDM	BENI
BEPA	BM	*Betula papyrifera*	Paper birch	BDM	BDM OTHER
BEPE	BN	*Betula pendula*	European white birch	BDM	BDM OTHER
BEPL2	BO	*Betula platyphylla*	Asian white birch	BDM	BDM OTHER
BEUT2	BQ	*Betula utilis*	Indian paper birch	BDM	BDM OTHER
BRPA	BR	*Broussonetia papyrifera*	Paper mulberry	BDM	BDM OTHER
BUDA2	BS	*Buddleja davidii*	Orange eye butterflybush	BDS	BDS OTHER
BUSP	BT	*Buxus* spp	Boxwood	BES	BES OTHER
CA1	BU	*Carya* spp	Hickory	BDL	BDL OTHER
CABE	BV	*Carpinus betulus*	European hornbeam	BDM	BDM OTHER
CACA	BW	*Carpinus caroliniana*	American hornbeam	BDM	BDM OTHER
CACO	BX	*Carya cordiformis*	Bitternut hickory	BDL	BDL OTHER
CADE	BY	*Castanea dentata*	American chestnut	BDL	BDL OTHER
CAGL	BZ	*Carya glabra*	Pignut hickory	BDL	BDL OTHER
CAIL	CA	*Carya illinoiensis*	Pecan	BDL	BDL OTHER
CAJA9	CB	*Camellia japonica*	Camellia	BES	BES OTHER

South					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
CAMO	CC	*Castanea mollissima*	Chinese chestnut	BDM	BDM OTHER
CAOV	CD	*Carya ovata*	Shagbark hickory	BDL	BDL OTHER
CASP	CE	*Catalpa speciosa*	Northern catalpa	BDM	BDM OTHER
CATO	CF	*Carya tomentosa*	Mockernut hickory	BDL	BDL OTHER
CE2	CG	*Celtis occidentalis*	Hackberry	BDL	BDL OTHER
CEAT	CH	*Cedrus atlantica*	Atlas cedar	CEM	CEM OTHER
CECA	CI	*Cercis canadensis*	Eastern redbud	BDS	BDS OTHER
CEDE	CJ	*Cedrus deodara*	Deodar cedar	CEL	CEL OTHER
CEJA	CK	*Cercidiphyllum japonicum*	Katsura tree	BDL	BDL OTHER
CELA	CM	*Celtis laevigata*	Sugarberry	CEL	CEL OTHER
CEOC	CO	*Celtis occidentalis*	Northern hackberry	BDL	BDL OTHER
CHLA2	CQ	*Chamaecyparis lawsoniana*	Port Orford cedar	CEL	CEL OTHER
CHPI	CR	*Chamaecyparis pisifera*	Sawara false cypress	CES	CES OTHER
CHRE	CS	*Chionanthus retusus*	Chinese fringe tree	BDS	BDS OTHER
CHTH	CT	*Chamaecyparis thyoides*	Atlantic white cedar	CEM	CEM OTHER
CHVI	CU	*Chionanthus virginicus*	Fringe tree	BDS	BDS OTHER
CLLU	CV	*Cladrastis kentukea*	Yellowwood	BDM	BDM OTHER
CLTR	CW	*Clerodendrun trichotomum*	Harlequin glorybower	BDS	BDS OTHER
CO1	CX	*Cornus* species	Dogwood	BDS	COFL
COAL	CY	*Cornus alternifolia*	Alternateleaf dogwood	BDS	BDS OTHER
COCO1	CZ	*Cotinus coggygria*	Smoke tree	BDS	BDS OTHER
COFL	DA	*Cornus florida*	Flowering dogwood	BDS	COFL
COKO	DB	*Cornus kousa*	Kousa dogwood	BDS	BDS OTHER
COMA	DC	*Cornus mas*	Cornelian cherry	BDS	BDS OTHER
CR	DD	*Crataegus* spp	Hawthorn	BDS	BDS OTHER
CRJA	DE	*Cryptomeria japonica*	Japanese red cedar	CEL	CEL OTHER
CRPH	DF	*Crataegus phaenopyrum*	Washington hawthorn	BDS	BDS OTHER
CRVI	DG	*Crataegus viridis*	Green hawthorn	BDS	BDS OTHER
CULA	DH	*Cunninghamia lanceolata*	Blue Chinese fir	CEL	CEL OTHER
CULE	DI	*xCupressocyparis leylandii*	Leyland cypress	CEL	CEL OTHER
DIVI	DJ	*Diospyros virginiana*	Common persimmon	BDM	BDM OTHER
ELUM	DK	*Elaeagnus umbellata*	Autumn olive	BES	BES OTHER
EU1	DL	*Eucalyptus* spp	Gum	BEL	BEL OTHER
FAGR	DM	*Fagus grandifolia*	American beech	BDL	BDL OTHER
FASY	DN	*Fagus sylvatica*	European beech	BDL	BDL OTHER
FICA	DO	*Ficus carica*	Common fig	BDS	BDS OTHER
FISI	DP	*Firmiana simplex*	Chinese parasoltree	BDM	BDM OTHER
FORS	DQ	*Forsythia* species	Forsythia	BDS	BDS OTHER
FRAM	DR	*Fraxinus americana*	White ash	BDL	BDL OTHER
FRNI	DS	*Fraxinus nigra*	Black ash	BDM	BDM OTHER
FRPE	DT	*Fraxinus pennsylvanica*	Green ash	BDL	BDL OTHER
FRQU	DU	*Fraxinus quadrangulata*	Blue ash	BDL	BDL OTHER
GIBI	DV	*Ginkgo biloba*	Ginkgo	BDM	BDM OTHER
GLTR	DW	*Gleditsia triacanthos*	Honeylocust	BDL	BDL OTHER
GYDI	DX	*Gymnocladus dioicus*	Kentucky coffeetree	BDL	BDL OTHER

South					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
HA4	DY	*Hakea* species	Hakea	BES	BES OTHER
HACA	DZ	*Halesia carolina*	Snowdrop tree	BDM	BDM OTHER
HAVI	EA	*Hamamelis virginiana*	Witch hazel	BDS	BDS OTHER
HISY	EB	*Hibiscus syriacus*	Rose-of-sharon	BDS	BDS OTHER
ILAQ	EC	*Ilex aquifolium*	English holly	BES	BES OTHER
ILCA	EE	*Ilex cassine*	Dahoon	BES	BES OTHER
ILCO2	EF	*Ilex cornuta*	Chinese Holly	BES	BES OTHER
ILOP	EG	*Ilex opaca*	American holly	BES	ILOP
ILSP	EH	*Ilex* spp	Holly	BES	BES OTHER
JU	EI	*Juniperus* spp	Juniper	CEM	CEM OTHER
JUNI	EJ	*Juglans nigra*	Black walnut	BDL	BDL OTHER
JURE	EK	*Juglans regia*	English walnut	BDM	BDM OTHER
JUVI	EL	*Juniperus virginiana*	Eastern red cedar	CEM	JUVI
KOPA	EM	*Koelreuteria paniculata*	Goldenrain tree	BDS	BDS OTHER
LA6	EN	*Lagerstroemia* spp	Common crapemyrtle	BDS	LA6
LADE	EO	*Larix decidua*	European larch	BDL	BDL OTHER
LISP	EP	*Ligustrum* spp	Privet	BES	ILOP
LIST	EQ	*Liquidambar styraciflua*	Sweetgum	BDL	LIST
LITU	ER	*Liriodendron tulipifera*	Tulip tree	BDL	BDL OTHER
MA1	ES	*Magnolia* spp	Magnolia	BDM	BDM OTHER
MA2	ET	*Malus* spp	Apple	BDS	MA2
MAAC	EU	*Magnolia acuminata*	Cucumber tree	BDL	BDL OTHER
MABE	EV	*Mahonia bealei*	Leatherleaf mahonia	BES	BES OTHER
MAGR	EW	*Magnolia grandiflora*	Southern magnolia	BEM	MAGR
MAPO	EX	*Maclura pomifera*	Osage orange	BDM	BDM OTHER
MASO	EY	*Magnolia x soulangiana*	Chinese magnolia; Saucer magnolia	BDS	BDS OTHER
MAST	EZ	*Magnolia stellata*	Star magnolia	BDS	BDS OTHER
MASY2	FA	*Malus sylvestris*	Paradise apple	BDS	BDS OTHER
MATS	FB	*Malus tschonoskii*	Crabapple	BDS	BDS OTHER
MAVI	FC	*Magnolia virginiana*	Sweetbay	BEM	BEM OTHER
MEAZ	FD	*Melia azedarach*	Chinaberry	BDM	BDM OTHER
MEGL	FE	*Metasequoia glyptostroboides*	Dawn redwood	BDL	BDL OTHER
MO	FF	*Morus* spp	Mulberry	BDM	BDM OTHER
MORU	FG	*Morus rubra*	Red mulberry	BDL	BDL OTHER
MYCE	FH	*Myrica cerifera*	Southern bayberry	BES	BES OTHER
NYSY	FI	*Nyssa sylvatica*	Black tupelo	BDM	BDM OTHER
OSVI	FJ	*Ostrya virginiana*	Eastern hophornbeam	BDM	BDM OTHER
PATO	FK	*Paulownia tomentosa*	Royal paulownia	BDM	BDM OTHER
PHAM	FO	*Phellodendron amurense*	Amur corktree	BDM	BDM OTHER
PHDA4	FP	*Phoenix dactylifera*	Date palm	PEL	PHDA4
PHFR	FQ	*Photinia xfraseri*	Fraser photinia	BES	BES OTHER
PHSP2	FR	*Photinia* spp	Chokeberry	BES	BES OTHER
PI1	FS	*Picea* spp	Spruce	CEM	CEM OTHER
PI2	FT	*Pinus* spp	Pine	CEL	CEL OTHER

South					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
PIAB	FU	*Picea* abies	Norway spruce	CEL	CEL OTHER
PICH	FV	*Pistacia chinensis*	Chinese pistache	BDM	BDM OTHER
PICO5	FW	*Pinus contorta* var. *bolanderi*	Bolander beach pine	CES	PICO5
PICO6	FX	*Pinus contorta var. latifolia*	Tall lodgepole pine	CEL	CEL OTHER
PIEC	FY	*Pinus echinata*	Shortleaf pine	CEL	PIEC
PIGL1	FZ	*Picea glauca*	White spruce	CEM	CEM OTHER
PIMU	GA	*Pinus mugo*	Sweet mountain pine	CES	CES OTHER
PINI	GB	*Pinus nigra*	Austrian pine	CEM	CEM OTHER
PIPA	GC	*Pinus palustris*	Longleaf pine	CEL	CEL OTHER
PIPU	GD	*Picea pungens*	Blue spruce	CEM	CEM OTHER
PIRE	GE	*Pinus resinosa*	Red pine	CEL	CEL OTHER
PIST	GF	*Pinus strobus*	Eastern white pine	CEL	CEL OTHER
PISY	GG	*Pinus sylvestris*	Scotch pine	CEM	CEM OTHER
PITA	GH	*Pinus taeda*	Loblolly pine	CEL	PITA
PIVI	GI	*Pinus virginiana*	Virginia pine	CEM	CEM OTHER
PLAC	GJ	*Platanus acerifolia*	London planetree	BDL	BDL OTHER
PLOC	GK	*Platanus occidentalis*	American sycamore	BDL	BDL OTHER
POAL	GL	*Populus alba*	White poplar	BDL	BDL OTHER
POBA	GM	*Populus balsamifera*	Balsam poplar	BDL	BDL OTHER
PODE	GN	*Populus deltoides*	Eastern cottonwood	BDL	BDL OTHER
PONI	GO	*Populus nigra*	Black poplar	BDM	BDM OTHER
PR	GP	*Prunus* spp	Plum	BDS	PR
PRCA	GQ	*Prunus caroliniana*	Carolina laurelcherry	BES	BES OTHER
PRCA2	GR	*Prunus campanulata*	Taiwan cherry	BDS	BDS OTHER
PRCE	GS	*Prunus cerasifera*	Cherry plum	BDS	BDS OTHER
PRPA	GT	*Prunus padus*	European bird cherry	BDM	BDM OTHER
PRPE2	GU	*Prunus persica*	Peach	BDS	BDS OTHER
PRSE1	GV	*Prunus serotina*	Black cherry	BDL	BDL OTHER
PRSE2	GW	*Prunus serrulata*	Kwanzan cherry	BDS	BDS OTHER
PRSU	GX	*Prunus subhirtella*	Higan cherry	BDS	BDS OTHER
PRTO	GY	*Prunus tomentosa*	Manchu cherry	BDS	BDS OTHER
PRYE	GZ	*Prunus yedoensis*	Yoshino flowering cherry	BDS	PRYE
PSME	HA	*Pseudotsuga menziesii*	Douglas fir	CEL	CEL OTHER
PY	HB	*Pyrus* spp	Pear	BDS	PYCA
PYCA	HC	*Pyrus calleryana*	Callery pear	BDS	PYCA
PYCO	HD	*Pyrus communis*	Common pear	BDM	BDM OTHER
PYKO	HE	*Pyracantha koidzumii*	Formosa firethorn	BES	BES OTHER
PYSP	HF	*Pyracantha* spp	Firethorn	BES	BES OTHER
QUAC	HG	*Quercus acutissima*	Sawtooth oak	BDM	BDM OTHER
QUAL	HH	*Quercus alba*	White oak	BDL	QUAL
QUBI	HI	*Quercus bicolor*	Swamp white oak	BDL	BDL OTHER
QUCO	HJ	*Quercus coccinea*	Scarlet oak	BDL	BDL OTHER
QUEL	HK	*Quercus ellipsoidalis*	Northern pin oak	BDL	BDL OTHER
QUFA	HL	*Quercus falcata*	Southern red oak	BDL	BDL OTHER
QUHE	HM	*Quercus hemisphaerica*	Darlington oak	BEM	BEM OTHER

South					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
QUIM	HN	*Quercus imbricaria*	Shingle oak	BDL	BDL OTHER
QULY	HO	*Quercus lyrata*	Overcup oak	BDM	BDM OTHER
QUMA1	HP	*Quercus macrocarpa*	Bur oak	BDL	BDL OTHER
QUMA2	HQ	*Quercus marilandica*	Blackjack oak	BDM	BDM OTHER
QUMI	HR	*Quercus michauxii*	Swamp chestnut oak	BDL	BDL OTHER
QUMU	HS	*Quercus muehlenbergii*	Chinkapin oak	BDM	BDM OTHER
QUNI	HT	*Quercus nigra*	Water oak	BDL	QUNI
QUPA	HU	*Quercus palustris*	Pin oak	BDL	BDL OTHER
QUPH	HV	*Quercus phellos*	Willow oak	BDL	QUPH
QURO	HW	*Quercus robur*	English oak	BDL	BDL OTHER
QURU	HX	*Quercus rubra*	Northern red oak	BDL	QURU
QUSH	HY	*Quercus shumardii*	Shumard oak	BDL	BDL OTHER
QUST	HZ	*Quercus stellata*	Post oak	BDL	BDL OTHER
QUVE	IA	*Quercus velutina*	Black oak	BDL	BDL OTHER
QUVI	IB	*Quercus virginiana*	Live oak	BEL	BEL OTHER
RHSP	IC	*Rhus* spp	Sumac	BDS	BDS OTHER
RHSP2	ID	*Rhamnus* spp	Buckthorn	BDS	BDS OTHER
ROBA	IE	*Rosa banksiae*	Banksian rose; Lady Bank's rose	BDS	BDS OTHER
ROPS	IF	*Robinia pseudoacacia*	Black locust	BDM	BDM OTHER
SA	IG	*Salix* spp	Willow	BDM	BDM OTHER
SAAL	IH	*Sassafras albidum*	Sassafras	BDM	BDM OTHER
SAGR	IJ	*Salix gracilistyla*	Rosegold pussy willow	BDS	BDS OTHER
SAMA	IK	*Salix matsudana*	Corkscrew willow	BDM	BDM OTHER
SANI	IL	*Salix nigra*	Black willow	BDM	BDM OTHER
SAPA	IM	*Sabal palmetto*	Cabbage palmetto	PEM	SAPA
SAPE12	IN	*Salix babylonica*	Wisconsin weeping willow	BDM	BDM OTHER
SAPE12	IO	*Salix x pendulina Wenderoth*	Wisconsin weeping willow	BDM	BDM OTHER
SERE2	IP	*Serenoa repens*	Saw palmetto	PES	PES OTHER
SOAU	IQ	*Sorbus aucuparia*	European mountain ash	BDS	BDS OTHER
SOJA	IR	*Sophora japonica*	Japanese pagoda tree	BDM	BDM OTHER
STJA	IS	*Styrax japonicus*	Japanese snowbell	BDS	BDS OTHER
SYRE	IW	*Syringa reticulata*	Japanese tree lilac	BDS	BDS OTHER
SYSP	IX	*Syringa* spp	Lilac	BDS	BDS OTHER
TADI	IY	*Taxodium distichum*	Baldcypress	BDL	BDL OTHER
THOC	IZ	*Thuja occidentalis*	Northern white cedar	CEM	CEM OTHER
THPL	JA	*Arborvitae plicata*	Western red cedar	CEL	CEL OTHER
THPL	JB	*Thuja plicata*	Western red cedar	CEL	CEL OTHER
TIAM	JC	*Tilia americana*	American basswood	BDL	BDL OTHER
TICO	JD	*Tilia cordata*	Littleleaf linden	BDM	BDM OTHER
TOTA	JE	*Torreya taxifolia*	Florida torreya	CES	CES OTHER
TRSE6	JF	*Sapium sebiferum*	Tallowtree	BDS	BDS OTHER
TSCA	JG	*Tsuga canadensis*	Eastern hemlock	CEM	CEM OTHER
ULAL	JH	*Ulmus alata*	Winged elm	BDL	ULAL
ULAM	JI	*Ulmus americana*	American elm	BDL	BDL OTHER
ULPA	JK	*Ulmus parvifolia*	Chinese elm	BDM	BDM OTHER

South					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ULPU	JL	*Ulmus pumila*	Siberian elm	BDL	BDL OTHER
ULRU	JM	*Ulmus rubra*	Slippery elm	BDM	BDM OTHER
ULS	JN	*Ulmus* spp	Elm	BDL	BDL OTHER
UNKNS	JO	Shrub	Unknown shrub	BDS	BDS OTHER
UNKNT	JP	Unknown	Unknown tree	BDM	BDM OTHER
VIAG	JQ	*Vitex agnus-castus*	Chaste tree	BDS	BDS OTHER
VIPR	JR	*Viburnum prunifolium*	Black haw	BDS	BDS OTHER
VISP2	JS	*Viburnum* spp	Viburnum	BDS	BDS OTHER
WAFI	JW	*Washingtonia filifera*	California palm	PES	WAFI
YU1	JX	*Yucca* spp	Yucca	PES	PES OTHER
ZESE	JY	*Zelkova serrata*	Japanese zelkova	BDL	BDL OTHER
BDL OTHER	BF	Broadleaf Deciduous Large	Broadleaf Deciduous Large	BDL	QUPH
BDM OTHER	BG	Broadleaf Deciduous Medium	Broadleaf Deciduous Medium	BDM	BENI
BDS OTHER	BH	Broadleaf Deciduous Small	Broadleaf Deciduous Small	BDS	COFL
BEL OTHER	BI	Broadleaf Evergreen Large	Broadleaf Evergreen Large	BEL	QUNI
BEM OTHER	BK	Broadleaf Evergreen Medium	Broadleaf Evergreen Medium	BEM	MAGR
BES OTHER	BP	Broadleaf Evergreen Small	Broadleaf Evergreen Small	BES	ILOP
CEL OTHER	CL	Conifer Evergreen Large	Conifer Evergreen Large	CEL	PIEC
CEM OTHER	CN	Conifer Evergreen Medium	Conifer Evergreen Medium	CEM	JUVI
CES OTHER	CP	Conifer Evergreen Small	Conifer Evergreen Small	CES	PICO5
PEL OTHER	FL	Palm Evergreen Large	Palm Evergreen Large	PEL	PHDA4
PEM OTHER	FM	Palm Evergreen Medium	Palm Evergreen Medium	PEM	WARO
PES OTHER	FN	Palm Evergreen Small	Palm Evergreen Small	PES	WAFI
VOIDS	JV	NEEDS PREP SMALL	Void small	NONTREE	NONTREE
VOIDM	JU	NEEDS PREP MEDIUM	Void medium	NONTREE	NONTREE
VOIDL	JT	NEEDS PREP LARGE	Void large	NONTREE	NONTREE
AVPSS	BE	NO PREP SMALL	Available planting site small	NONTREE	NONTREE
AVPSM	BD	NO PREP MEDIUM	Available planting site medium	NONTREE	NONTREE
AVPSL	BC	NO PREP LARGE	Available planting site large	NONTREE	NONTREE
STUMPS	IV	REMOVE STUMP PLANT LARGE	Stump present small planting site	NONTREE	NONTREE
STUMPM	IU	REMOVE STUMP PLANT MEDIUM	Stump present medium planting site	NONTREE	NONTREE
STUMPL	IT	REMOVE STUMP PLANT LARGE	Stump present large planting site	NONTREE	NONTREE

Coastal Plain					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ACBU	AA	Acer buergeranum	Trident maple	BDM	ACRU
ACGI	AB	Acer ginnala	Amur maple	BDS	ACRU
ACNE	AC	Acer negundo	Boxelder	BDM	ACRU
ACPA	AD	Acer palmatum	Japanese maple	BDS	ACRU
ACRU	AE	*Acer rubrum*	Red maple	BDL	ACRU
ACRU_O	AF	*Acer rubrum* 'October glory'	October glory red maple	BDM	ACRU
ACSA1	AG	*Acer saccharinum*	Silver maple	BDL	ACRU
ACSA2	AH	*Acer saccharum*	Sugar maple	BDL	ACRU
AEGL	AI	*Aesculus glabra*	Ohio buckeye	BDL	BDL OTHER
ALJU	AJ	*Albizia julibrissin*	Mimosa	BDS	BDS OTHER
BENI	AK	*Betula nigra*	River birch	BDM	BDM OTHER
BRPA	AL	*Broussonetia papyrifera*	Paper mulberry	BDM	BDM OTHER
BUCA	AM	*Butia capitata*	Jelly palm	PES	BUCA
CA1	AN	*Carya* species	Hickory	BDL	CAIL
CABI	AO	*Catalpa bignonioides*	Southern catalpa	BDM	BDM OTHER
CACA	AP	*Carpinus caroliniana*	American hornbeam	BDM	BDM OTHER
CACO	AQ	*Carya cordiformis*	Bitternut hickory	BDL	CAIL
CAGL	AR	*Carya glabra*	Pignut hickory	BDL	CAIL
CAIL	AS	*Carya illinoensis*	Pecan	BDL	CAIL
CASA	AT	*Camellia sasanqua*	Sasanqua camellia	BES	BES OTHER
CATO	AU	*Carya tomentosa*	Mockernut hickory	BDL	CAIL
CECA	AV	*Cercis canadensis*	Eastern redbud	BDS	BDS OTHER
CELA	AW	*Celtis laevigata*	Sugarberry	CEL	CELA
CHHU	AX	*Chamaerops humilis*	Mediterranean fan palm	PES	PES OTHER
CHTH	AY	*Chamaecyparis thyoides*	Atlantic white cedar	CEL	CEL OTHER
CIAU2	AZ	*Citrus aurantium*	Sour orange	BES	BES OTHER
CICA	BA	*Cinnamomum camphora*	Camphor tree	BEM	BEM OTHER
CLLU	BB	*Cladrastis kentukea*	Yellowwood	BDM	BDM OTHER
COFL	BC	*Cornus florida*	Flowering dogwood	BDS	COFL
COKO	BD	*Cornus kousa*	Kousa dogwood	BDS	COFL
CRPH	BE	*Crataegus phaenopyrum*	Washington hawthorn	BDS	BDS OTHER
CULE2	BF	*x Cupressocyparis leylandii*	Leyland cypress	CEL	CEL OTHER
CUSE	BG	*Cupressus sempervirens*	Italian cypress	CEM	CEM OTHER
CYRE11	BH	*Cycas revoluta*	Sago palm	PES	PES OTHER
DIVI	BI	*Diospyros virginiana*	Common persimmon	BDM	BDM OTHER
ERJA	BJ	*Eriobotrya japonica*	Loquat tree	BES	BES OTHER
EUCI	BK	*Eucalyptus cinerea*	Silver dollar eucalyptus	BEM	BEM OTHER
EUSA	BL	*Eucalyptus saligna*	Sydney blue gum	BEL	BEL OTHER
FISI	BM	*Firmiana simplex*	Chinese parasoltree	BDM	BDM OTHER
FOIN3	BN	*Forsythia x intermedia*	Showy forsythia	BDS	BDS OTHER
FRAM	BO	*Fraxinus americana*	White ash	BDL	BDL OTHER
FRPE	BP	*Fraxinus pennsylvanica*	Green ash	BDL	BDL OTHER
GIBI	BQ	*Ginkgo biloba*	Ginkgo	BDL	BDL OTHER
GLTR	BR	*Gleditsia triacanthos*	Honeylocust	BDL	GLTR

Coastal Plain					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
HIMU3	BS	*Hibiscus mutabilis*	Dixie rosemallow	BDS	BDS OTHER
HISY	BT	*Hibiscus syriacus*	Rose-of-sharon	BDS	BDS OTHER
ILAT	BU	*Ilex x attenuata*	Topal holly	BES	ILOP
ILCA	BV	*Ilex cassine*	Dahoon	BES	ILOP
ILCO2	BW	*Ilex cornuta*	Chinese holly	BES	ILOP
ILMY	BX	*Ilex myrtifolia*	Myrtle dahoon	BES	ILOP
ILOP	BY	*Ilex opaca*	American holly	BES	ILOP
ILOP_S	BZ	*Ilex opaca x attenuata* 'Savannah'	Savannah holly	BEM	ILOP
ILSP	CA	*Ilex* species	Holly	BES	ILOP
ILVO	CB	*Ilex vomitoria*	Yaupon	BES	ILOP
JU	CC	*Juniperus* species	Juniper	CEM	JUVI
JUNI	CD	*Juglans nigra*	Black walnut	BDL	BDL OTHER
JUVI	CE	*Juniperus virginiana*	Eastern red cedar	CEM	JUVI
KOBI	CF	*Koelreuteria bipinnata*	Chinese flame tree	BDM	BDM OTHER
KOPA	CG	*Koelreuteria paniculata*	Goldenrain tree	BDS	BDS OTHER
LA6_M	CH	*Lagerstroemia* x 'Muskogee'	Muskogee crapemyrtle	BDS	LAIN
LA6_N	CI	*Lagerstroemia* x 'Natchez'	Natchez crapemyrtle	BDS	LAIN
LA6_T1	CJ	*Lagerstroemia* x 'Tuscarora'	Tuscarora crapemyrtle	BDS	LAIN
LA6_T2	CK	*Lagerstroemia* x 'Tuskegee'	Tuskegee crapemyrtle	BDS	LAIN
LAIN	CL	*Lagerstroemia indica*	Common crapemyrtle	BDS	LAIN
LIJA	CM	*Ligustrum japonicum*	Chinese privet	BES	BES OTHER
LISI	CN	*Ligustrum sinense*	Ligustro	BES	BES OTHER
LIST	CO	*Liquidambar styraciflua*	Sweetgum	BDL	LIST
LITU	CP	*Liriodendron tulipifera*	Tulip tree	BDL	BDL OTHER
MA2	CQ	*Malus* species	Apple	BDS	BDS OTHER
MAGR	CR	*Magnolia grandiflora*	Southern magnolia	BEM	MAGR
MAGR_L	CS	*Magnolia grandiflora* 'Little Gem'	Little gem southern magnolia	BEM	BEM OTHER
MASO	CT	*Magnolia x soulangiana*	Chinese magnolia; Saucer magnolia	BDS	BDS OTHER
MAST	CU	*Magnolia stellata*	Star magnolia	BDS	BDS OTHER
MATR	CV	*Magnolia tripetala*	Umbrella magnolia	BDS	BDS OTHER
MEAZ	CW	*Melia azedarach*	Chinaberry	BDM	BDM OTHER
MEGL	CX	*Metasequoia glyptostroboides*	Dawn redwood	CEL	CEL OTHER
MORU	CY	*Morus rubra*	Red mulberry	BDM	BDM OTHER
MYCE	CZ	*Myrica cerifera*	Southern bayberry	BES	BES OTHER
NEOL	DA	*Nerium oleander*	Oleander	BES	BES OTHER
NYSY	DB	*Nyssa sylvatica*	Black tupelo	BDL	BDL OTHER
OSFR	DC	*Osmanthus fragrans*	Sweet olive	BES	BES OTHER
PAAC	DD	*Parkinsonia aculeata*	Jerusalem thorn	BDS	BDS OTHER
PEBO	DE	*Persea borbonia*	Redbay	BEL	BEL OTHER
PHCA	DF	*Phoenix canariensis*	Canary island date palm	PEL	PHCA
PHFR	DG	*Photinia x fraseri*	Fraser photinia	BES	BES OTHER
PHSE	DH	*Photinia serratifolia*	Taiwanese photinia	BES	BES OTHER

Coastal Plain					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
PHSP2	DI	*Photinia* spp.	Chokeberry	BES	BES OTHER
PICH	DJ	*Pistacia chinensis*	Chinese pistache	BDM	BDM OTHER
PICO5	DK	*Pinus contorta var. bolanderi*	Bolander beach pine	CES	PICO5
PIEC	DL	*Pinus echinata*	Shortleaf pine	CEL	PITA
PIEL	DM	*Pinus elliottii*	Slash pine	CEL	PITA
PINI	DN	*Pinus nigra*	Austrian pine	CEM	JUVI
PIPA	DO	*Pinus palustris*	Longleaf pine	CEL	PITA
PIPU	DP	*Picea pungens*	Blue spruce	CEL	PITA
PIST	DQ	*Pinus strobus*	Eastern white pine	CEL	PITA
PITA	DR	*Pinus taeda*	Loblolly pine	CEL	PITA
PIVI	DS	*Pinus virginiana*	Virginia pine	CEM	JUVI
PLAC	DT	*Platanus hybrida*	London planetree	BDL	PLOC
PLAC_B	DU	*Platanus acerifolia* 'Bloodgood'	London planetree 'Bloodgood'	BDL	PLOC
PLOC	DV	*Platanus occidentalis*	American sycamore	BDL	PLOC
POAL	DW	*Populus alba*	White poplar	BDL	BDL OTHER
PODE	DX	*Populus deltoides*	Eastern cottonwood	BDL	BDL OTHER
POMA	DY	*Podocarpus macrophyllus*	Yew podocarpus	BEM	BEM OTHER
PR	DZ	*Prunus* species	Plum	BDS	BDS OTHER
PRAM	EA	*Prunus americana*	American plum	BDS	BDS OTHER
PRCA	EB	*Prunus caroliniana*	Carolina laurelcherry	BEM	BEM OTHER
PRCE	EC	*Prunus cerasifera*	Cherry plum	BDS	BDS OTHER
PRPE2	EE	*Prunus persica*	Peach	BDS	BDS OTHER
PRSE1	EF	*Prunus serotina*	Black cherry	BDL	BDL OTHER
PRSE2	EG	*Prunus serrulata*	Kwanzan cherry	BDS	BDS OTHER
PYAN	EH	*Malus angustifolia*	Southern crabapple	BDS	BDS OTHER
PYCA	EI	*Pyrus calleryana*	Callery pear	BDM	PYCA
PYCA_B	EJ	*Pyrus calleryana* 'Bradford'	Bradford pear	BDM	PYCA
PYCO	EK	*Pyrus communis*	Common pear	BDM	PYCA
PYCO2	EL	*Pyracantha coccinea*	Fire thorn	BES	BES OTHER
QU	EM	*Quercus* species	Oak	BDL	BDL OTHER
QUAC	EN	*Quercus acutissima*	Sawtooth oak	BDM	BDM OTHER
QUAL	EO	*Quercus alba*	White oak	BDL	BDL OTHER
QUCI	EP	*Quercus incana*	Bluejack oak	BES	BES OTHER
QUCO	EQ	*Quercus coccinea*	Scarlet oak	BDL	BDL OTHER
QUFA	ER	*Quercus falcata*	Southern red oak	BDL	BDL OTHER
QUHE	ES	*Quercus hemisphaerica*	Darlington oak	BEM	BEM OTHER
QULA1	ET	*Quercus laevis*	Turkey oak	BDM	BDM OTHER
QULA2	EU	*Quercus laurifolia*	Laurel oak	BDL	QULA2
QUMI	EV	*Quercus michauxii*	Swamp chestnut oak	BDL	BDL OTHER
QUNI	EW	*Quercus nigra*	Water oak	BDL	QUNI
QUPA	EX	*Quercus palustris*	Pin oak	BDL	BDL OTHER
QUPH	EY	*Quercus phellos*	Willow oak	BDL	QUPH
QURU	EZ	*Quercus rubra*	Northern red oak	BDL	BDL OTHER
QUSH	FA	*Quercus shumardii*	Shumard oak	BDL	BDL OTHER

Coastal Plain					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
QUST	FB	*Quercus stellata*	Post oak	BDL	BDL OTHER
QUVE	FC	*Quercus velutina*	Black oak	BDL	BDL OTHER
QUVI	FD	*Quercus virginiana*	Live oak	BEL	QUVI
ROPS	FE	*Robinia pseudoacacia*	Black locust	BDM	BDM OTHER
SA	FF	*Salix* species	Willow	BDM	BDM OTHER
SAAL	FG	*Sassafras albidum*	Sassafras	BDL	BDL OTHER
SAMA_T	FH	*Salix matsudana* 'Tortuosa'	Corkscrew willow	BDM	BDM OTHER
SAMI8	FI	*Sabal minor*	Dwarf palmetto	PES	PES OTHER
SANI	FJ	*Salix nigra*	Black willow	BDM	BDM OTHER
SAPA	FK	*Sabal palmetto*	Cabbage palmetto	PEM	SAPA
SAPE12	FL	*Salix babylonica*	Wisconsin weeping willow	BDM	BDM OTHER
SEBI5	FM	*Cassia bicapsularis*	Christmasbush	BDS	BDS OTHER
TADI	FN	*Taxodium distichum*	Baldcypress	CEL	CEL OTHER
THOC	FO	*Thuja occidentalis*	Northern white cedar	CEM	CEM OTHER
TIAM	FP	*Tilia americana*	American basswood	BDL	BDL OTHER
TICO	FQ	*Tilia cordata*	Littleleaf linden	BDM	BDM OTHER
TRFO	FR	*Trachycarpus fortunei*	Windmill palm	PEM	PEM OTHER
TRSE6	FS	*Sapium sebiferum*	Tallowtree	BDM	BDM OTHER
ULAL	FT	*Ulmus alata*	Winged elm	BDM	BDM OTHER
ULAM	FU	*Ulmus americana*	American elm	BDL	BDL OTHER
ULPA	FV	*Ulmus parvifolia*	Chinese elm	BDM	BDM OTHER
ULPA_D	FW	*Ulmus parvifolia* 'Drake'	Drake Chinese elm	BDM	BDM OTHER
ULPA_E	FX	*Ulmus parvifolia* 'Emer II'	Emer II/Emerald Vase Chinese elm	BDM	BDM OTHER
ULPU	FY	*Ulmus pumila*	Siberian elm	BDM	BDM OTHER
ULRU	FZ	*Ulmus rubra*	Slippery elm	BDL	BDL OTHER
ULS	GA	*Ulmus species*	Elm	BDL	BDL OTHER
VIAG	GB	*Vitex agnus-castus*	Chaste tree	BDS	BDS OTHER
VIPR	GC	*Viburnum prunifolium*	Black haw	BDS	BDS OTHER
WARO	GD	*Washingtonia robusta*	Mexican fan palm	PES	PES OTHER
WIFL	GE	*Wisteria floribunda*	Japanese wisteria	BDS	BDS OTHER
YUGL2	GF	*Yucca gloriosa*	Moundlily yucca	PES	PES OTHER
ZESE	GG	*Zelkova serrata*	Japanese zelkova	BDL	BDL OTHER
BDL OTHER	GH	Broadleaf Deciduous Large Other	Broadleaf Deciduous Large Other	BDL	CAIL
BDM OTHER	GI	Broadleaf Deciduous Medium Other	Broadleaf Deciduous Medium Other	BDM	PYCA
BDS OTHER	GJ	Broadleaf Deciduous Small Other	Broadleaf Deciduous Small Other	BDS	LAIN
CEL OTHER	GK	Conifer Evergreen Large Other	Conifer Evergreen Large Other	CEL	PITA
CEM OTHER	GL	Conifer Evergreen Medium Other	Conifer Evergreen Medium Other	CEM	JUVI
CES OTHER	GM	Conifer Evergreen Small Other	Conifer Evergreen Small Other	CES	PICO5
BEL OTHER	GN	Broadleaf Evergreen Large Other	Broadleaf Evergreen Large Other	BEL	QUVI
BEM OTHER	GO	Broadleaf Evergreen	Broadleaf Evergreen	BEM	MAGR

Coastal Plain					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
		Medium Other	Medium Other		
BES OTHER	GP	Broadleaf Evergreen Small Other	Broadleaf Evergreen Small Other	BES	ILOP
PEL OTHER	GQ	Palm Evergreen Large Other	Palm Evergreen Large Other	PEL	PHCA
PEM OTHER	GR	Palm Evergreen Medium Other	Palm Evergreen Medium Other	PEM	SAPA
PES OTHER	GS	Palm Evergreen Small Other	Palm Evergreen Small Other	PES	BUCA

Tropical					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
ACCO	AA	*Acacia confusa*	Formosan koa	BEM	BEM OTHER
ACKO	AB	*Acacia koa*	Koa	BEL	BEL OTHER
ACWR	AC	*Acoelorraphe wrightii*	Silver saw palmetto	PES	PES OTHER
AGVI14	AD	*Agathis vitiensis*	Nandu	CEL	CEL OTHER
ALFA	AE	*Falcataria moluccana*	Moluccan albizia	BEL	BEL OTHER
ALJU	AF	*Albizia julibrissin*	Mimosa	BDM	BDM OTHER
ALLE	AG	*Albizia lebbeck*	Siris tree	BDL	BDL OTHER
ALMO	AH	*Aleurites moluccana*	Kukui	BEL	BEL OTHER
AMNO4	AI	*Amherstia nobilis*	Pride of Burma	BEM	BEM OTHER
ANIM	AJ	*Andira inermis*	Partridgewood	BEL	BEL OTHER
ANMU	AK	*Annona muricata*	Soursop	BES	BES OTHER
ANRE	AL	*Annona reticulata*	Custard apple	BDM	BDM OTHER
ANSQ	AM	*Annona squamosa*	Sugar apple	BDS	BDS OTHER
ARAL	AN	*Archontophoenix alexandrae*	Alexandra palm	PES	PES OTHER
ARAL2	AO	*Artocarpus altilis*	Ulu	BEL	BEL OTHER
ARCO24	AP	*Araucaria columnaris*	Cook-pine	CEL	CEL OTHER
ARCU	AQ	*Archontophoenix cunninghamiana*	Bangalow palm	PES	PES OTHER
ARHE	AR	*Araucaria heterophylla*	Norfolk Island pine	CEL	CEL OTHER
ARHE2	AS	*Artocarpus heterophyllus*	Jack fruit	BEL	BEL OTHER
AVBI	AT	*Averrhoa bilimbi*	Cucumber tree	BEL	BEL OTHER
AVCA	AU	*Averrhoa carambola*	Star fruit	BES	BES OTHER
AZIN2	AV	*Azadirachta indica*	Neem tree	BEL	BEL OTHER
BA13	AW	*Bauhinia species*	Orchid tree	BEM	BEM OTHER
BABL	AX	*Bauhinia x blakeana*	Hong Kong orchid tree	BES	BABL
BAHO3	AY	*Bauhinia hookeri*	Orchid tree 'hookeri'	BES	BES OTHER
BAPU	AZ	*Bauhinia purpurea*	Orchid tree 'purpurea'	BEM	BEM OTHER
BAVA	BA	*Bauhinia variegata*	Orchid tree, variegated	BEM	BEM OTHER
BDL OTHER	BB	Broadleaf Deciduous Large Other	Broadleaf Deciduous Large Other	BDL	PISA2
BDM OTHER	BC	Broadleaf Deciduous Medium Other	Broadleaf Deciduous Medium Other	BDM	CANE33
BDS OTHER	BD	Broadleaf Deciduous Small	Broadleaf Deciduous Small	BDS	DERE

Tropical					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
		Other	Other		
BEL OTHER	BE	Broadleaf Evergreen Large Other	Broadleaf Evergreen Large Other	BEL	FIBE
BEM OTHER	BF	Broadleaf Evergreen Medium Other	Broadleaf Evergreen Medium Other	BEM	CISP2
BERE	BG	Beaucarnea recurvata	Ponytail	BEM	BEM OTHER
BES OTHER	BH	Broadleaf Evergreen Small Other	Broadleaf Evergreen Small Other	BES	BABL
BIOR	BI	*Bixa orellana*	Lipstick plant	BEM	BEM OTHER
BO9	BJ	*Bougainvillea* species	Bouganvillea	BES	BES OTHER
BOSP8	BK	*Bolusanthus speciosus*	Tree wisteria	BES	BES OTHER
BRAC	BL	*Schefflera actinophylla*	Octopus tree	BEL	BEL OTHER
BUBU	BM	*Bucida buceras*	Geometry tree	BEL	BEL OTHER
BUCA	BN	*Butia capitata*	Jelly palm	PEM	PEM OTHER
CACA73	BO	*Calycophyllum candidissimum*	Lemonwood	BDL	BDL OTHER
CACI	BP	*Callistemon citrinus*	Red bottlebrush	BES	BES OTHER
CAEQ	BQ	*Casuarina equisetifolia*	Ironwood	BEL	CAEQ
CAFI	BR	*Cassia fistula*	Golden shower	BDM	CANE33
CAGR11	BS	*Cassia grandis*	Pink shower	BDL	BDL OTHER
CAIN4	BT	*Calophyllum inophyllum*	Kamani	BEM	CAIN4
CALO	BU	*Catalpa longissima*	Yokewood	BEL	BEL OTHER
CAMA37	BV	*Carissa macrocarpa*	Natal plum	BES	BES OTHER
CAMI36	BW	*Caryota mitis*	Fishtail palm	PES	PES OTHER
CANE33	BX	*Cassia x nealiae*	Rainbow shower tree	BDM	CANE33
CAPA3	BY	*Carica papaya*	Papaya	BES	BES OTHER
CARI9	BZ	*Callistemon rigidus*	Stiff bottlebrush	BES	BES OTHER
CARO	CA	*Cassia javanica*	Pink and white shower	BDM	CANE33
CAVI	CB	*Callistemon viminalis*	Weeping bottlebrush	BEM	BEM OTHER
CEL OTHER	CC	Conifer Evergreen Large Other	Conifer Evergreen Large Other	CEL	PIRA
CEM OTHER	CD	Conifer Evergreen Medium Other	Conifer Evergreen Medium Other	CEM	PIBR2
CES OTHER	CE	Conifer Evergreen Small Other	Conifer Evergreen Small Other	CES	PICO5
CESI3	CF	*Ceratonia siliqua*	Kelakid	BEL	BEL OTHER
CHHU	CG	*Chamaerops humilis*	European fan palm	PES	PES OTHER
CHLU	CH	*Dypsis lutescens*	Areca palm	PES	PES OTHER
CHOL	CI	*Chrysophyllum oliviforme*	Satinleaf	BEM	BEM OTHER
CHSP	CJ	*Chorisia speciosa*	Floss-silk tree	BDL	BDL OTHER
CICA	CK	*Cinnamomum camphora*	Camphor tree	BEL	BEL OTHER
CIGR	CL	*Citrus maxima*	Pummelo	BES	BES OTHER
CILI	CM	*Citrus limon*	Lemi	BES	BES OTHER
CIPA	CN	*Citrus X paradisi*	Grapefruit	BEL	BEL OTHER
CIRE3	CO	*Citrus reticulata*	Mandarin orange	BES	BES OTHER
CISI	CP	*Citrus sinensis*	Kona orange	BEM	BEM OTHER
CISP	CQ	*Citrus* species	Citrus	BES	BES OTHER

Tropical					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
CISP2	CR	*Citharexylum spinosum*	Fiddlewood	BEM	CISP2
CIVE2	CS	*Cinnamomum verum*	Cinnamon	BEM	BEM OTHER
CLRO	CT	*Clusia rosea*	Autograph tree	BES	BES OTHER
COCO1	CU	*Cotinus coggygria*	Smoketree	BDS	BDS OTHER
COERA2	CV	*Conocarpus erectus var. argenteus*	Silver buttonwood	BES	COERA2
CONU	CW	*Cocos nucifera*	Coconut palm	PEL	CONU
CORA13	CX	*Colvillea racemosa*	Colville's glory	BEM	BEM OTHER
COSE2	CY	*Cordia sebestena*	Geiger tree	BES	COSU2
COSU2	CZ	*Cordia subcordata*	Kou	BEL	COSU2
COUT	DA	*Corypha utan*	Buri palm	PEL	PEL OTHER
COUV	DB	*Coccoloba uvifera*	Sea-grape	BES	BES OTHER
COVI	DC	*Cochlospermum vitifolium*	Buttercup tree	BDL	BDL OTHER
CRCU	DD	*Crescentia cujete*	Calabash tree	BES	BES OTHER
CU	DE	*Cupressus* species	Cypress	CEL	CEL OTHER
CUAN	DF	*Cupaniopsis anacardioides*	Carrotwood	BEM	BEM OTHER
CUSE	DG	*Cupressus sempervirens*	Italian cypress	CEL	CEL OTHER
CYRE11	DH	*Cycas revoluta*	Sago palm	PES	PES OTHER
DA2	DI	*Dalbergia* species	Sissoo	BDL	BDL OTHER
DERE	DJ	*Delonix regia*	Royal poinciana	BDS	DERE
DR	DK	*Dracaena* species	Dracaena	BES	BES OTHER
DYDE2	DL	*Dypsis decaryi*	Triangle palm	PES	PES OTHER
ELOR2	DM	*Elaeodendron orientale*	False olive	BES	ELOR2
ENCY	DN	*Enterolobium cyclocarpum*	Earpod	BDL	BDL OTHER
ER15	DO	*Erythrina* species	Coral tree species	BDL	BDL OTHER
ERCR	DP	*Erythrina crista-galli*	Coral tree	BEM	BEM OTHER
ERJA	DQ	*Eriobotrya japonica*	Loquat	BES	BES OTHER
ERSA11	DR	*Erythrina sandwicensis*	Wiliwili	BDL	BDL OTHER
ERVA7	DS	*Erythrina variegata*	Indian coral tree	BDL	BDL OTHER
ERVAO	DT	*Erythrina variegata v. orientalis*	Indian coral tree, oriental	BDL	BDL OTHER
EU1	DU	*Eucalyptus* species	Eucalyptus	BEL	BEL OTHER
EUCI2	DV	*Eucalyptus citriodora*	Lemon-scented gum	BEL	BEL OTHER
EUDE	DW	*Eucalyptus deglupta*	Mindanao gum	BEL	BEL OTHER
EURO	DX	*Eucalyptus robusta*	Swamp mahagony	BEL	BEL OTHER
EUTI	DY	*Euphorbia tirucalli*	Pencil tree	BDS	BDS OTHER
EUUN2	DZ	*Eugenia uniflora*	Surinam-cherry	BEM	BEM OTHER
FABE	EA	*Fagraea berteroana*	Pua kenikeni	BEL	BEL OTHER
FI1	EB	*Ficus* species	Banyan	BEL	FIBE
FIBE	EC	*Ficus benjamina*	Benjamin fig	BEL	FIBE
FIBE2	EE	*Ficus benghalensis*	Indian banyan	BEL	FIBE
FICA	EF	*Ficus carica*	Common fig	BDS	FIBE
FIDE6	EG	*Filicium decipiens*	Fern tree	BEM	FIDE6
FIEL	EH	*Ficus elastica*	Indian rubber tree	BEL	FIBE
FILY	EI	*Ficus lyrata*	Fiddle-leaf fig	BEL	FIBE
FIMA2	EJ	*Ficus macrophylla*	Moreton Bay fig	BEM	FIBE

Tropical					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
FIMI2	EK	*Ficus microcarpa*	Chinese banyan	BEL	FIBE
FIRE3	EL	*Ficus religiosa*	Bo tree	BEL	FIBE
FIVI3	EM	*Ficus virens*	Ara	BDL	FIBE
FRUH	EN	*Fraxinus uhdei*	Tropical ash	BDL	BDL OTHER
GA2	EO	*Gardenia* species	Gardenia	BES	BES OTHER
GRRO	EP	*Grevillea robusta*	Silky-oak	BEL	BEL OTHER
GUOF	EQ	*Guaiacum officinale*	Lignum-vitae	BES	BES OTHER
HACA3	ER	*Harpephyllum caffrum*	Kaffir-plum	BEM	BEM OTHER
HAPE7	ES	*Harpullia pendula*	Tulipwood	BES	BES OTHER
HELI9	ET	*Heritiera littoralis*	Looking-glass tree	BEL	BEL OTHER
HENY	EU	*Hernandia nymphaeifolia*	Jack in the box tree	BEL	BEL OTHER
HISP	EV	*Hibiscus* species	Hibiscus	BES	BES OTHER
HITI	EW	*Hibiscus tiliaceus*	Hau	BDM	BDM OTHER
HUCR	EX	*Hura crepitans*	Sandbox tree	BDL	BDL OTHER
HYLA15	EY	*Hyophorbe lagenicaulis*	Bottle palm	PES	PES OTHER
HYVE9	EZ	*Hyophorbe verschaffeltii*	Spindle palm	PES	PES OTHER
ILPA2	FA	*Ilex paraguariensis*	Paraguay-tea	BES	ILPA2
JAIN	FB	*Jatropha integerrima*	Jatropha	BES	BES OTHER
JAMI	FC	*Jacaranda mimosifolia*	Jacaranda	BDM	BDM OTHER
JUCH	FD	*Juniperus chinensis*	Chinese juniper	CEL	CEL OTHER
JUCHS6	FE	*Juniperus chinensis* 'Torulosa'	Hollywood juniper	CEL	CEL OTHER
KOEL	FF	*Koelreuteria elegans*	Goldenrain tree	BDM	BDM OTHER
LAIN	FG	*Lagerstroemia indica*	Crapemyrtle	BDS	BDS OTHER
LAPA	FH	*Lagunaria patersonii*	Primrose tree	BEL	BEL OTHER
LASP	FI	*Lagerstroemia speciosa*	Giant crapemyrtle	BDL	LASP
LELE	FJ	*Leucaena leucocephala*	Koa haole	BES	BES OTHER
LICH	FK	*Livistona chinensis*	Chinese fan palm	PES	PES OTHER
LICH4	FL	*Litchi chinensis*	Litchi	BEL	BEL OTHER
LIJA	FM	*Ligustrum japonicum*	Japanese privet	BES	BES OTHER
MAGR	FN	*Magnolia grandiflora*	Magnolia	BES	BES OTHER
MAIN	FO	*Mangifera indica*	Mango	BEL	BEL OTHER
MAIN8	FP	*Macadamia integrifolia*	Macadamia nut	BEL	BEL OTHER
MAZA	FQ	*Manilkara zapota*	Sapodilla	BEL	BEL OTHER
MEAZ	FR	*Melia azedarach*	Pride-of-India	BDL	BDL OTHER
MEPO5	FS	*Metrosideros polymorpha*	Ohi'a lehua	BEL	BEL OTHER
MEQU	FT	*Melaleuca quinquenervia*	Paperbark	BEL	MEQU
MICA21	FU	*Mimusops caffra*	Red milkwood	BEM	BEM OTHER
MO	FV	*Morus* species	Mulberry	BDS	BDS OTHER
MOCI3	FW	*Morinda citrifolia*	Noni	BES	BES OTHER
MONI	FX	*Morus nigra*	Black mulberry	BDS	BDS OTHER
MOOL	FY	*Moringa oleifera*	Horseradish tree	BEM	BEM OTHER
MU5	FZ	*Musa* species	Banana	BES	BES OTHER
MUPA4	GA	*Murraya paniculata*	Mock orange	BES	BES OTHER
NEOL	GB	*Nerium oleander*	Oleander	BES	BES OTHER
NOEM	GC	*Noronhia emarginata*	Madagascar-olive	BEL	BEL OTHER

Tropical					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
OCEL	GD	*Ochrosia elliptica*	New Caledonia tree	BES	BES OTHER
OCSE2	GE	*Ochna serrulata*	Mickey Mouse plant	BES	BES OTHER
OLEU	GF	*Olea europaea*	Olive	BEL	BEL OTHER
ORCO9	GG	*Orbignya cohune*	Cohune palm	PEL	PEL OTHER
PACE8	GH	*Parmentiera cereifera*	Candle tree	BES	BES OTHER
PASP	GI	Palm species	Palm	PEM	PEM OTHER
PATE2	GJ	*Pandanus tectorius*	Hala	BEM	BEM OTHER
PEAM	GK	*Persea americana*	Avocado	BEL	BEL OTHER
PEL OTHER	GL	Palm Evergreen Large Other	Palm Evergreen Large Other	PEL	CONU
PEM OTHER	GM	Palm Evergreen Medium Other	Palm Evergreen Medium Other	PEM	PHDA4
PEPT	GN	*Peltophorum pterocarpum*	Yellow poinciana	BEL	BEL OTHER
PES OTHER	GO	Palm Evergreen Small Other	Palm Evergreen Small Other	PES	VEME
PH7	GP	*Phoenix* species	Date palm species	PEM	PEM OTHER
PHCA	GQ	*Phoenix canariensis*	Canary Island date palm	PEL	PEL OTHER
PHDA4	GR	*Phoenix dactylifera*	Date palm	PEM	PHDA4
PHRO	GS	*Phoenix roebelenii*	Dwarf date palm	PES	PES OTHER
PI2	GT	*Pinus* species	Pine	CEL	CEL OTHER
PI23	GU	*Pittosporum* species	Pittosporum species	BEM	BEM OTHER
PIAR9	GV	*Pittosporum arborescens*	Pittosporum	BEM	BEM OTHER
PIBR2	GW	*Pinus brutia*	Turkish pine; east mediterranean pine	CEM	PIBR2
PICO5	GX	*Pinus contorta var. bolanderi*	Bolander beach pine	CES	PICO5
PIDI3	GY	*Pimenta dioica*	Allspice	BEL	BEL OTHER
PIDU	GZ	*Pithecellobium dulce*	Opiuma	BEL	BEL OTHER
PIPE8	HA	*Pittosporum pentandrum*	Mamalis	BEM	BEM OTHER
PIPI2	HB	*Pinus pinea*	Umbrella pine	CEL	CEL OTHER
PIRA	HC	*Pinus radiata*	Monterey pine	CEL	PIRA
PIRA2	HD	*Pimenta racemosa*	Bay-rum tree	BEL	BEL OTHER
PISA2	HE	*Samanea saman*	Monkeypod	BDL	PISA2
PITH	HF	*Pinus thunbergiana*	Japanese black pine	CEL	CEL OTHER
PL13	HG	*Plumeria* species	Plumeria	BES	BES OTHER
PLOR80	HH	*Platycladus orientalis*	Oriental arborvitae	CEL	CEL OTHER
PLPI4	HI	*Platymiscium pinnatum*	Chachimbo	BDL	BDL OTHER
PO3	HJ	*Podocarpus* species	Podocarpus	CEL	CEL OTHER
POLO21	HK	*Polyalthia longifolia*	Cemetery tree	BDL	BDL OTHER
PONE21	HL	*Podocarpus neriifolius*	Brown pine	CEL	CEL OTHER
POUS2	HM	*Podocarpus usambarensis*	East African yellow wood	CEL	CEL OTHER
PRPA11	HN	*Pritchardia pacifica*	Fiji fan palm	PES	PES OTHER
PRPA2	HO	*Prosopis pallida*	Kiawe	BEL	BEL OTHER
PSCA	HP	*Psidium cattleianum*	Strawberry guava	BES	BES OTHER
PSEL5	HQ	*Pseudobombax ellipticum*	Shaving brush tree	BDL	BDL OTHER
PSGU	HR	*Psidium guajava*	Guava	BEM	BEM OTHER
PTIN	HS	*Pterocarpus indicus*	Narra	BDL	BDL OTHER
PTMA8	HT	*Ptychosperma macarthurii*	Macarthur palm	PES	PES OTHER

Tropical					
Species Code	**MCTICode**	**Scientific Name**	**Common Name**	**Tree Type**	**SppValue Assignment**
RAMA	HU	*Ravenala madagascariensis*	Traveller's palm	BEL	BEL OTHER
RORE2	HV	*Roystonea regia*	Cuban royal palm	PEM	PEM OTHER
SAMA	HW	*Salix matsudana*	Weeping willow	BEM	BEM OTHER
SCMO	HX	*Schinus molle*	Pepper tree	BEM	BEM OTHER
SCPU18	HY	*Schefflera pueckleri*	Mallet flower	BES	BES OTHER
SCTE	HZ	*Schinus terebinthifolius*	Christmas berry	BDS	BDS OTHER
SEGR5	IA	*Sesbania grandiflora*	Sesban	BEL	BEL OTHER
SESU4	IB	*Senna surattensis*	Scrambled egg tree	BES	BES OTHER
SPCA	IC	*Spathodea campanulata*	African-tulip tree	BEL	BEL OTHER
SWMA	ID	*Swietenia mahagoni*	West Indian mahogany	BEL	SWMA
SYCO	IE	*Syagrus coronata*	Licury palm	PEM	PEM OTHER
SYJA	IF	*Syzygium jambos*	Rose-apple	BEM	BEM OTHER
SYRO	IG	*Syagrus romanzoffiana*	Queen palm	PEL	PEL OTHER
TAAR	IH	*Tabebuia aurea*	Silver trumpet tree	BEL	TAAR
TABA2	IJ	*Tabebuia bahamensis*	White dwarf tabebuia	BDS	TACH
TACH	IK	*Tabebuia ochracea subsp. neochrysantha*	Golden trumpet tree	BEL	TACH
TADO2	IL	*Tabebuia donnell-smithii*	Gold tree	BDL	TACH
TAIM	IM	*Tabebuia impetiginosa*	Amapa rosa	BDL	TAAR
TAIN	IN	*Tamarindus indica*	Busbusilak	BEL	BEL OTHER
TAPA	IO	*Tabebuia heterophylla*	Pink tecoma	BEL	TAPA
TAPA13	IP	*Tabernaemontana pandacaqui*	Bitter bark	BES	BES OTHER
TASP	IQ	*Tabebuia* species	Trumpet tree	BDL	TAAR
TECA	IR	*Terminalia catappa*	False kamani	BDL	BDL OTHER
THPE3	IS	*Thevetia peruviana*	Be-still tree	BES	BES OTHER
THPU	IT	*Thespesia populnea*	Milo	BEM	BEM OTHER
TITU	IU	*Tipuana tipu*	Pride of Bolivia	BDL	BDL OTHER
TOAR2	IV	*Tournefortia argentea*	Tree heliotrope	BEM	BEM OTHER
UNID	IW	Unidentified sp.	Unidentified	BEM	BEM OTHER
VEME	IX	*Veitchia merrillii*	Manila palm	PES	VEME
VIPA6	IY	*Vitex parviflora*	Molave	BEL	BEL OTHER
WARO	IZ	*Washingtonia robusta*	Mexican washingtonia	PES	PES OTHER

Appendix E. Paper Data Collection Forms

Ecosystem Analysis Forms (UFORE)

Field Data Sheets

PLOT ID=	DATE=	CREW=	GPS COOR	PHOTO ID=
			X	
			Y	

PLOT SKETCH AND NOTES FOR PLOT RELOCATION

(Note distance and direction from plot center to fixed objects; sketch fixed objects in relation to plot center)

Plot address=
Notes:

Plot contact info:
Name and Title:_____
Phone #_____

LOCATING REFERENCE OFJECTS/LANDMARKS (Identify at least 1 object)
Measure Reference Object (1) description_____
Distance to Reference Object (1)_____
Direction to Reference Object (1)_____
Measured Reference Object (2) description_____
Distance to Reference Object (2) _____
Direction to Reference Object (2)_____
Tree Measurement Point (TMP): Reference Object (1) used Y/N
Reference Object (2) used Y/N
Measurement Unit: M/E

Percent Measured_____

ACTUAL LAND USE=	PERCENT IN=	PLOT TREE COVER (%)=	SHRUB COVER (%)=	PLANTABLE SPACE (%)=
ACTUAL LAND USE=	PERCENT IN=			
ACTUAL LAND USE=	PERCENT IN=			
ACTUAL LAND USE=	PERCENT IN=			

GROUND COVER	%BLDG	%CMNT	%TAR	%ROCK	%SOIL	%DUFF/ MULCH	%HERB/ IVY	%MAIN. GRASS	%UNMAIN GRASS	%H2O

	SPECIES	HEIGHT	% AREA	% MISSING	SPECIES	HEIGHT	% AREA	% MISSING	SPECIES	HEIGHT	% AREA	% MISSING
SHRUBS												

PLOT ID =				TREE			DBH						HEIGHT		CROWN WIDTH							TREES NEAR BUILDINGS						
TREE ID	N R /	DR	DS	SPECIES	# DBHs	HT DBH	1	2	3	4	5	6	TOT	CRWN BASE	N-S	E-W	% MISS	DB	% IMP	% SHRUB	CLE	D1	S1	D2	S2	D3	S3	STREET TREE

Mobile Community Tree Inventory Form (MCTI)

City/Town _____

Survey Team _____

MCTI DATA COLLECTION

Sheet # ___ of ____

Date: __ / __ / 20__

Tree Information			Tree Condition					Plnt.	Conditions					Maint.	Tree Eval	Note This	
ID#	Species	DBH	G	F	P	D	Cons.	Loc.	Weak Fork	Over. Wires	Dead Wood	% Dead	Cav.	Needs	(4 nos.)	Tree	Comments

Plnt. Loc. = S, <4, >4, L **Maint.** = Cln, Rse, Rdc, Rmv **Tree Eval**. = Failure (1-4) + Size (1-3) + Potential (1-3) + Other (0-2)

Storm Damage Assessment Protocol Forms (SDAP)

Form 1

Record of Plot Length and Completion of Pre- and Post-Storm Survey

Community Name:					
Date Pre-Storm Survey Completed:		**Date Post-Storm Survey Completed:**			
	÷		× 100	=	%
Total Plot Length (mi)[1]		**Total Street Miles[2]**		**= Percent Street Miles**	

Plot Number	Plot Length (feet)	Pre-Storm Survey Completed		Post-Storm Survey Completed	
		Initials of Data Collector	Date Completed	Initials of Data Collector	Date Completed

Total Length[1]	

[1] Where necessary, convert total plot length from feet to miles by dividing it by **5,280** before entering the amount at the top of the form.

[2] If not using TIGER/Line files, total street mileage can be obtained from the engineering or public works department. Only public streets that will be included in an actual storm cleanup should be counted.

Form 2A

PRE-Storm Field Data Collection Sheet (Populated Areas)

Community Name:		
ON Street:		**Plot Number:**
FROM Street:	**TO Street:**	
Date:	**Plot Length (ft/mi):**	
ROW Width (feet):	**Collected by:**	

Complete this section only if the plot is less than the full blockside.
Start of plot description:
End of plot description:

ON Right-of-Way Trees (Count trees on both sides of the street)							**ROW + 50' Trees[1]**			
DBH Class	**Tally of ROW Trees[2]**	**Number of ROW Trees**	**Time per Tree for Removal[3]**	**Total Hours for Removal (total trees × time per tree)**	**Time Per Hazard Prune[4]**	**Total Hours Haz Prune (total trees × time per tree)**	**DBH Class**	**Tally Off ROW Trees**	**Total Off ROW Trees**	**TOTALS**
6-12			3.2		0.75		6-12			
13-18			5.1		1.0		13-18			
19-24			7.7		1.5		19-24			
25-30			10.2		2.0		25-30			
31-36			12.5		3.0		31-36			
37-42			20.4		4.0		37-42			
43+			28.0		5.0		43+			
Totals										

[1] Rate all trees as a group that fall within 50 feet of the edge of the right-of-way.
[2] Record each tree with a tally mark, then place the total number of marks in the next column.
[3] Time for removal does not include stump removal (see *Protocol*).
[4] Time for hazard pruning is for removal of broken or hazardous branches greater than 2 inches only (see *Protocol*).

Form 2B

PRE-Storm Field Data Collection Sheet (Rural Areas)

Community Name:	
ON Road:	**Plot Number:**
Intersection nearest to plot start:	
Approximate distance to intersection:	
Date:	**Plot Length (mi):**
ROW Width (feet):	**Collected by:**

Indicate here permanent features (such as poles, signs, driveways, etc.) that help locate the plot.
Start of plot:
End of plot:

ON Right-of-Way Trees (Count trees on both sides of the road)					
Tally of ROW Trees[1]	**Number of ROW Trees**	**Avg. Time per Removal[2]**	**Total Hours Removal (total trees × time per removal)**	**Avg. Time Per Prune[3]**	**Total Hours Hazard Prune (total trees × time per prune)**
				2.5	
Totals					

[1] Record all trees >6" with a tally mark, then place the total number of marks in the next column.
[2] Time reduced 50% from urban rate to account for simpler procedure. It does not include stump removal.
[3] Time reduced 50% from urban rate. It includes pruning of broken or hazardous branches greater than 4 inches only.

Form 2C

PRE-Storm Field Data Collection Sheet (Non-linear Maintained Areas)

Community/Facility Name:	**Plot Number:**
Survey Area Location:	
Collected by: **Date:**	

Indicate here ways to relocate the plot center		
Ref. point 1:	**Compass bearing 1:**	**Distance 1:**
Ref. point 2:	**Compass bearing 2:**	**Distance 2:**
Ref. point 3:	**Compass bearing 3:**	**Distance 3:**
Permanent plot center marker (Y/N)?	**Marker type:**	
Other:		

Maintained Trees						
DBH Class	**Tally of Trees[1]**	**Number of Trees**	**Time per Tree for Removal[2]**	**Total Hours for Removal (total trees × time per tree)**	**Time Per Hazard Prune[3]**	**Total Hours Haz Prune (total trees × time per tree)**
6-12			3.2		0.75	
13-18			5.1		1.0	
19-24			7.7		1.5	
25-30			10.2		2.0	
31-36			12.5		3.0	
37-42			20.4		4.0	
43+			28.0		5.0	
Totals						

[1] Record all trees >6" with a tally mark, then place the total number of marks in the next column.
[2] Time reduced 50% from urban rate to account for simpler procedure. It does not include stump removal.
[3] Time reduced 50% from urban rate. It includes pruning of broken or hazardous branches greater than 4 inches only.

Form 2D

PRE-Storm Field Data Collection Sheet (Non-linear Unmaintained Areas)

Community/Facility Name:		**Plot Number:**
Survey Area Location:		
Collected by:	**Date:**	

Indicate here ways to relocate the plot center		
Ref. point 1:	**Compass bearing 1:**	**Distance 1:**
Ref. point 2:	**Compass bearing 2:**	**Distance 2:**
Ref. point 3:	**Compass bearing 3:**	**Distance 3:**
Permanent plot center marker (Y/N)?	**Marker type:**	
Other:		

Unmaintained Trees					
Tally of Trees[1]	**Number of Trees**	**Avg. Time per Removal[2]**	**Total Hours Removal (total trees × time per removal)**	**Avg. Time Per Prune[3]**	**Total Hours Hazard Prune (total trees × time per prune)**
Totals					

[1] Record all trees >6" with a tally mark, then place the total number of marks in the next column.
[2] Time reduced 50% from urban rate to account for simpler procedure. It does not include stump removal.
[3] Time reduced 50% from urban rate. It includes pruning of broken or hazardous branches greater than 4 inches only.

Form 3 – Page 1

PRE-Storm Community Summary Data

Plot Number	Total Hours Removal[3]	Total Hours Prune	Total ROW Trees	Total All Trees (rural: only in ROW)	Plot Length (feet)[2]	Tree Density per 100 ft. (total trees in plot × 100 ÷ plot length)	Brush[7] (cubic yards per 100 feet)	Total Brush (plot length × brush ÷ 100) (cubic yards)[5]
Totals								

Form 3 – Page 2

PRE-Storm Community Summary Data

Community Name:			
State:	**Date:**	**Total Street Miles[1]:**	**Total Plot Length[2] (mi):**

hrs	×	**mi**	÷	**mi**	=	**hrs**
Total Hours[3]		Total Street Miles		Total Plot Length		**Total Removal Hours**
hrs	×	**$**	×	**0.2**	=	**$**
Total Removal Hours		Cost per Hour[4]		Tree Removal Percentage		**Tree REMOVAL Cost**

hrs	×	**mi**	÷	**mi**	=	**hrs**
Total Hours[3]		Total Street Miles		Total Plot Length		**Total Pruning Hours**
hrs	×	**$**	×	**0.3**	=	**$**
Total Pruning Hours		Cost per Hour[4]		Tree Pruning Percentage		**Tree PRUNING Cost**

cu yd	×	**mi**	÷	**mi**	=	**cu yd**
Total Brush[5]		Total Street Miles		Total Plot Length		**Total Brush**
cu yd	×	**$**			=	**$**
Total Brush		Cost per cubic yard[6]				**BRUSH Clean-Up Cost**

$	+	**$**	+	**$**	=	**$**
Tree Removal Cost		Tree Pruning Cost		Brush Clean-Up Cost		**Final Clean-Up Cost**

[1] Total street miles in the community or in the area being surveyed.

[2] If total plot length is in feet at the bottom of Form 3 -- Page 1, divide by 5280 feet to obtain miles.

[3] Enter the total hours for all plots from the bottom of Form 3 -- Page 1.

[4] Cost can be provided by local community based on past experience, or a default cost of $45–$65 **per man-hour** for a fully equipped crew can be used.

[5] Enter the total brush in cubic yards from the bottom of Form 3 -- Page 1.

[6] Brush cleanup costs range typically between $5 and $15 per cubic yard. These costs vary based on local conditions.

[7] Determine the **brush in yards per 100'** based on tree density from Table G-1 at the end of Section 3.3.3, making sure to use the far right column. Then enter that number for each plot on Form 6.

Form 4

Local, State, and Federal Agency Contact Information

Local Contact	
Contact Name:	Telephone:
Office/Agency:	Fax:
Department:	E-mail:
Address:	Date Sent:
City/State/Zip:	Overnight Mail Carrier No.:

State Contact	
Contact Name:	Telephone:
Office/Agency:	Fax:
Department:	E-mail:
Address:	Date Sent:
City/State/Zip:	Overnight Mail Carrier No.:

Federal Contact	
Contact Name:	Telephone:
Office/Agency:	Fax:
Department:	E-mail:
Address:	Date Sent:
City/State/Zip:	Overnight Mail Carrier No.:

Other Contact	
Contact Name:	Telephone:
Office/Agency:	Fax:
Department:	E-mail:
Address:	Date Sent:
City/State/Zip:	Overnight Mail Carrier No.:

Form 5A

POST-Storm Field Data Collection Sheet (Populated Areas)

Community Name[1]:	
ON Street:	**Plot Number[1]:**
FROM Street:	**TO Street:**
Date:	**Plot Length (ft/mi):**
ROW Width (feet):	**Collected by:**

Start of plot description:
End of plot description:

ROW Trees ONLY									**ROW + 50' Trees[2]**		
Tree Removals					**Tree Pruning**				**Debris Estimate[3]**		
DBH Class	**Tally Number of Removal Trees**	**Total All Removal Trees**	**Time Per Tree (hours)**	**Total Hours for Removal (total trees × time per tree)**	**Tally Hazard Prune Trees**	**Total All Hazard Prune Trees**	**Time Per Tree (hours)**	**Total Hours Haz Prune (total trees × time per tree)**	**Rate in 100-Foot Segments**	**CROWN LOSS[4]**	**CUBIC YARDS**
6-12			3.2				0.75		0-100		
13-18			5.1				1.0		101-200		
19-24			7.7				1.5		201-300		
25-30			10.2				2.0		301-400		
31-36			12.5				3.0		401-500		
37-42			20.4				4.0		501-600		
43+			28.0				5.0		601-700		
Totals									701-800		
									Extra[5]		
									Total CL		
									Average[6]		
									Total CY		

[1] If plot information was recorded during set up, just fill in name and plot number.
[2] Rate all trees as a group that fall within 50 feet of the edge of the right-of-way.
[3] Choose either Crown Loss **or** Cubic Yards for the whole plot.
[4] Estimate Crown Loss with one of these values: **12.5** (0-25%), **37.5** (26-50%), **62.5** (51-75%), or **87.5** (76-100%).
[5] For plots longer than 800 feet, report average (Crown Loss) or total (Cubic Yards) of the remainder of the plot beyond 800 feet in the correct column here.
[6] Average = Total ÷ number of 100-foot segments examined.

Form 5B

POST-Storm Field Data Collection Sheet (Rural Areas)

Community Name[1]:	
ON Road:	**Plot Number[1]:**
Intersection nearest to plot start:	
Approximate distance to intersection:	
Date:	**Plot Length (feet):**
ROW Width (feet):	**Collected by:**

Start of plot:
End of plot:

ON Right-of-Way Trees
(Count trees on both sides of the road)

Tally of hazardous removal ROW trees	Total Number of hazardous removal ROW Trees	Avg. Time[2] per Removal	Total Hours Removal (total trees × time per removal)	Tally of hazardous prune ROW trees	Total Number of hazardous prune ROW trees	Avg. Time[3] Per Prune	Total Hours Hazard Prune (total trees × time per prune)
Totals							

Debris estimate[4]

Rate in 100-Foot Segments	Crown Loss	Cubic Yards
0-100		
101-200		
201-300		
301-400		
401-500		
501-600		
601-700		
701-800		
Extra[5]		
Total CL		
Average[6]		
Total CY		

1 If road and plot information was recorded during set up, just fill in name and plot number.
2 On rural roads, removals are only recorded for large trees already in failure. Time has been reduced 50% from the urban rate, and excludes stump removal.
3 On rural roads, time per prune is for pruning of broken or hazardous branches greater than 4 inches only. Time has been reduced 50% from the urban rate, and does not include other pruning.
4 Choose Crown Loss or Cubic Yards for the plot. Estimate Crown Loss with one of these values: 12.5 (0-25%), 37.5 (26-50%), 62.5 (51-75%), or 87.5 (76-100%).
5 For plots longer than 800 feet, report average (Crown Loss) or total (Cubic Yards) of the rest of the plot beyond 800 feet in the correct column here.
6 Average = Total CL ÷ # of 100' segments

Form 5C

POST-Storm Field Data Collection Sheet (Non-linear Maintained Areas)

Community/Facility Name[1]:		**Plot Number[1]:**
Survey Area Location:		
Collected by:	**Date:**	

Indicate here ways to relocate the plot center		
Ref. point 1:	**Compass bearing 1:**	**Distance 1:**
Ref. point 2:	**Compass bearing 2:**	**Distance 2:**
Ref. point 3:	**Compass bearing 3:**	**Distance 3:**
Permanent plot center marker (Y/N)?	**Marker type:**	
Other:		

Maintained Trees								
Tree Removals					**Tree Pruning**			
DBH Class	**Tally of Trees for Removal**	**Total All Removal Trees**	**Time Per Tree (hours)**	**Total Hours for Removal (total trees × time per tree)**	**Tally Hazard Prune Trees**	**Total All Hazard Prune Trees**	**Time Per Tree (hours)**	**Total Hours Haz Prune (total trees × time per tree)**
6-12			3.2				0.75	
13-18			5.1				1.0	
19-24			7.7				1.5	
25-30			10.2				2.0	
31-36			12.5				3.0	
37-42			20.4				4.0	
43+			28.0				5.0	
Totals								
FILL IN ONE: Crown Loss:[2] _____ % OR Cubic Yards: _____								

[1] If street and plot information was recorded during pre-storm set up, just fill in name and plot number.
[2] Estimate Crown Loss with one of these values: **12.5** (0-25%), **37.5** (26-50%), **62.5** (51-75%), or **87.5** (76-100%).

Form 5D

POST-Storm Field Data Collection Sheet (Non-linear Unmaintained Areas)

Community/Facility Name[1]:		**Plot Number[1]:**
Survey Area Location:		
Collected by:	**Date:**	

Indicate here ways to relocate the plot center		
Ref. point 1:	**Compass bearing 1:**	**Distance 1:**
Ref. point 2:	**Compass bearing 2:**	**Distance 2:**
Ref. point 3:	**Compass bearing 3:**	**Distance 3:**
Permanent plot center marker (Y/N)?	**Marker type:**	
Other:		

Unmaintained Trees							
Tally of Trees for Removal[2]	**Number of Trees for Removal**	**Avg. Time per Removal**	**Total Hours Removal (total trees × time per removal)**	**Tally of Trees for Hazard Prune[2]**	**Number of Trees for Hazard Prune**	**Avg. Time Per Prune**	**Total Hours Hazard Prune (total trees × time per prune)**
Totals							
FILL IN ONE: Crown Loss:[4] _____ % OR Cubic Yards: _____							

[1] If street and plot information was recorded during pre-storm set up, just fill in name and plot number.
[2] Record only larger trees already in failure with a tally mark, then put the total count in the next column.
[3] Record hazard pruning for branches > 4" only when a likely target can be identified.
[4] Estimate Crown Loss with one of these values: **12.5** (0-25%), **37.5** (26-50%), **62.5** (51-75%), or **87.5** (76-100%).

Form 6

POST-Storm Community Summary Data

Plot Number	Plot Length (feet)	Total Removal (hours)[2]	Total Hazard Pruning (hours)[2]	Brush per 100 ft. (from the pre-storm analysis)	Average Canopy Loss	Adjusted Brush[5]	Total Brush (cu yd)[5]
Totals							

Form 6 (Cont.)

POST-Storm Community Summary Data

NOTE:

Community Name:			
State:	**Date:**	**Total Street Miles[1]:**	**Total Plot Length (mi)[1]:**

hrs	×	**mi**	÷	**mi**	=	**hrs**
Total Hours[3]		Total Street Miles		Total Plot Length		**Total Removal Hours**
[redacted]		**hrs**	×	$	=	$
8		Total Removal Hours		Cost per Hour[4]		**Tree REMOVAL Cost**

hrs	×	**mi**	÷	**mi**	=	**hrs**
Total Hours[3]		Total Street Miles		Total Plot Length		**Total Pruning Hours**
[redacted]		**hrs**	×	$	=	$
		Total Pruning Hours		Cost per Hour[4]		**Tree PRUNING Cost**

cu yd	×	**mi**	÷	**mi**	=	**cu yd**
Total Brush[5]		Total Street Miles		Total Plot Length		**Total Adjusted Brush**
[redacted]		**cu yd**	×	$	=	$
		Total Adjusted Brush		Cost per yard[4]		**BRUSH Clean-Up Cost**

$	+	**$**	+	**$**	=	**$**
Tree Removal Cost		Tree Pruning Cost		Brush Clean-Up Cost		**FINAL Clean-Up Cost**

[1] Plot number, plot length, and total street miles should be filled in from pre storm data. If total miles and total plot lengths are different than original estimate, enter the new miles.

[2] Sum all the plot totals to obtain total hours of tree removal and hazard pruning cleanup.

[3] Cost per man-hour for a fully equipped crew to do removal and pruning work. Note that this hourly figure may be different than the $45–65 per man-hour range that was suggested in the pre-storm cleanup estimate.

[4] Average brush cleanup cost is between $5 and $15 per cubic yard. The post-storm cost may differ from these pre-storm estimates.

[5] If using the crown loss method, Total Brush = plot length × Adjusted brush ÷ 100. Total Brush comes from Form 3 (Page 1), and Adjusted brush is estimated from Table G-2 on the last page of these forms, using the Total Brush estimates and the average post-storm canopy loss in the plot. If visually estimating cubic yards of debris, enter the numbers directly.

Appendix F. Install and Configure Microsoft ActiveSync for Storm Damage Assessment Utility

IMPORTANT NOTE:

The Storm Damage Assessment Utility is compatible only with Pocket PCs running a Windows Mobile 2002, 2003, and 5.0 operating systems (OS). PDAs running an alternative OS (Palm, Blackberry, Psion, PocketLinux, etc.) are not compatible.

If you are using a Pocket PC with Windows Mobile 2002 or 2003 OS, ActiveSync version 3.x is compatible and no other installations are required. However, Windows Mobile 5.0 users must install ActiveSync version 4.x, which requires an additional steps for i-Tree compatibility: running the i-Tree "Registry" modification tool. See sections 3.2.2 for installation details.

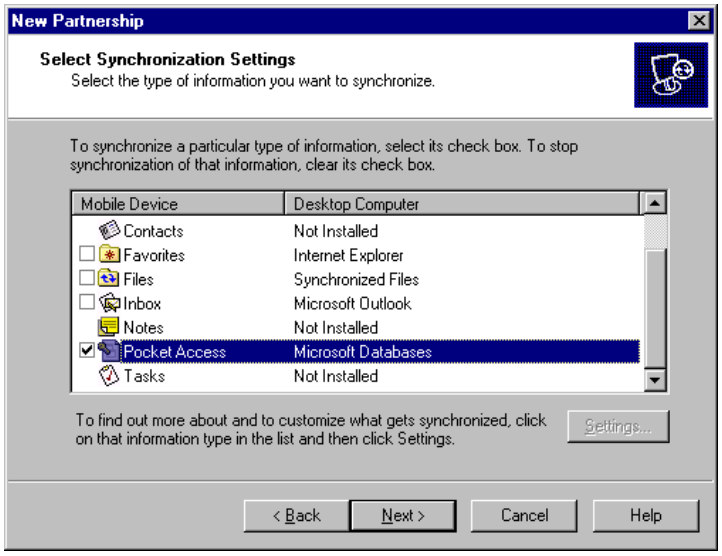
The i-Tree Installation CD and your Pocket PC came with a copy of Microsoft ActiveSync. This must be installed on your PC in order to communicate with the Pocket PC if you are using PDAs for data collection. You may also be synchronizing your date book, contacts, phone numbers, etc. (If you've already done this, you may skip to the part where we tell ActiveSync to sync with Pocket Access).

1. **Install Microsoft ActiveSync** from the i-Tree Installation CD or the CD included with your Pocket PC. The Pocket PC manufacturer will have provided instructions on how to do this.
2. If you installed ActiveSync version 4.x, modify the Registry as directed in sections 3.3.2 now. Users who installed ActiveSync version 3.x may skip this step.
3. After the installation is complete, **open ActiveSync**.
4. Once ActiveSync is open, you are asked to **establish a "Partnership"**. If you are not automatically asked, simply click the File menu and select Get Connected… on the drop-down menu.
5. On the next screen, click **Next** to accept default **"Standard Partnership"**.

NOTE: It is extremely important that "Standard partnership" is selected; otherwise the mobile device will not be able to synchronize with your computer.

6. ActiveSync will allow you to establish a Partnership with a single desktop computer or multiple computers. For most users, only one partnership will be necessary, so just click **Next** to accept the default of synchronizing with only this computer.
7. Tell ActiveSync that you want to synchronize with Pocket Access by checking that box on the Synchronization Settings screen.

NOTE: You may also synchronize your contacts, e-mail, or other items. These are not necessary for the i-Tree programs, but if you need and use them, feel free to include them here. This will, however, make the synchronization process a bit slower.



8. Click **Finish**.

ActiveSync and the i-Tree Storm Damage Assessment Utility

The Storm Damage Assessment Utility programs work with Microsoft ActiveSync to manage the exchange of information between the desktop PC and PDAs running Pocket PC. There are a couple of very important things to keep in mind when using ActiveSync with an i-Tree PDA Utility.

- ActiveSync must be running at the same time that you use the PDA Utility **Import Field Data** functions. If you do not have ActiveSync configured to run whenever the PDA is connected, you must manually initiate the data transfer from within ActiveSync. It's very important that you follow the steps outlined on the PDA Utility screen in the proper sequence.
- ActiveSync cannot merge data in a **one-way** fashion. In a sense, all ActiveSync can do is compare two database tables and make them the same. ActiveSync looks at when information was added, changed, or deleted in both tables, and makes sure the resulting synchronized tables have the most current information.