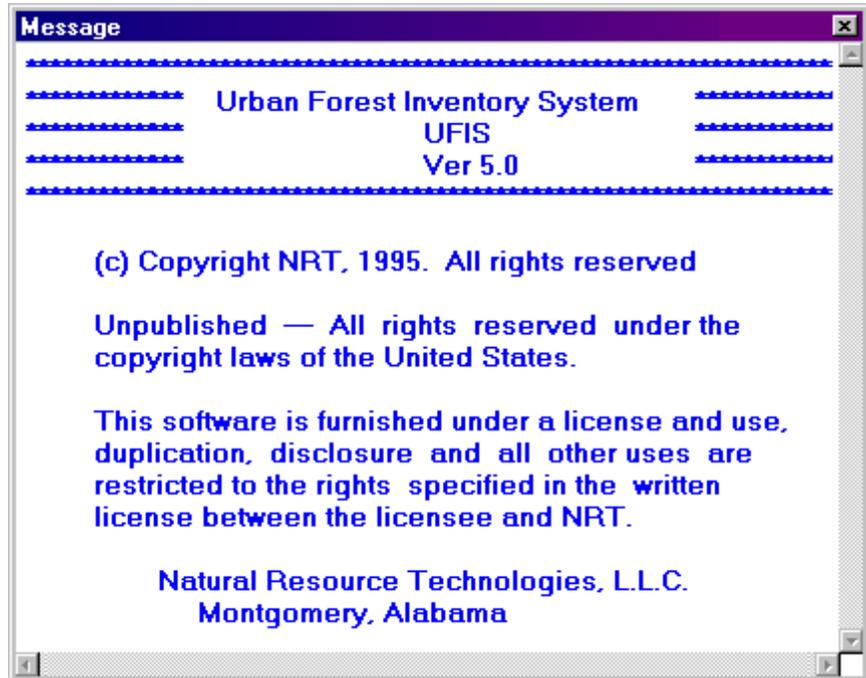




Urban Forest Inventory System (UFIS) was developed and is distributed by Natural Resource Technologies (NRT) based in Tallassee, Alabama. UFIS uses a runtime module of MapInfo - a GIS which can display and print maps of trees, planting spaces, streets, and other features. The runtime module of MapInfo has limited functionality compared to the full version, however is adequate for urban forest inventory purposes and is offered at a lower cost. UFIS is the only program in this review that directly incorporates a GIS. NRT provides services both nationally and internationally, where there are over 15 communities using UFIS.



▲ Figure 3.12.1: UFIS splash screen.

Services

- Urban forest inventories
- Urban forest management plans
- Urban and rural interface analysis
- Tree and park mapping with GPS
- Corridor, greenway, and canopy analysis
- Timber and forestland management

System requirements

- Windows[®] 3.1, 95, 98, NT
- 486 processor
- 16 MB of RAM

UFIS was primarily used on a Gateway[™] G6-200 Pentium[®] Pro, using Windows NT[®]. UFIS was also used with Windows[®] 98 on a Gateway[™] G6-300 Pentium[®] II. The UFIS and MapInfo runtime directories use 820 KB and 9.81 MB of hard disk space, respectively. After entering data for approximately 455 tree sites the UFIS directory size increased to 1,602 KB. Therefore 1,000 trees sites would require approximately 1,719 KB (1.68 MB).

Software cost

UFIS is purchased from Natural Resource Technologies for \$3,500.00. This price includes both the UFIS and MapInfo runtime program files. A demonstration presentation program is available.

Technical support

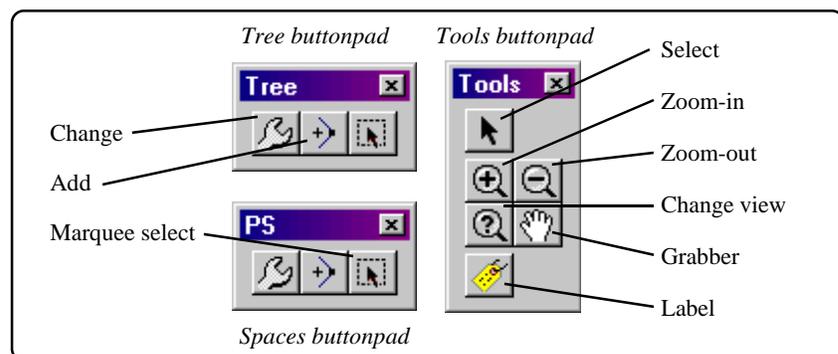
UFIS is provided with a 23 page manual. Online help files are not available. Natural Resource Technologies offers 90 days of free

phone support after purchase. An optional \$250.00 annual charge includes technical support and software upgrades.

Contact

Natural Resources Technologies
P.O. Box 780603
Tallalsee, Al 36078

Phone: 1-888-848-2146
Email: nrtal@aol.com
Internet: www.nrtech.com



▲ Figure 3.12.2: UFIS has tree, space (PS), and tools buttonpads which can be resized, moved, closed, or docked to the menu bar. Buttons can be viewed large or small, and can be shown in color or black and white.

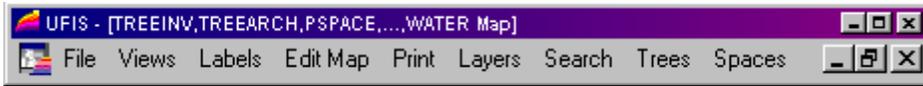


Figure 3.12.3: UFIS menu bar selections.

The **bold** text in the following description refers to window names indicated in the title bar of each window. *Italicized* text refers to either commands, menu items, or field names. UFIS buttons and their functions are indicated in Figure 3.12.2.

Digitizing streets

Streets are digitized, edited, and deleted by using the commands under the *edit map* menu (Figure 3.12.3). Streets are digitized as lines, with each segment containing the street name and address range as encoded values (Figure 3.12.4). Since the study area was previously digitized in ArcView, features (streets, blocks, and sidewalks) were converted to MapInfo format using pcArcInfo (developed by Environmental Systems Research Institute) and were used as a base map layer. Because features were digitized as polygons in ArcView, street segments were digitized as lines in UFIS and encoded as mentioned above. A *snap* feature in MapInfo can be used to connect line endpoints.

Defining fields

Up to five custom fields can be defined for both tree and planting site data entry (Figure 3.12.5). Both the *field name* and *screen name* fields can be up to ten characters. The *field name* appears in the MapInfo **browser** window (a matrix of inventory data), and the *screen name* appears in the **add tree** window (a Graphical User Interface used for data entry). The *field type* can be either *C* (character), *N* (numeric), or *D* (date), and the *field length* can be up to 99 characters.

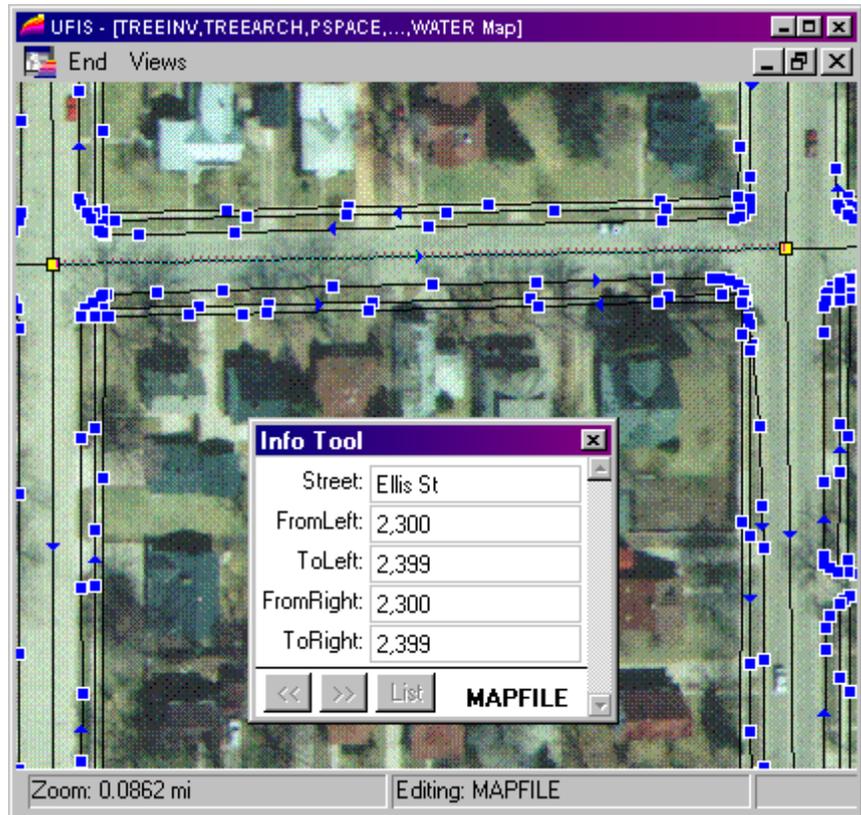


Figure 3.12.4: Streets are digitized as lines, and street names and address ranges are then encoded in the info tool window. Boxes indicate either nodes or vertices, and triangles indicate the digitized line direction (from-to nodes).

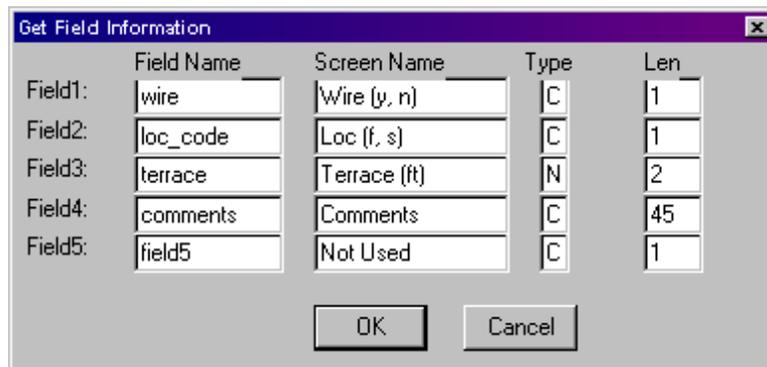


Figure 3.12.5: Up to five custom fields can be defined for both tree and planting site data entry.



Figure 3.12.6: Trees (circles) and planting sites (stars) are digitized as points. Street and address data are entered after “clicking” on the appropriate tree site location on the map.

Adding tree sites

The *add* tool on the **tree** buttonpad allows for digitizing trees on the map (Figure 3.12.2). The **add by pointing** dialog asking for both the address number and street name appears after the tree is digitized (Figure 3.12.6). The **add tree** window is then used for entering tree site data (Figure 3.12.7). Required fields include *cell number*, *tree number*, *DBH*, *tree height*, and *location*, *condition*, and *species* values.

Location descriptor fields include *cell* and *tree number*. *Cell number* is a two digit number identifying the location of the tree site using a grid system which follows around the perimeter of the lot. *Tree number* is the sequence number of the tree at the address. A value of zero was used for *cell number* since this system was not used for locating tree sites.

Tree descriptors include *DBH*, *height*, *species*, *condition percent*, and *species rating*. *DBH*, *height*, and *species rating* (CTLA) can each be up to three characters. *Species* name can be up to 30 characters. *Condition percent* can be up to two characters. *Tree value* is calculated by UFIS using the CTLA valuation method.

Site descriptors include *location percent*, *wire*, *location side*, and *terrace width*. *Wire*, *location side*, and *terrace width* are custom fields. *Location percent* can be up to two characters. *Wire* indicates the presence or absence of overhead utilities, and *location side* indicates if the site is on the front (*F*) or side (*S*) of the lot.

Other data entry fields include *inspection date*, *inspector initials*, and *comments*. *Comments* is a custom field that can be up to 45 characters.

Tree information can be either saved or printed after data entry. *Save/new tree* is selected from the **add tree** window when there are additional sites to be entered at the address.

Figure 3.12.7: Tree inventory data are entered into the add tree window after the tree site is located on the map and the address is entered.

This command eliminates the previous steps of selecting a tree location on the map and entering the address and street in the **add by pointing** dialog, however the tree is placed directly over the previous tree on the map and needs to be moved to its correct location after data entry.

Adding planting spaces

Planting spaces are digitized on the map by using the *add* tool from the spaces (**PS**) buttonpad (Figure 3.12.2). The same process is used as described above for adding trees, however fewer fields are offered for data in the **add space** window (Figure 3.12.8). Fields are similar to those in the **add tree** window except for a one character *size* field which indicates the relative size of the planting site.

Editing tree and planting sites

The select tool on the **tools** buttonpad must first be used to select either a tree or planting site to be edited (Figure 3.12.2). Once a site is selected the **change** tool on either the **tree** or **PS** buttonpad opens the **access tree** or **space** window, listing either the trees or planting spaces at the address (Figure 3.12.9). A site must be selected from this window in order to open the editing window, which is similar to either the **add tree** or **add space** window depending upon whether a tree or planting space is being edited. Sites can be deleted from this window or can be deleted directly from the map.

Creating and editing work orders

Work orders are created by first going through the edit tree process described above. The command box in the **edit tree** window contains a *new work order* selection which is used to open the **new work order** window (Figure 3.12.10). Up to a ten

Address: 2111 ELLIS ST

Cell No: 0
 Space No: 1
 Size: S
 Inspect Date: 09/30/1997
 Inspector: GO
 Wire (y, n): N
 Loc Code: F
 Terrace (ft): 6
 Field 4:
 Field 5:

Save/New Space
 Save/Print
 Save/New Address
 Cancel

▲ Figure 3.12.8: Planting space data are entered in the add space window after the planting space is located on the map and the address is entered.

Address: 2101 Clark St

SELECT TREE	Cell Tree	Species
	00 06	HARVEST GOLD CRAB
	00 05	HARVEST GOLD CRAB
	00 04	CENTURION FLOWERIN
	00 02	AMERICAN ELM
	00 03	EMERALD QUEEN MAPL
	00 01	EMERALD QUEEN MAPL

OK Exit

◀ Figure 3.12.9: The access tree window is used to select a tree site at an address to be edited.

character work order number can be entered, along with the date, time, and the address and name of the person calling. Request 1 and 2 fields are provided to describe the tree problem, and can each be up to 40 characters. The name or initials of the person assigned the work, the date its assigned, the *priority* of the work, and the work *instructions* can also be entered.

Save Tree
 Save/Print
 New Work Order
 Edit Work Order
 View Archive
 Delete Tree
 Exit

Completed work orders are edited by using the *edit work order* command in the **edit tree** window. The **edit work order** window is similar to the **new work order** window (Figure 3.12.10). Two lines are provided for a description of the *work performed*, each of which can be up to 40 characters. The *equipment used*, *date completed*, person who completed the work, *hours spent*, and *cost* can be entered.

Requested and completed work orders can be saved and printed. UFIS keeps an archive of work history at a site, however only the most recent work order is editable. The archive is viewed by using the *view archive* command in the **edit tree** window.

Reports

The **search criteria** window lists data fields used for searching UFIS databases (Figure 3.12.11). Boolean operators including *equal to* (=), *less than* (<), *and*, and *or* can be used to query the database. Figure 3.12.11 indicates all species equal to American Elm (*Ulmus americana*). The Boolean operator *and* can be used to include further search criteria, such as American Elms that have *condition* values below 50 percent. The results for the query are indicated in the map window and in a **browser** window, which is a spreadsheet style matrix of inventory data (Figure 3.12.12). The map window highlights the selected trees. Columns in the **browser** window can be resized and moved, and data can be edited. Fields can be removed from the **browser** window by using the commands in the **pick fields** window (Figure 3.12.13). Results in the browser window and on the map can be printed.

A spatial query of the database is performed by using the *marquee select* tool located on either the **tree** or **PS** buttonpad (Figure 3.12.2). The *marquee select* tool is used for selecting an area of tree sites on the map that are of interest. Once selected, a **browser** window opens containing the data for the tree sites.

Statistics on any one field in either the inventory database or the previously performed query can be viewed by using the *calculate statistics* command (Figure 3.12.14). Statistical results include *count*, *minimum*, *maximum*, *range*, *sum*,

▲ Figure 3.12.10: Work orders are added, edited, and printed from the work order window.

◀ Figure 3.12.11: The search criteria window is used to query the UFIS database.

Figure 3.12.12: The browser window contains a matrix of inventory data which opens after performing a query of the database.

Address	Tree_no	Dbh	Species	Maint_cd	Cond_pcnt	Tree_ht
2117 CLARK ST	2	20.7	AMERICAN ELM	N	65	50
2125 CLARK ST	2	26.8	AMERICAN ELM	N	55	55
2125 CLARK ST	3	23.3	AMERICAN ELM	N	55	55
2257 CLARK ST	1	18.8	AMERICAN ELM	PR	50	60
2124 LINCOLN AVE	2	16.0	AMERICAN ELM	N	60	50
2124 LINCOLN AVE	3	19.5	AMERICAN ELM	N	65	50
2141 LINCOLN AVE	1	19.9	AMERICAN ELM	N	60	50
2133 LINCOLN AVE	1	19.4	AMERICAN ELM	N	55	50
2324 CENTER ST	4	14.9	AMERICAN ELM	N	65	45
1741 FREMONT ST	2	23.4	AMERICAN ELM	PR	65	55
1915 ILLINOIS AVE	2	8.0	AMERICAN ELM	PR	45	30

mean, variance, and standard deviation. Figure 3.12.14 indicates these results for the DBH field for the inventory database.

Addresses can be searched by using the *find address* command. After typing in a street and address number in the **find address** dialog, UFIS highlights the street segment (line) on the map. This tool identifies where a range of addresses lie on a block.

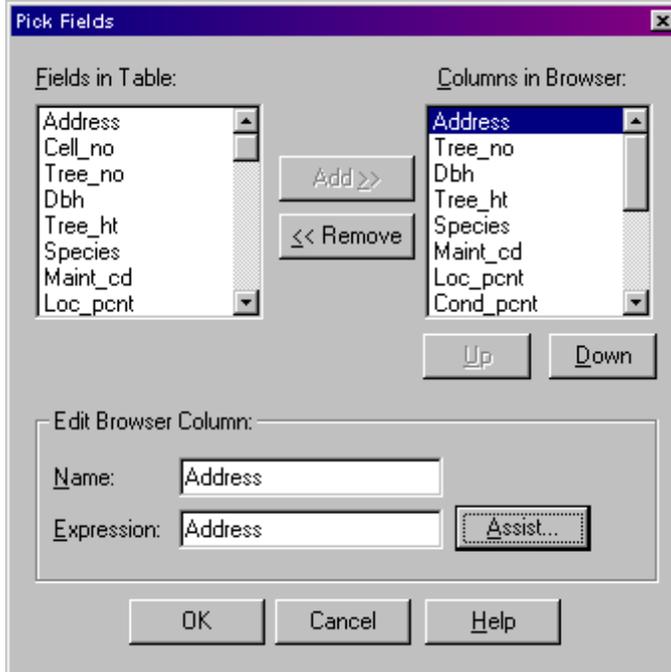


Figure 3.12.13: Columns in the browser window can be removed and added through the pick fields window. Mathematical operations and Boolean operators can be performed on columns of data by using an expression builder.

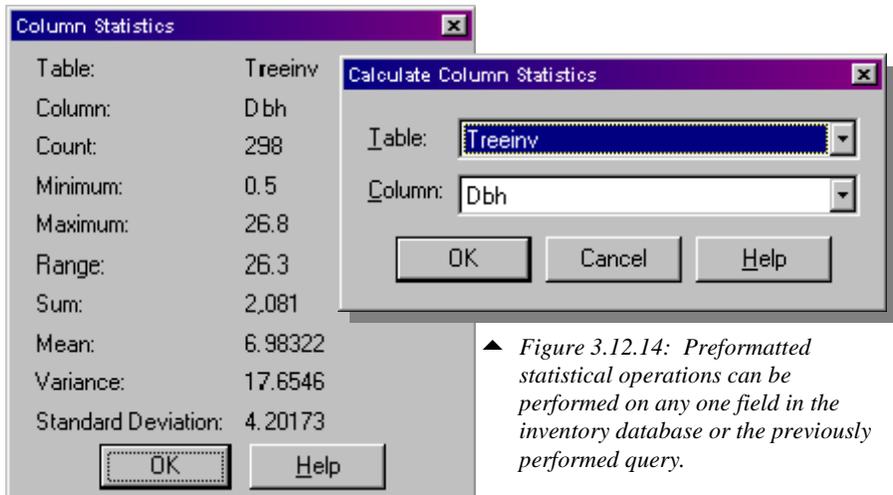


Figure 3.12.14: Preformatted statistical operations can be performed on any one field in the inventory database or the previously performed query.