Urban Tree Management System (UTMS) was developed and is distributed by Alan Wagar in Shoreline, Washingtion. Two versions of UTMS are available - UTMS 5000 and UTMS III. Both versions are identical except UTMS 5000 is limited to records for 5000 trees sites. There are over 12 communities using UTMS nationally and internationally.

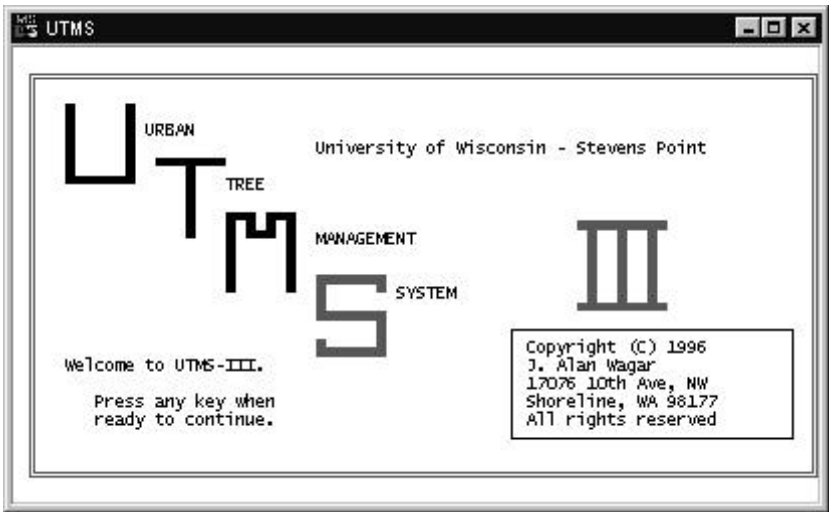
System requirements

- MS-DOS®
- 286 Processor
- 640 KB of memory

UTMS was primarily used on a Gateway™ G6-200 Pentium® Pro PC using Windows NT®. UTMS was also used with Windows® 95 and 98, on a Gateway™ P5-166 Pentium® PC and a G6-300 Pentium® II PC, respectively. The UTMS directory uses 631 KB of hard disk space. After entering data for 456 tree sites the directory size increased to 807 KB. Therefore 1,000 tree sites would require approximately 386 KB (0.38 MB).

Software cost

UTMS III is purchased from Alan Wagar for $695.00. UTMS 5000 is purchased for $100.00. A demonstration version is available.



▲ *Figure 3.13.1: UTMS splash screen.*

Technical support

A 30 page user manual and online documentation are provided with UTMS. Additional phone support is provided at no cost.

Contact

UTMS
17076 10th Ave. NW
Shoreline, WA 98177

Phone: (206) 546-8251
Email: jawagar@u.washington.edu

The **bold** text in the following description refers to screen names. *Italicized* text refers to either field names or field selections.

Defining species

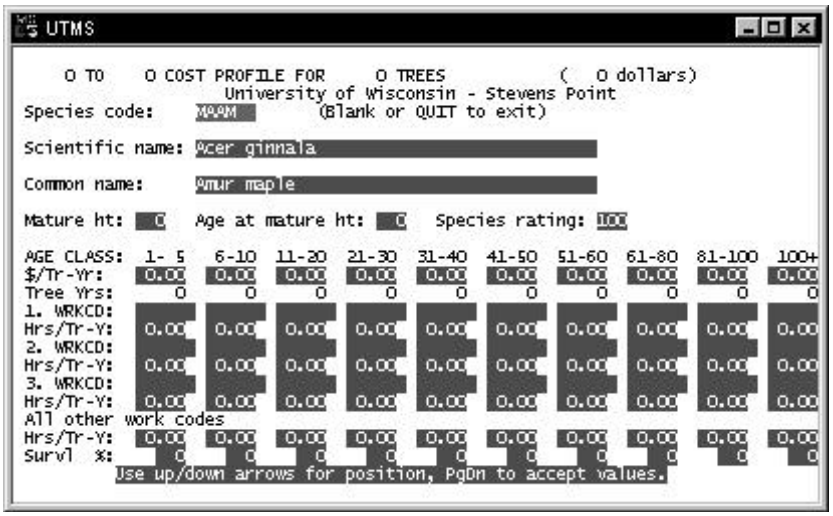
Species are added, edited, and deleted in the **new species** screen (Figure 3.13.2). A *species code*, *scientific name*, *common name*, *mature height*, *age at mature height*, and *species rating* (CTLA valuation) must be entered. UTMS assigns a zero to the latter three fields if values are not entered. *Species code* can be up to 6 characters, and *scientific* and *common names* can each be up to 40 characters. The remaining fields on this screen are used for computing performance information when comparing species. These fields are generally disregarded at this time. UTMS must be restarted after defining ten species records. UTMS was programmed in this manner to reduce system memory requirements.

Defining work codes

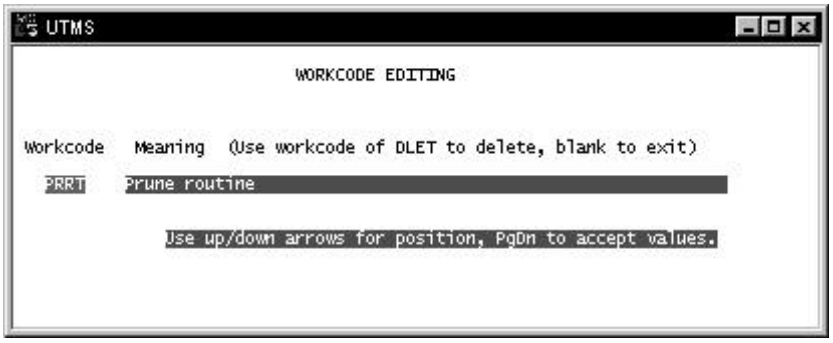
When adding work codes up to a four character *workcode* and up to a 60 character description must be entered (Figure 3.13.3). Work codes and descriptions are also edited and deleted in the **workcode editing** screen. UTMS must be restarted after defining ten *workcode* records.

Defining optional fields

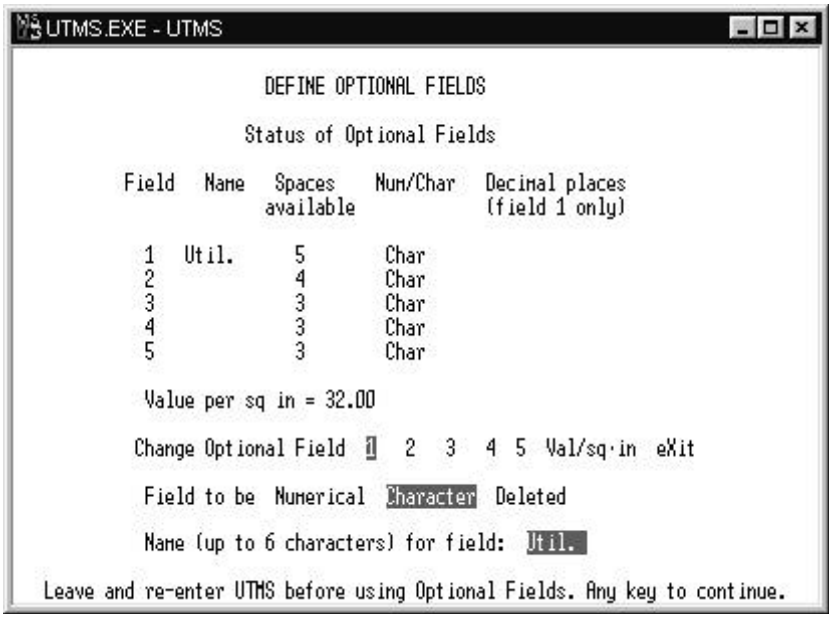
Up to five optional data entry fields can be defined (Figure 3.13.4). One field can be numeric or character, and the remaining four must be character. Up to a five character name is given to each field, and field lengths range from three to five characters. The *value per square inch* (CTLA valuation) is also defined in this screen.



▲ *Figure 3.13.2: Species code, scientific name, common name, mature height, age at mature height, and species rating are entered when defining species.*



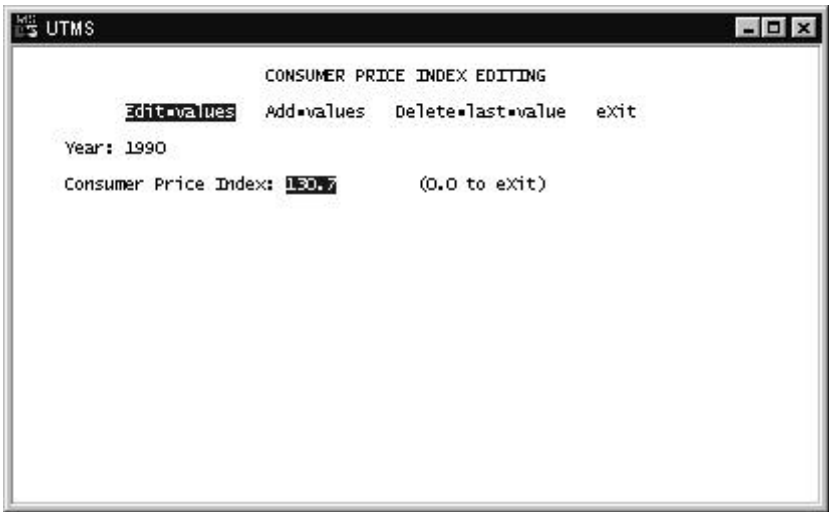
▲ *Figure 3.13.3: Work codes and descriptions are defined in the workcode editing screen.*



▲ *Figure 3.13.4: Up to five optional data entry fields can defined.*

Defining consumer price indices

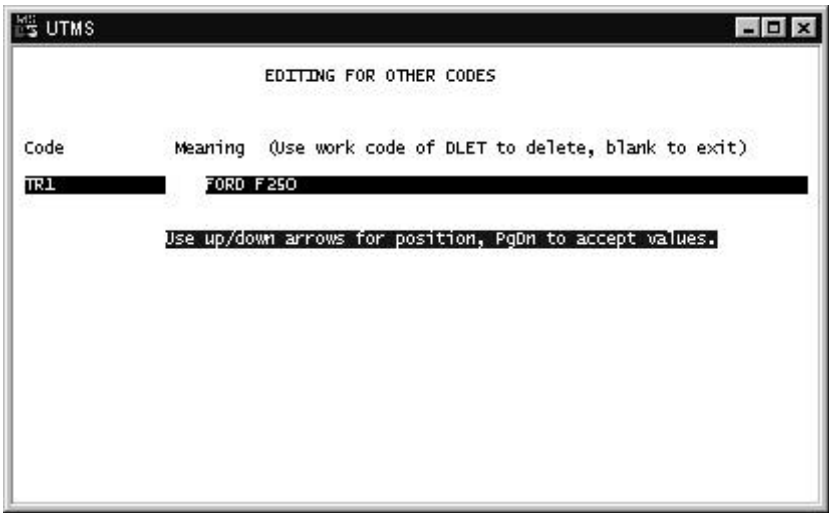
The consumer price index (CPI) is used to adjust all costs in cost profiles to a common year. Cost profiles are used to forecast workloads. CPI values for the United States are provided from 1960 to 1991, and annual values are added, edited, and deleted in the **consumer price index editing** screen (Figure 3.13.5).



▲ *Figure 3.13.5: A database of consumer price indices is maintained to adjust all costs in cost profiles to a common year.*

Defining other codes

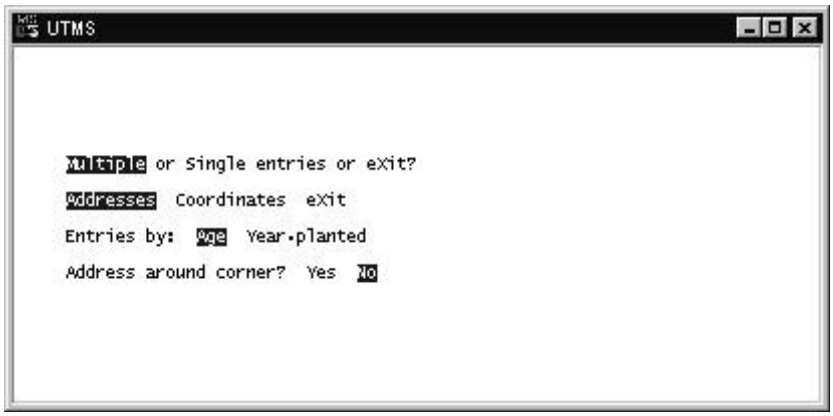
Miscellaneous codes are referred to as *other codes* and are added, edited, and deleted in the **editing for other codes** screen (Figure 3.13.6). Up to a 14 character code and up to a 60 character description must be entered. UTMS must be restarted after defining ten *other code* records.



▲ *Figure 3.13.6: Miscellaneous codes and their descriptions can be entered into a database for referencing during data entry.*

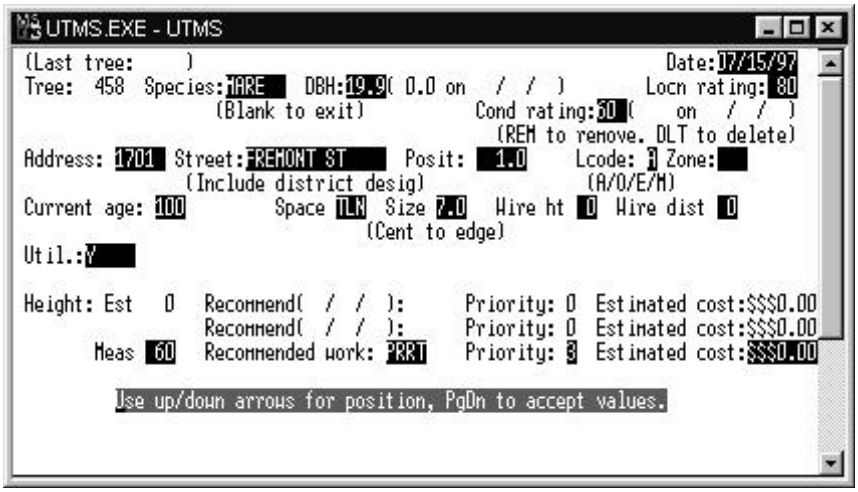
Adding tree sites

A series of four questions must be answered before entering tree site data (Figure 3.13.7). Either *multiple* or *single entries* must be chosen, where *multiple* duplicates data in all fields from one record to the next. When *single entries* is selected all fields except date and tree number remain blank. Either *addresses* or *coordinates* is selected depending upon the type of location method used. *Age* is selected when age data are recorded for existing trees, and *year planted* is selected when entering data for newly planted trees. Whether the address is around a corner must also be specified before entering address information.



▲ *Figure 3.13.7: A series of questions must be answered before entering tree site data.*

In the **data entry** screen a *date*, *species* code, *address*, *street*, and *zone* must be entered (Figure 3.13.8). The *date* field indicates the current date although it can be edited. *Species* code must be typed, although a separate screen listing codes and descriptions can be viewed for reference (Figure 3.13.9). *Address* number can be up to five characters and *street* name can be up to 14 characters. The management *zone* can be up to three characters.



▲ *Figure 3.13.8: Tree, location, and site descriptors are entered in the data entry screen. Recommended work along with its priority and estimated cost can also be entered.*

Other location descriptor fields include *location rating*, *position*, and location code (*lcode*). *Location rating* (CTLA valuation) can be up to three characters. *Position* indicates the tree site sequence number at the address. *Lcode* indicates if the tree site is at an address (*A*), odd number address (*O*), even number address (*E*), or within a median (*M*).

Other tree descriptor fields include *DBH*, *condition rating*, *current age*, and *measured height*. *DBH* can be up to two characters and can be to one decimal place. *Condition rating* (CTLA valuation), *current age*, and *measured height* can each be up to three characters. UTMS estimates height using a growth curve and the *mature height* and *age at mature height* data entered when the species was defined. If a different *measured height* from this estimate is entered, a multiplier is calculated to adjust all future height estimates for the tree.

Site descriptor fields include grow *space* type and *size*, along with *wire height* and *distance*. Grow *space* type can be up to a three character code. Grow space *size* indicates either the distance across the space or the distance from the center to edge. *Wire height* is the vertical distance from the ground to overhead wires, and *wire distance* is the horizontal distance from the center of the tree to overhead wires. Since we did not measure *wire height* or *distance*, either *Y* (yes) or *N* (no) was entered in an optional field named *utilities*.

A *recommended work* code along with its *priority* and *estimated cost* can be entered in the **data entry** screen. The *recommended work* code must be typed, although a separate screen listing codes and descriptions can be viewed for reference (Figure 3.13.9). A *priority* from *1* (high) to *3* (low) can be entered.

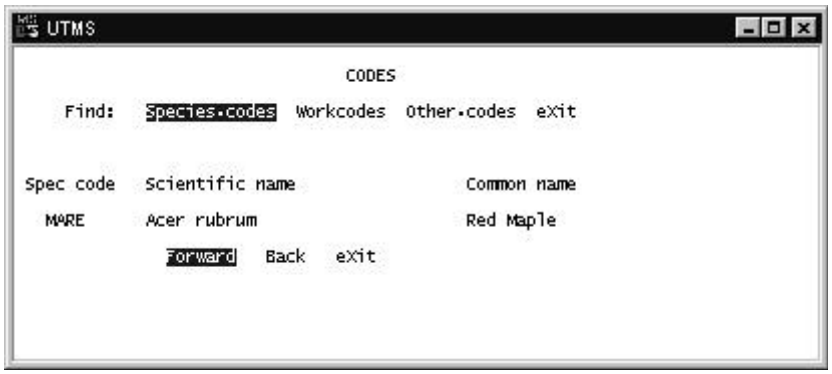


Figure 3.13.9: Species, work, and other codes are viewed in the codes screen for reference during data entry.

Adding work records

After entering data in the **data entry** screen an option is provided to enter work record or inspection information in the **work record** screen (Figure 3.13.10). The current *date* and *species* code are entered automatically. A valid *workcode* must be entered. If *DBH* and *condition* are entered their corresponding entries are updated in the inventory database. Two fields are provided for entering *person hours* and wage *rates*. An *equipment code* up to three characters along with its *units* (miles, hours, etc.) and hourly *rate* can be entered. Fields are also provided for entering a *material code* up to four characters, material *cost*, and *crew ID*. *Crew ID* can be up to four characters. If additional work is required at the site a *recommended work* code, *priority*, and *cost* can be entered.

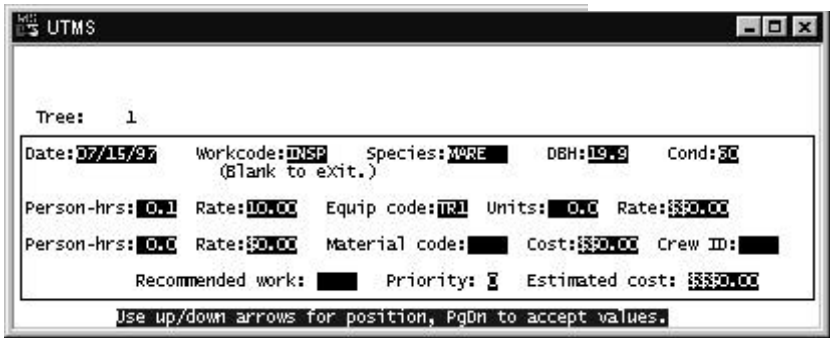


Figure 3.13.10: Work record information includes work code, person hours, hourly rate, equipment and material used, crew ID, and costs.

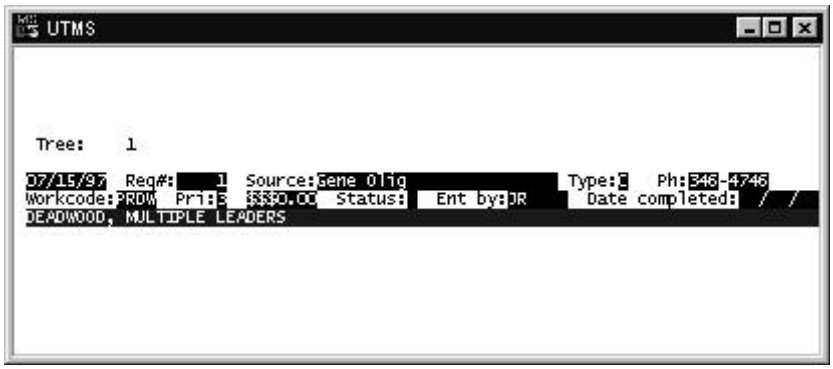


Figure 3.13.11: Work request information includes source, phone number, work code, work priority, and comments.

Adding work requests

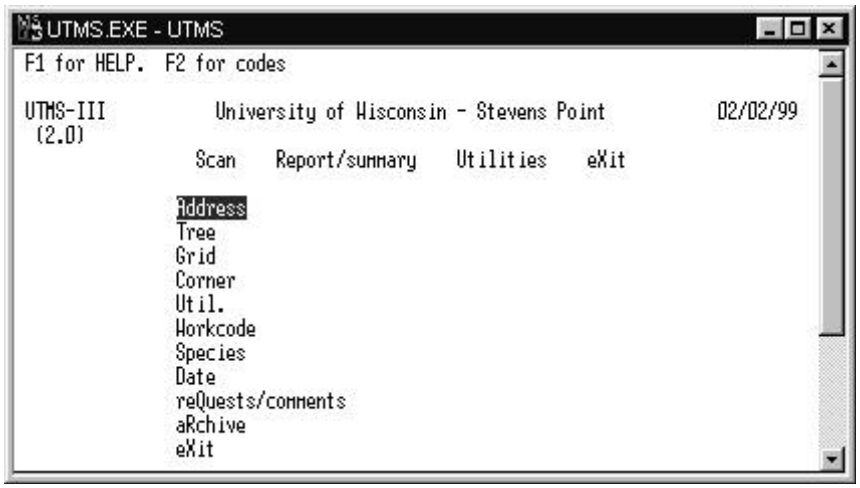
After entering data in the **enter work record** screen an option is provided to enter additional work records, followed by an option to enter work requests or comments. When entering work requests or comments the current *date* and *request number* are entered automatically (Figure 3.13.11). To enter a work request data must be entered into at least one of the fields provided for *source*, *type*, *phone*, or *workcode*. Up to a 24 character *source* name and up to a one character *type* can be entered. *Type* can be any character that classifies the *source*, such as citizen (*C*) or departmental (*D*). *Workcode priority*, *estimated cost*, *status*, request *entered by*, and *comment* information can be entered. All fields are left blank except *date* and *comments* when only comment information is added for the tree site.

Searching records

Tree sites can be searched by *address*, *tree* number, *grid* location, *corner* address, *workcode*, *species*, *date*, and *requests/comments* (Figure 3.13.12). The first user-defined optional field can also be used as a search method. Each of these have a similar output screen which is used for scrolling through tree sites and editing and printing tree site data. *Work records* and *requests/comments* can be added, edited, and printed for tree sites at this time. When searching for trees at an address the desired *address* number and *street* name are entered. Tree site data for the address are listed for the site at *position* one if the address is found in the database (Figure 3.13.13). The next higher address on the street is listed if the searched address is not found.

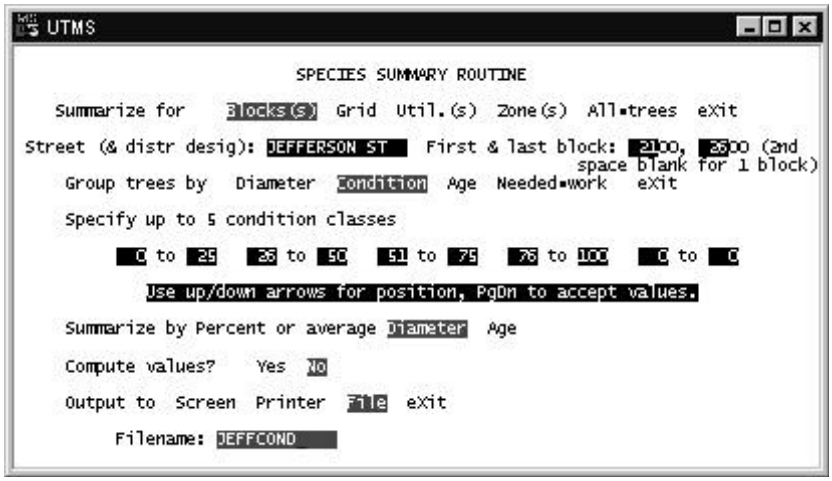
Species summaries

Species can be summarized for the entire inventory, blocks, grids, and zones (Figure 3.13.14). A species summary can also be created for the first user-defined optional field. The output for species summaries must be grouped by either *diameter*, *condition*, *age*, or *needed work*. Up to five classes are defined when grouping by *diameter*, *condition*, and *age*. Up to five work codes are defined when grouping by *needed work*. Species summaries also include a summary by either *percent*, *average diameter*, or *age*. An option is provided for including species values (CTLA valuation) in the report. Results are output to either the screen, printer, or a text file. Figure 3.13.14 indicates the **species summary routine** for blocks on one street grouped by *condition* classes and summarized by *diameter*, with output written to a text file. The output in Figure 3.13.15 indicates results grouped by block, with *species* and totals indicated as rows and *condition* classes and totals indicated as columns. Columns are



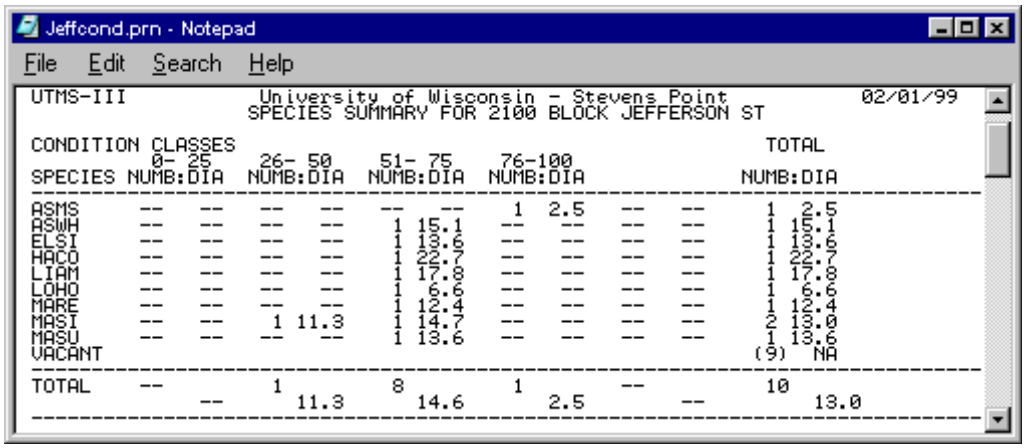
▲ *Figure 3.13.12: Searches can be performed by using address, tree number, grid location, workcode, species, date, and request/comment information.*

▲ *Figure 3.13.13: An address number and street name are entered to search for tree sites at an address. Search results list tree site data which can be edited and printed. Work records, requests, and comments can be viewed, edited, added, and printed through this screen.*



▲ *Figure 3.13.14: Species summarized for blocks on a street and grouped by user-defined condition classes. Output is written to a text file in this example.*

Figure 3.13.15: A species summary indicating species by row and condition classes by column. Condition classes are subdivided into species count and average diameter.



subdivided to indicate *species* count and *diameter* summaries.

Listings

Listings include inventory record, work record, species, work code, other code, work request, and zero-tree information. Zero-tree information refers to work and costs not associated with trees. Listings are created for either all records or user-selected records. Up to three fields are first selected as filtering criteria when user-selected listings are created (Figure 3.13.16). *Species* and *address* fields are selected in Figure 3.13.16. The desired data used to filter the selection for the previously chosen fields are then entered (Figure 3.13.17). The listing can be filtered further by specifying either *odd* or *even* addresses. Output list items and their order must be specified, and output can be either to the screen, printer, or a text file (Figure 3.13.18). An option is available for including latest uncompleted work requests along with lines used for entering completed work. The output screen has time-delayed scrolling which can be paused if desired. Figure 3.13.19 indicates *address*, *street* name, *position*, *tree number*, *species*,

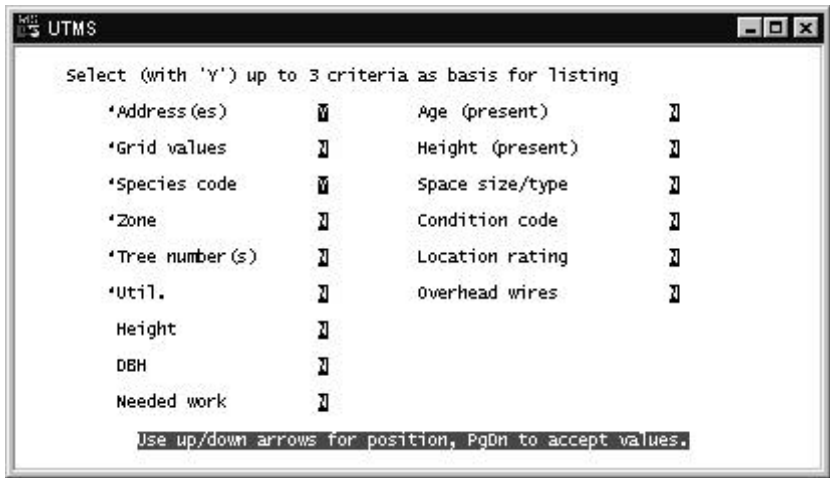


Figure 3.13.16: Up to three fields are chosen as basis for filtering a listing.

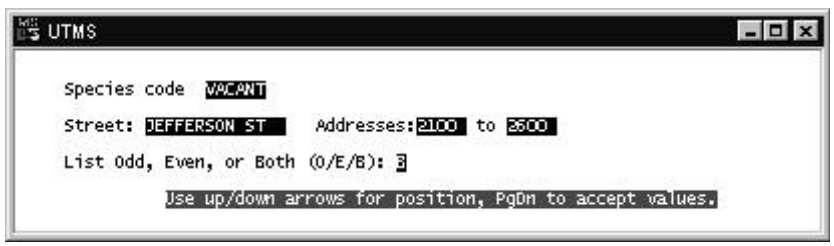


Figure 3.13.17: Desired listing criteria are entered in the previously selected fields.

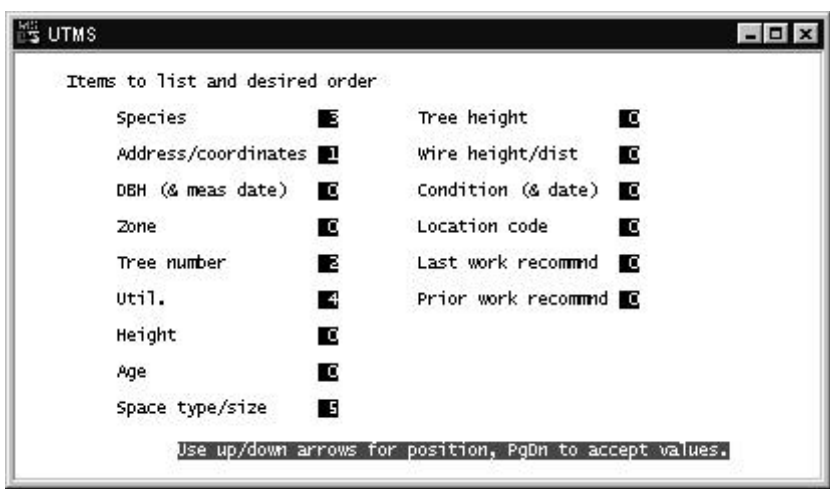


Figure 3.14.18: Fields are selected and ranked in the order that they will appear in the listing output.

presence or absence of *utilities*, and *space type* and *size* columns in their specified order.

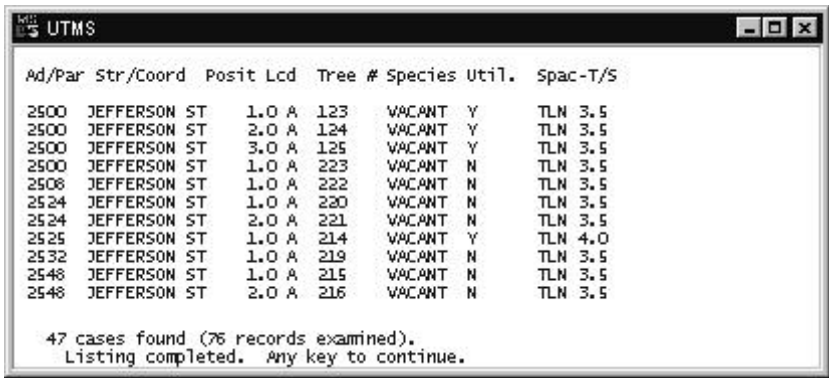
Value computation

Tree values (CTLA valuation) can be computed for a user-specified range of tree numbers or for all trees in the database. Tree values can also be computed for trees on blocks, grids, and zones. A *value per square inch* must be specified for each of the above, and options are available for filtering by both *species* and *age* where appropriate. Output can be either to the screen, printer, or a text file. Figure 3.13.20 indicates the computed value for Red Maple (*Acer rubrum*) with output to the screen.

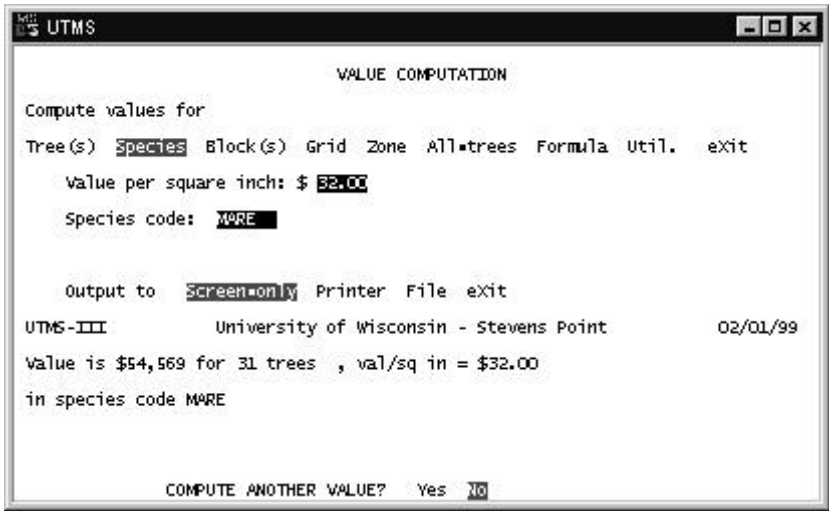
Tree value can also be computed for specified *diameter*, *species*, *condition*, and *location* values. Either the 1988 or 1992 CTLA method can be used. The 1992 method includes fields for entering the *installed cost*, *diameter*, and *basic price* of the largest transplantable tree (Figure 3.13.21).

Work record summaries

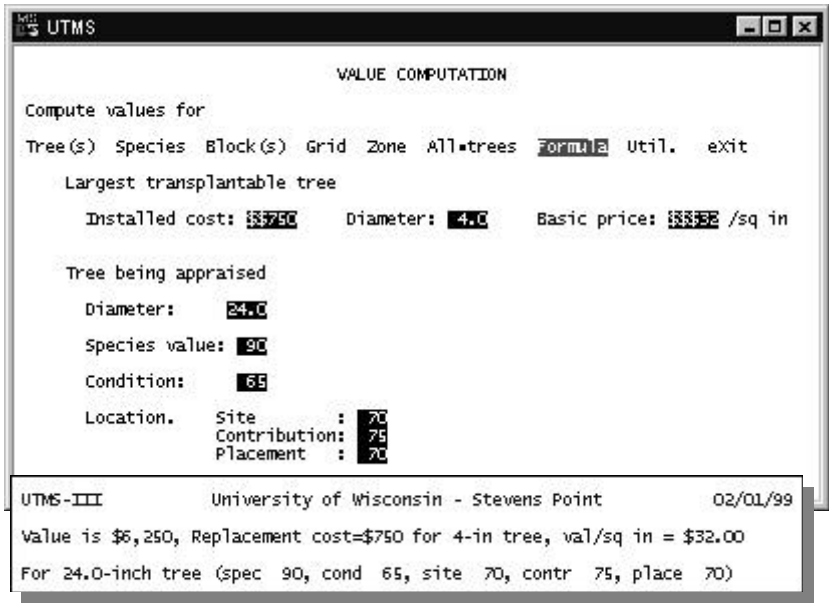
Work records are summarized by either *tree* number, *address*, *workcode*, *species*, *dates*, *blocks*, *zones*, or *grids*. A summary by the first user-defined optional field can also be created. A date range must be entered for each summary type. The output indicates *workcode*, *cost*, and *hours* by row, and *age class* by column. *Total cost* and *hours* are indicated for each age class, along with totals for all age classes.



▲ *Figure 3.13.19: Screen output for listings has a time-delayed scroll with the option to pause at each page. Columns are indicated in the user-specified order.*



▲ *Figure 3.13.20: Values for trees on either blocks, grids, or zones are calculated by UTMS after specifying a value per square inch. Values can also be calculated for a specified species or range of tree numbers.*



▶ *Figure 3.13.21: Tree value can be computed by entering the installed cost, diameter, and basic price of the largest transplantable tree along with entering diameter, species, condition, and location values for the appraised tree.*

Performance profiles

Although not used in this study, UTMS can develop performance profiles used for species comparisons. Profiling summarizes work and performance history for each species by age class and is used as a basis for forecasting workloads. A species profile contains values for costs and amounts of work needed, and contains survival rates for each age class by species. The most recent CPI is used to convert costs to constant dollars.

Forecasting workloads

Performance profiles are used to forecast workloads for user-specified time periods and locations. A forecast can be created for blocks, grids, zones, all trees, or the first user-defined optional field. Each of the above can be filtered to a single species if desired. The first forecast year up to ten years in the future and the last forecast year must be entered when creating a forecast. Output can be to the screen, printer, or a text file.