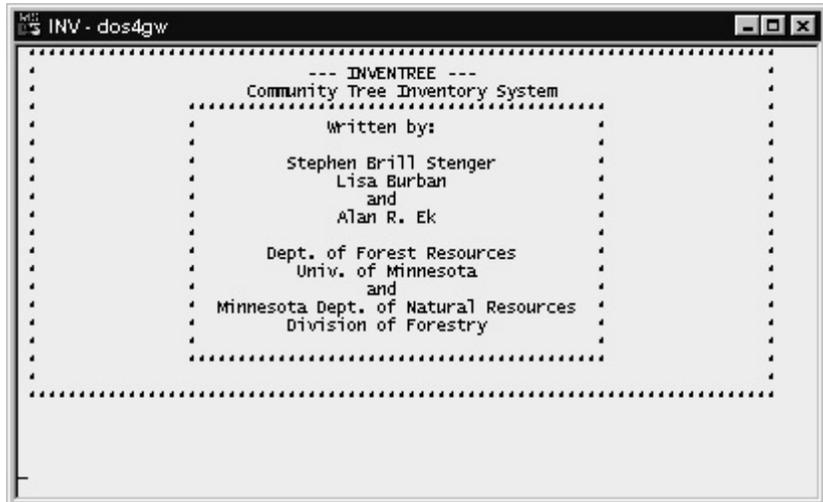


Inventree was developed by Lisa Burban, Stephen Stenger, and Alan Ek through the Department of Forest Resources at the University of Minnesota and the Minnesota Department of Natural Resources Division of Forestry. Inventree is distributed by the Kunde Company based in Roseville, Minnesota. Inventree uses and is provided with a runtime version of the R:BASE relational database program. The full version of R:BASE provides expanded functionality however must be purchased separately. The runtime version was used in this study. The Kunde Company does not plan on updating their software to Windows® in the near future. Over ten communities are using Inventree nationally and internationally.

System requirements

- MS-DOS®
- 286 Processor
- 2 MB of memory

Inventree was primarily used on a Gateway™ G6-200 Pentium® Pro PC using Windows NT®. Inventree was also used with Windows® 95 and 98, on a Gateway™ P5-166 Pentium® PC and a G6-300 Pentium® II PC, respectively. The Inventree directory uses 3,482 KB of hard disk space. After entering data for 361 tree sites the directory size increased to 3,625 KB. Therefore 1,000 trees sites would require approximately 396 KB (0.39 MB).



▲ Figure 3.2.1: Inventree splash screen.

Software cost

Inventree is purchased from the Kunde Company for \$150.00. A demonstration version is not available.

Technical support

Inventree is provided with a 20 page manual and online documentation. Training is not provided. Technical support is free, however an hourly rate may be charged for lengthy sessions.

Contact

Kunde Company, Inc.
2311 Woodbridge St. #170
Roseville, MN 55113

Phone: (612) 484-0114
Email: kundeco@isd.net
Internet: www.kundeco.com

The **bold** text in the following description refers to either screen or menu names. *Italicized* text refers to either commands, menu items, or field names.

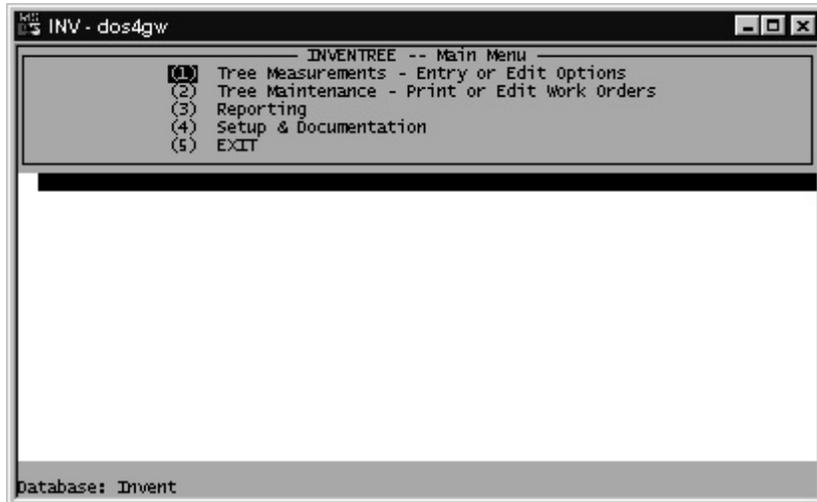
The **main menu** screen in Inventree contains selections that give access to all program functions (Figure 3.2.2). The setup and documentation selection accesses the **setup and documentation** screen where program databases are configured (Figure 3.2.3).

Defining species

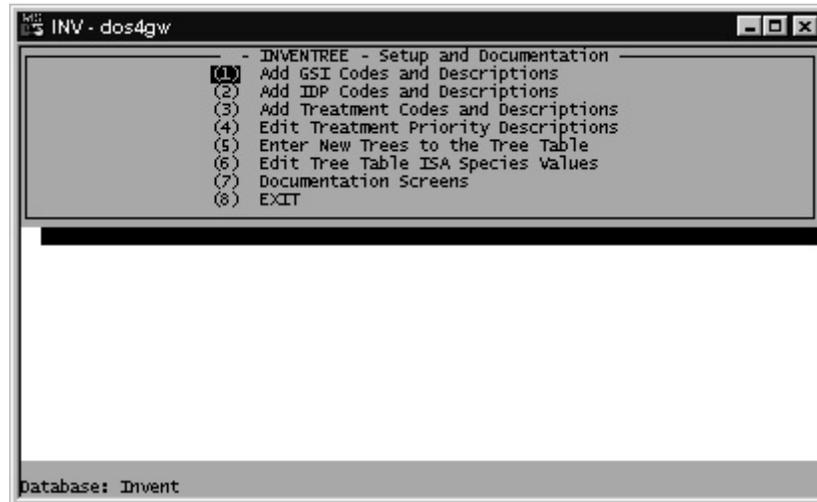
A species database is provided with the system which has entries that can not be edited or deleted, however additional species can be defined. Up to a four character *code* must be entered (Figure 3.2.4). Both a *general* and *specific name* can be entered which can be up to 19 and 14 characters, respectively. *General name* refers to the common name of the genus (i.e. Ash) and *specific name* refers to the common name of the species (i.e. Green). Up to a 12 character *genus* and up to a 14 character *species* can be entered. *Species values* (CTLA valuation) are also defined in this screen, and can be edited for any of the species in the database.

Defining GSI codes

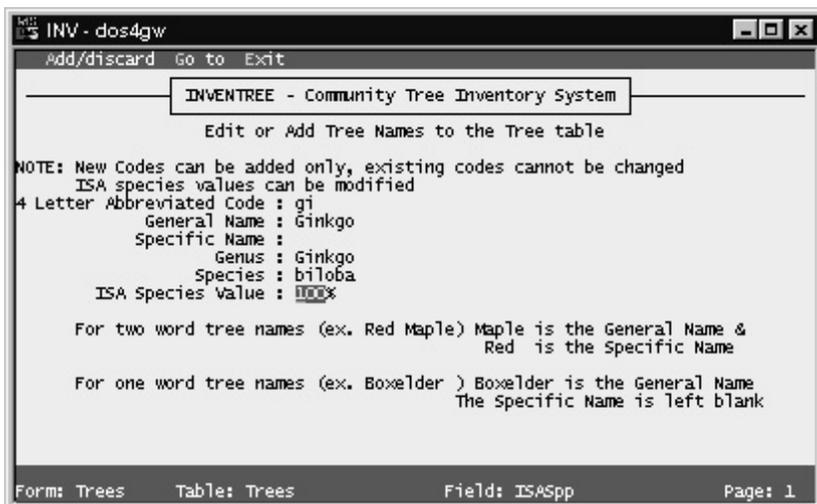
GSI (General Site Information) codes are provided with the system and can not be edited or deleted (Figure 3.2.5). Up to a three character *GSI code* and up to 40 character *description* must be entered when creating user-defined *GSI codes*.



▲ Figure 3.2.2: Data entry, printing, editing, reporting, and program setup screens are accessed through the main menu screen.



▲ Figure 3.2.3: The setup and documentation screen lists the configurable databases.



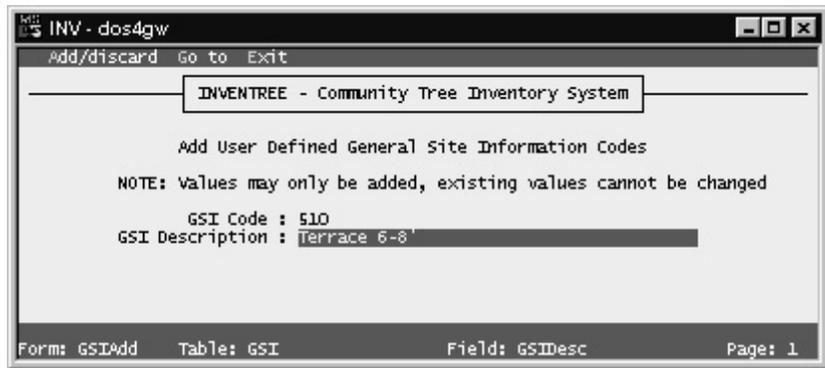
▲ Figure 3.2.4: Species can only be added to the existing species database, although species values can be edited for any species.

Defining IDP codes

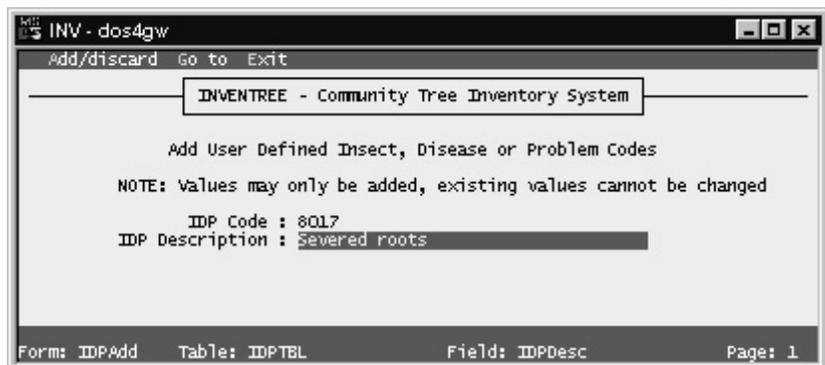
IDP (Insect, Disease, Problem) codes are provided with the system and can not be edited or deleted (Figure 3.2.6). An *IDP code* up to four characters and a *description* up to 34 characters must be entered when creating user-defined IDP codes.

Defining treatments

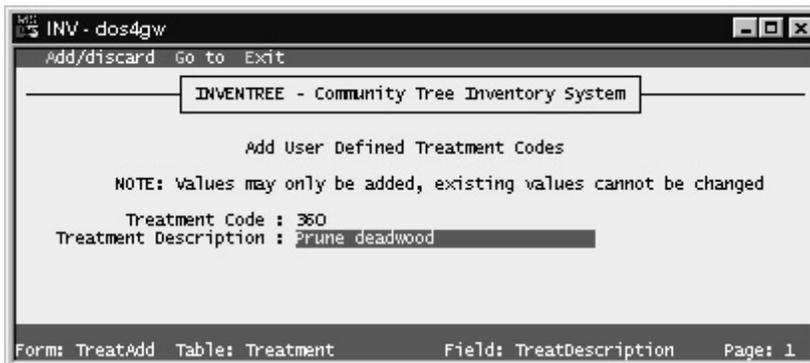
The treatment and treatment priority databases are used when entering work orders. Treatment codes and descriptions are provided with the system and can not be edited or deleted (Figure 3.2.7). A *treatment code* up to three characters and a *treatment description* up to 30 characters must be entered when creating user-defined treatments. Inventree allows for editing up to ten treatment *priority descriptions* (Figure 3.2.8). *Priority codes* numbered from zero to nine can not be modified. *Priority descriptions* can be up to 43 characters.



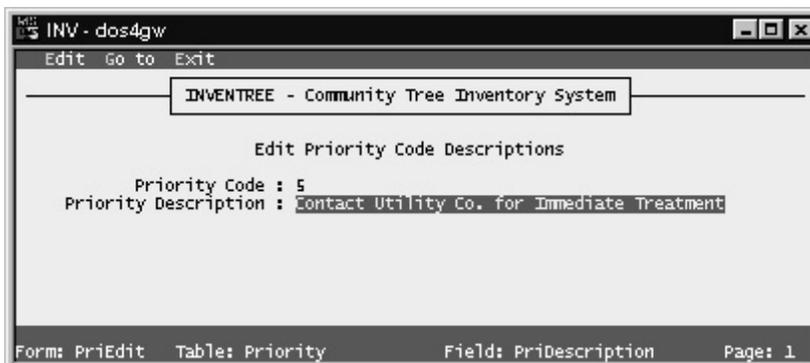
▲ Figure 3.2.5: General site information codes and descriptions can be added to the existing GSI database.



▲ Figure 3.2.6: Insect, disease, and problem codes and descriptions can be added to the existing IDP database.



◀ Figure 3.2.7: Treatment codes and descriptions can be added to the existing treatment database.



◀ Figure 3.2.8: Up to ten treatment priority descriptions can be edited in the treatment priority database.

Adding tree sites

Inventree offers three methods on the **tree measurements** menu for data entry which include entry using a short form, long form, and importing data from a data recorder (Figure 3.2.9). The long form allows for entry of two GSI and IDP codes per site whereas the short form allows for entry of one of each per site. The long form is accessed through the **long form** menu which contains options for entering, editing, and viewing data (Figure 3.2.10). An option is also available for entering data using only codes. The short form is accessed through the **short form** menu and also contains options for entering, editing, and viewing data (Figure 3.2.11). The following describes data entry using the long form.

Location descriptor fields include *zip code*, *management unit*, *owner classification code*, *street name*, *house number*, *reference point*, *azimuth*, and *distance* (Figure 3.2.12). *Zip code* is optional and can include a four digit extension. *Management unit* is also optional and can be up to eight characters. Inventree provides a list of *owner classification codes* which are not editable (Figure 3.2.13). Codes are divided into six categories including *private*; *public - city*; *public - county*; *public - township*; *public - state*; and *public - federal*. Each category contains a list of 20 landuse classifications such as industrial, residential, and commercial. This field is also optional. *Street name* and *house number* fields are both required, and can be up to 25 and six characters, respectively. *Street name* is selectable from a pick list after it is initially entered into the database from this screen (Figure 3.2.13). We were not able to edit values in this list. Tree sites are located at the address by entering up to a 40 character description of a permanent *reference point*, along with the *azimuth* (degrees) and *distance* (feet)

```

INVENTREE -- Tree Measurements - Entry or Edit Options Menu
(1) Enter or Edit Data using the Long Form
(2) Enter or Edit Data using the Short Form
(3) Enter Data from a Handheld Data Recorder
(4) Return to Main Menu
  
```

▲ Figure 3.2.9: The tree measurements menu contains three data entry options.

```

INVENTREE -- Long Form Entry or Edit Options Menu
(1) Enter Data Using the Long Form
(2) Enter Data Using the Long Form ( with codes only )
(3) Edit Data Using the Long Form
(4) Enter Planting Space Information Only
(5) View the Existing Data
(6) Return to the Tree Measurement Options Menu
  
```

▲ Figure 3.2.10: The long form menu contains options for entering, editing, and viewing data. The long form allows for up to two GSI and IDP codes to be entered during data entry

```

INVENTREE -- Short Form - Entry or Edit Options Menu
(1) Enter Data Using the Short Form
(2) Edit Data Using the Short Form
(3) Enter Planting Space Information Only
(4) View the Existing Data
(5) Return to the Tree Measurements Options Menu
  
```

▲ Figure 3.2.11: The short form menu contains options for entering, editing, and viewing data. The short form allows for one GSI and IDP code to be entered during data entry.

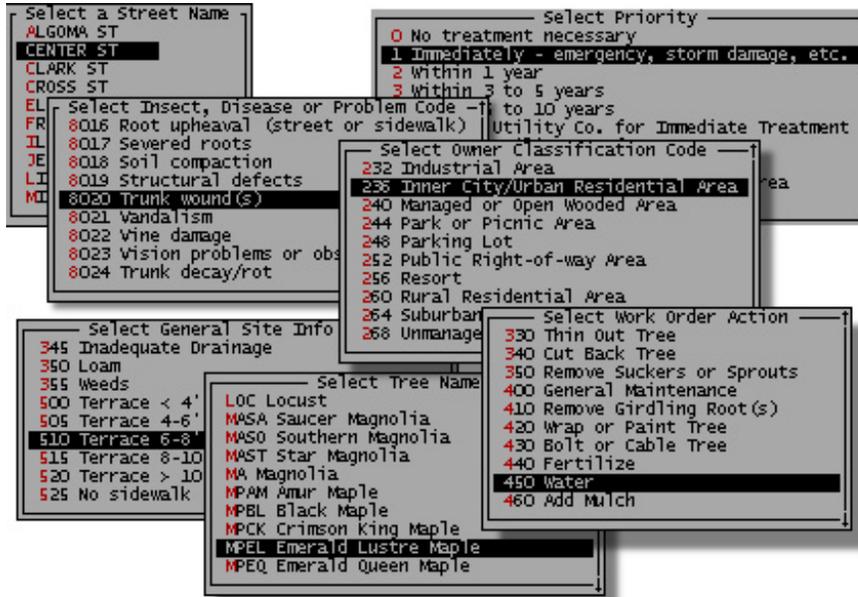
from that point to the tree site. Entering data in the *reference point* field is required, however *azimuth* and *distance* fields are optional.

Tree descriptor fields include *species code*, *DBH*, *ISA species* value, *ISA condition* percent, and *IDP*. *Species code* must be entered by either typing the code or selecting the species in a pick list (Figure 3.2.13). Entering a *DBH* is optional and can be recorded to one decimal place. *ISA species* value is entered automatically after a

species code is selected. Entering an *ISA condition* is optional and can be up to three characters. Up to two IDP codes can be either typed or selected from a pick list (Figure 3.2.13).

Site descriptors include *ISA location* percent and *GSI*. *ISA location* percent can be up to three characters. Up to two GSI codes can be either typed or selected from a pick list (Figure 3.2.13).

▲ Figure 3.2.12: Data are entered using either the long or short form.



◀ Figure 3.2.13: Pick lists include owner classification codes and descriptions, street names, species codes and names, IDP codes and descriptions, work order actions, and work order priorities.

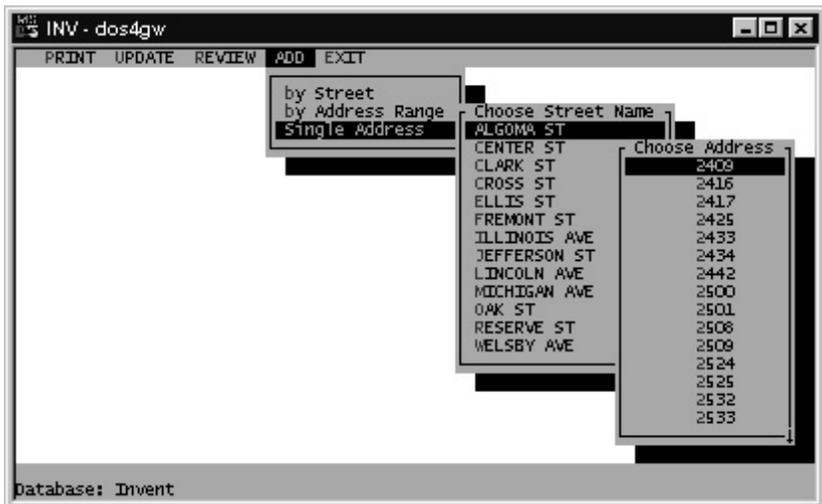
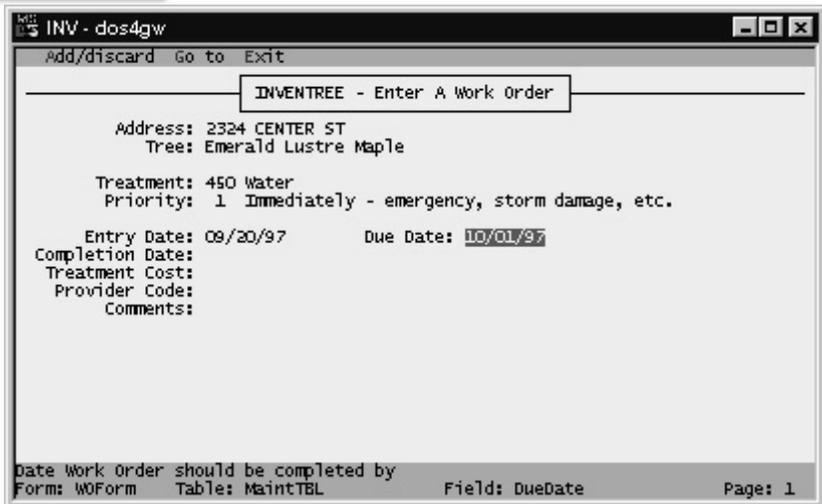
▼ Figure 3.2.14: A work order can be entered after entering tree data using the long or short form.

Other fields include *estimated value* and *date measured*. *Estimated value* is calculated automatically after species, condition, and location data are entered.

Adding work orders

Inventree prompts to enter work order information after entering tree site data. *Address* and *tree* name are entered automatically in the **work order** screen (Figure 3.2.14). A *treatment* and *priority* must be entered, and can both be selected from pick lists (Figure 3.2.13). Other data that can be entered include *entry*, *due*, and *completion dates*. A *treatment cost* up to nine characters and a *provider code* up to ten characters can also be entered. A field is provided for entering *comments*.

Work orders can also be added through the **main menu** (Figure 3.2.2). Either a single address, an address range, or an entire street can be selected for the work order (Figure 3.2.15). Work orders can be updated, reviewed, and printed by work order task, management unit, street, or address. Output can be viewed on screen or saved to a text file.

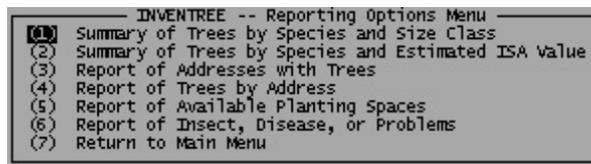


▲ Figure 3.2.15: Work orders can be added for a single address, address range, or an entire street.

Reports

Reporting options include a summary of trees by species and size class, summary of trees by species and estimated ISA value, report of addresses with trees, report of trees by address, report of available planting spaces, and report of IDP problems (Figure 3.2.16). Each report and summary can be viewed on screen, printed, or saved to a text file.

A summary of trees by species and size class indicates a matrix of species by row and diameter classes by column (Figure 3.2.17). Size classes include less than 4", 4-8", 8-12", 12-16", 16-20", and greater than 24". The matrix includes row and column totals, along with a species count and condition percent average in each cell.



◀ Figure 3.2.16: The reporting options menu contains report and summary selections.

Emerald Queen Maple	2	7	7	0	0	0	0	16
	75%	65%	65%					
Norway Maple	3	2	0	2	1	0	0	8
	66%	72%		40%	60%			
Red Maple	0	2	13	14	7	2	0	38
		65%	54%	59%	51%	45%		
Red Sunset Maple	1	0	0	0	0	0	0	1
	50%							
Schwedler Maple	2	8	7	0	0	0	0	17
	72%	62%	66%					
Silver Maple	0	3	4	4	2	2	5	20
		65%	61%	62%	72%	55%	59%	
Sugar Maple	2	1	3	2	0	0	0	8
	72%	70%	61%	65%				
Red Mulberry	1	0	0	0	0	0	0	1
	65%							

▲ Figure 3.2.17: Summary output of trees by species and size class indicates species counts and condition percent averages.

American Linden	1	17.8	17.8	17.8	\$2,257.53
Little-leaf Linden	5	6.8	4.8	7.6	\$2,542.54
Black Locust	1	9.0	9.0	9.0	\$144.28
Amur Maple	12	2.1	1.5	3.0	\$511.65
Crimson King Maple	4	3.5	2.5	5.1	\$523.36
Emerald Lustre Maple	11	2.6	2.5	3.5	\$817.99
Emerald Queen Maple	16	7.0	3.5	10.2	\$8,724.21
Norway Maple	8	7.1	0.5	17.0	\$5,082.39
Red Maple	38	13.4	6.1	21.7	\$62,138.26
Red Sunset Maple	1	2.5	2.5	2.5	\$47.71
Schwedler Maple	17	7.2	2.5	10.7	\$9,614.38
Silver Maple	20	17.7	7.2	35.7	\$39,105.34
Sugar Maple	8	8.2	2.5	13.6	\$7,330.55
Red Mulberry	1	1.0	1.0	1.0	\$4.41
Northern Red Oak	2	5.1	5.1	5.2	\$676.73
Eastern White Pine	1	0.5	0.5	0.5	\$3.24
Stump	1	8.0	8.0	8.0	\$0.00

Report Summary Total Number of Trees Total Estimated Value

Trees by Species and Estimated ISA Value 301 \$230,048.53

Press any key to continue

◀ Figure 3.2.18: Summary output of trees by species and estimated ISA value.

▼ Figure 3.2.19: A report of all addresses with trees.

A summary of trees by species and estimated ISA value indicates species by row along with a species count and the minimum, maximum, and average diameters (Figure 3.2.18). Total estimated values for each species are indicated along with a total for the entire database.

A report of addresses with trees can be categorized by street name, management unit, or condition class. A report can also be created for all addresses in the database (Figure 3.2.19). The report includes street

```

40 = Total # of Trees on CLARK ST
-----
Street Name: CROSS ST
1408 Inner City/Urban Residential Area
Red Maple DBH: 21.7 in Cond: 45%
Sidewalk intersection Az:180 Dist:130.
Red Maple DBH: 21.7 in Cond: 45%
Sidewalk intersection Az:180 Dist:130.

2 = Total # of Trees on CROSS ST
-----
Street Name: ELLIS ST
2100 Inner City/Urban Residential Area
Little-leaf Linden DBH: 4.8 in Cond: 65%
Sidewalk intersection Az: 90 Dist: 25.
2108 Inner City/Urban Residential Area
Little-leaf Linden DBH: 7.2 in Cond: 70%
Sidewalk intersection Az: 90 Dist: 65.
2116 Inner City/Urban Residential Area
Greenspire Linden DBH: 4.8 in Cond: 70%
Sidewalk intersection Az: 90 Dist:130.
2124 Inner City/Urban Residential Area
Little-leaf Linden DBH: 7.3 in Cond: 70%
Sidewalk intersection Az: 90 Dist:175.
More output follows. Press Esc to quit, any key to continue.

```

name, house number, owner class code, species, DBH, condition, reference point, azimuth, and distance. A total number of trees per street is also indicated.

A report of available planting spaces can be categorized by street name or management unit. A report can also be created for all planting spaces in the database. Figure 3.2.20 indicates available planting spaces on a designated street. The report includes street name, house number, sidewalk presence or absence, reference point, azimuth, and distance information.

A report of trees with insects, diseases or problems can be categorized by IDP code, street name, or management unit (Figure 3.2.21). A report can also be created for all IDPs in the database. IDP code and description, street name, house number, species, DBH, condition, GSI code, reference point, azimuth, and distance information are included.

The long and short form menus (Figure 3.2.10 and 3.2.11) each contain an option that allows for viewing a matrix of existing tree data (Figure 3.2.22). Searches and calculations can be performed from this screen, and the layout can be customized for reports. Preformatted calculations can be made on condition, location, GSI code, IDP code, reference point, azimuth, and distance fields. Statistical information includes count, minimum, maximum, sum, average, standard deviation, and variance.

House Number	Planting Space Type	Location (reference point, azimuth, distance)
Street Name: CENTER ST		
# 2240	Inner City/Urban Residential Area	
- w\ Sidewalk	Sidewalk intersection	0 deg. 40. ft.
- w\ Sidewalk	Sidewalk intersection	0 deg. 80. ft.
- w\ Sidewalk	Sidewalk intersection	270 deg. 25. ft.
# 2300	Inner City/Urban Residential Area	
- w\ Sidewalk	Sidewalk intersection	0 deg. 75. ft.
- w\ Sidewalk	Sidewalk intersection	90 deg. 30. ft.
# 2316	Inner City/Urban Residential Area	
- w\ Sidewalk	Alley intersection	90 deg. 55. ft.
# 2406	Inner City/Urban Residential Area	
- w\ Sidewalk	Sidewalk intersection	90 deg. 105. ft.
- w\ Sidewalk	Sidewalk intersection	90 deg. 150. ft.
# 2516	Inner City/Urban Residential Area	
- w\ Sidewalk	Sidewalk intersection	270 deg. 50. ft.

9 = Number of Planting Spaces on CENTER ST
9 = Total Number of Planting Spaces
Press any key to continue

▲ Figure 3.2.20: A report of available planting spaces on a designated street.

1 = Number of Occurrences of: Girdling root(s)

8020 Trunk wound(s)
Street Name: ALGOMA ST
House #: 2524
Patmore Ash DBH: 3.7 in Cond: 70% GSI:510
Ref Pt: Sidewalk intersection Az:270 Dist: 175 ft

1 = Number of Occurrences of: Trunk wound(s)

8009 Girdling root(s)
Street Name: ALGOMA ST
House #: 2532
Red Maple DBH: 16.3 in Cond: 55% GSI:510
Ref Pt: Sidewalk intersection Az:270 Dist: 70 ft

1 = Number of Occurrences of: Girdling root(s)

8014 Missing or dead top
Street Name: ALGOMA ST
House #: 2532
Red Maple DBH: 19.2 in Cond: 45% GSI:510
Ref Pt: Sidewalk intersection Az:270 Dist: 85 ft
More output follows. Press Esc to quit, any key to continue.

▲ Figure 3.2.21: A report of insect, disease or problems on a designated street.

Street#	Street Name	Species	DBH	ISAC	ISAL	GSI	GSI	IDPC	IDP
2409	ALGOMA ST	Marshall's Ash	70	80	510	-0-	-0-	-0-	-0-
2416	ALGOMA ST	Red Maple	60	80	510	-0-	8025	-0-	-0-
2416	ALGOMA ST	Red Maple	60	80	510	-0-	8025	802	802
2417	ALGOMA ST	Marshall's Ash	55	80	510	210	-0-	-0-	-0-
2425	ALGOMA ST	Marshall's Ash	65	80	510	210	-0-	-0-	-0-
2433	ALGOMA ST	Marshall's Ash	65	80	510	210	-0-	-0-	-0-
2433	ALGOMA ST	Marshall's Ash	65	80	510	210	-0-	-0-	-0-
2434	ALGOMA ST	Crimson King Maple	60	80	510	-0-	-0-	-0-	-0-
2442	ALGOMA ST	Northern Catalpa	65	80	510	-0-	8009	-0-	-0-
2442	ALGOMA ST	Northern Catalpa	65	80	510	-0-	8027	-0-	-0-
2500	ALGOMA ST	Marshall's Ash	65	80	510	210	-0-	-0-	-0-
2501	ALGOMA ST	Marshall's Ash	65	80	510	210	-0-	-0-	-0-
2508	ALGOMA ST	Autumn Purple Ash	85	80	510	-0-	-0-	-0-	-0-
2509	ALGOMA ST	Marshall's Ash	70	80	510	210	-0-	-0-	-0-
2509	ALGOMA ST	Marshall's Ash	65	80	510	210	-0-	-0-	-0-
2524	ALGOMA ST	Patmore Ash	80	80	510	-0-	-0-	-0-	-0-
2524	ALGOMA ST	Patmore Ash	70	80	510	-0-	8020	-0-	-0-
2525	ALGOMA ST	Marshall's Ash	70	80	510	210	-0-	-0-	-0-
2532	ALGOMA ST	Red Maple	45	80	510	210	8014	802	802
2532	ALGOMA ST	Red Maple	55	80	510	-0-	8009	802	802

Database: Invent Read Noscroll F4 to Edit Browse

▲ Figure 3.2.22: A matrix of inventory data for the entire database. Searches and preformatted statistical calculations can be performed from this screen.