LCTA Users Interface Program Users Manual: Version 1.0

by
Alan B. Anderson, William Sprouse, Patrick Guertin, and David Kowalski

The Land Condition Trend Analysis (LCTA) users interface program assists natural resources managers at U.S. military installations to manage and summarize LCTA inventory and monitoring data. The LCTA users interface program provides mechanisms to view and summarize vegetation, wildlife, soils, and land use data. This manual contains instructions for installing the software, viewing data, and summarizing data. Comprehensive descriptions for each data analysis summary include required input data, output data and file formats, quality control data checks, error codes, and data summary use descriptions.

The LCTA users interface program requires a 386 IBM compatible personal computer with at least 4 MB random access memory (RAM) and 200 MB hard disk space. The system must be equipped with MS-DOS® 3.1 or above, Windows™ 3.1 or above, and SQLBase® 5.0 or above.

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13. ABSTRACT (Maximum 200 words)

The Land Condition-Trend Analysis (LCTA) users interface program assists natural resources managers at U.S. military installations to manage and summarize LCTA inventory and monitoring data. The LCTA users interface program provides mechanisms to view and summarize vegetation, wildlife, soils, and land use data. This manual contains instructions for installing the software, viewing data, and summarizing data. Comprehensive descriptions for each data analysis summary include required input data, output data and file formats, quality control data checks, error codes, and data summary use descriptions.

The LCTA users interface program requires a 386 IBM compatible personal computer with at least 4 MB random access memory (RAM) and 200 MB hard disk space. The system must be equipped with MS-DOS® 3.1 or above, Windows™ 3.1 or above, and SQLBase® 5.0 or above.

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Foreword

This study was conducted for the Office of the Directorate of Environmental Programs (DAIM), Assistant Chief of Staff (Installation Management) (ACS(IM)) under Project 4A162720A896, "Environmental Quality Technology"; Work Unit EN-TT4, "LCTA Systems Analysis and Reporting of Land Inventory Data." The technical monitor was Dr. Victor E. Diersing, DAIM-ED-N.

The work was performed by the Natural Resources Assessment and Management Division (LL-N) of the Land Managment Laboratory (LL), U.S. Army Construction Engineering Research Laboratories (USACERL). The USACERL principal investigator was Alan B. Anderson. Dr. David J. Tazik is Acting Chief, CECER-LL-N, Dr. William D. Severinghaus is Acting Operations Chief, and William D. Goran is Chief, CECER-LL. The USACERL technical editor was Agnes E. Dillon, Technical Resources Center.

COL James T. Scott is Commander and Acting Director of USACERL, and Dr. Michael J. O'Connor is Technical Director.

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1 Introduction

Background

The U.S. Army Land Condition Trend Analysis (LCTA) program is the U.S. Army's standard for land inventory and monitoring. It uses standard methods to collect, analyze, and report natural resources data. LCTA promotes the principles of sustained yield, land stewardship, and multiple use of military land resources. The major objectives of LCTA are to:

- evaluate the capability of land to meet the multiple-use demands of the U.S. Army on a sustained basis
- delineate the biophysical and regulatory constraints on use of the land
- monitor changes in land resource condition
- evaluate change in terms of current land use
- develop and refine land management plans to ensure long-term resource availability
- characterize installation natural resources
- implement standards in collection, analysis, and reporting of the acquired data that enable Army-wide data compilation.

LCTA inventory and monitoring data is stored in a relational database. Standardized data summaries are required from the data stored in the database. The need for a user friendly program that would allow the user to access the LCTA data and perform data analyses with little knowledge of statistical theories, quality control issues, data storage formats, data retrieval procedures, and data summary methodologies prompted the development of the LCTA user interface program.

The LCTA user interface program is a Microsoft® Windows™ based program that allows the user to access LCTA data and run standardized summaries. The program provides avenues for the user to view and edit data that exists in an SQLBase database. Additional editing functionality is provided in other third party commercial software packages. The primary goal of the LCTA user interface program is to provide the user with easy-to-use software that offers standardized data summary capabilities.

Objective

The objective of this manual is to provide the necessary information for users of the LCTA users interface program to initiate, understand, and interpret the data analyses contained in the program.

Approach

The LCTA users interface program was developed through a series of prototypes that were fielded at selected installations to incorporate user requirements. Summaries incorporated into the program were obtained from LCTA installation reports and user requirements. Data quality control checks incorporated into the data summaries were identified through a study of existing LCTA databases from a number of installations.

Mode of Technology Transfer

Software can be obtained from USACERL. For technical support when using the LCTA users interface program or for further information about the program or the LCTA databases, contact the USACERL LL-N Division at 217-373-4420 or (outside Illinois) 1-800-USA-CERL, or write to USACERL, LL-N Division, P.O. Box 9005, Champaign, IL 61826-9005.

2 The LCTA Programs

The following items are required to install the LCTA programs:

Microsoft® Windows™ 3.1
LCTA program installation disks
Gupta Client/Server Database software.

Document Syntax

This manual uses the following syntax conventions to describe user interaction with the program.

Italic text written between brackets < > is text that is entered at the computer.
Normal text written between brackets < > is menu options.
Bold italic text indicates section headers for information on menu options.

Document Features

This document contains several ease-of-use features. Extensive use of graphics detail the features encountered when running the application. Menu graphics show the exact data summary documented. Dialog box graphics illustrate user-required input. Output window graphics illustrate program output.

Lists of errors that may be encountered during data analysis document the extent of error checking performed for each data summary. Structured query language (SQL) commands for each potential error are provided to help correct data problems.

Reduced entity relationship (ER) database diagrams define input and output database tables for each data summary. The complete database is included in each ER diagram to allow comparisons between summaries. The ER diagrams help identify which data are being used and where data summaries are stored.

Database input and output tables and columns are provided for each data summary. Because not all columns in a table are used for a data summary, these tables define exactly which data fields are used and how each data field is used. The entity relationship diagrams provide a high level view of data use. The input and output tables provide a low level detailed view of data use.

Many sections provide lists of supplemental information. Supplemental information includes books, articles, reports, and online documents. Online documentation is information available through the Windows™ online help facilities. See the Windows™ documentation for information on how to use Windows™ online help.

General Document and Program Use

To make using the LCTA user interface program easier, program documentation has been provided in several forms. The remainder of this section provides a high level description of the chronological use of the software. The LCTA Tutorial (a separate document available from the LCTA support center) provides a step-by-step training guide that highlights many of the features of the software. Chapter 4 of this document provides detailed information on each specific menu selection, dialog box, and data summary. Online help sessions also provide access to detailed information on each menu selection and data summary.

New users of the LCTA user interface program should read Chapters 2 and 3 of this document before installing the program. After program installation, new users should complete the LCTA tutorial session. The user should be competent in general program use when the tutorial session is completed. As each program feature is utilized, further detailed help can be obtained from Chapter 4 of this document.

Chronological Use of the LCTA Users Interface Program

Most users will first use the LCTA users interface software at the beginning of the field season. LCTA plot inventory methods employ standard methods (Tazik et al., February 1992). The handheld computer data collection program automates standard LCTA field data collection. However, many installations supplement the standard data collection methods with additional data collection methodologies. Many of these supplemental data collection methods can be included in the handheld computer collection program. The LCTA user interface program provides access to utilities that customize installation-specific, handheld computer data collection programs.

During the field season, most users will again use the LCTA users interface program to load handheld data files into the installation LCTA database. The program software automates loading of field data into the database. The software will identify errors in the handheld data files. Program utilities are also available to automatically check species codes for invalid codes, new codes, and missing species information.

If field data are recorded on paper sheets, the LCTA users interface software provides utilities for data entry. Data forms, closely matching field sheets, allow easy input of field data. This utility also can be used to view and correct data improperly recorded in the field.

After field season, most users will use the LCTA users interface to verify and correct the field data. Many field crews have a list of unknown species codes, additional data not recorded in handheld data files, and lists of misspelled and misidentified species that need to be corrected in the database. The LCTA software provides several mechanisms for viewing and editing data. Data forms, similar to field data sheets, provide access to data in the database. Users familiar with the SQL language can write and execute queries directly from the LCTA program. Several utilities exist that identify and report errors found in the database.

The LCTA users interface will be used to run standard LCTA data summaries. Run the base summaries first. The base summaries provide extensive data checking and error reporting. After a summary is run, errors should be corrected and the summary rerun. After a base summary is completed, trend and group summaries can be run. Because many of the data summaries use the same data, data corrections for one data analysis should be completed before running another data summary. Correcting data errors for one summary will reduce the number of errors for other summaries.

Data should be corrected as soon as possible. When data is not corrected promptly, the errors may be uncorrectable later. Field crew members often leave after the field season and are not available to help correct data. Field notes may be misplaced or lost. Data corrections made for the LCTA standard summaries also mean that fewer data errors exist for installation-specific data summaries.

Most users will want to create reports and presentations using LCTA data. LCTA data summaries can be easily incorporated into common commercial Windows™ applications after all data have been loaded into the database, corrected for errors, and summarized. Data summaries can be copied directly from the LCTA users interface program into word processors, spreadsheets, and statistic and graphics packages.

Using Online Help

To obtain help about the LCTA program, pick the help menu command to start the help sessions. This help session works the same as any other Windows™ help session. All green text with dotted underline will bring up a definition box when the text is selected. When the green solid underlined text is selected, the program will jump to that subject. Topics can be browsed by selecting the left and right arrows in the help session menu bar. For further information on using a Windows™ help session, please consult the Windows™ manual.

3   Installation of the Programs

System Requirements

The LCTA program software was designed and tested for a typical LCTA computer hardware and software configuration, including:

Software
- MS DOS® 5.0
- Windows™ 3.1
- SQLBase® 5.0

Hardware
- 386 or 486 PC
- 4 MB RAM required, 8 MB recommended
- 200 MB hard drive

Installation Program

The program files are supplied on 3.5 in. or 5.25 in. diskette(s) in a compressed format with an installation program included. To install these files, Microsoft® Windows™ 3.1 must be running on the computer. Information and verification dialog boxes that are not shown and discussed in the following text may appear during the installation process.

Insert installation disk no. 1 into the appropriate floppy drive. Select <File> from the Windows™ Program Manager main menu, then select the <Run> option (Figure 1).

A dialog box will appear prompting for the installation program (Figure 2). In the command line field enter   <B:\Instalit>   or <A:\Instalit> depending on which drive contains the installation disk. Select <OK> to
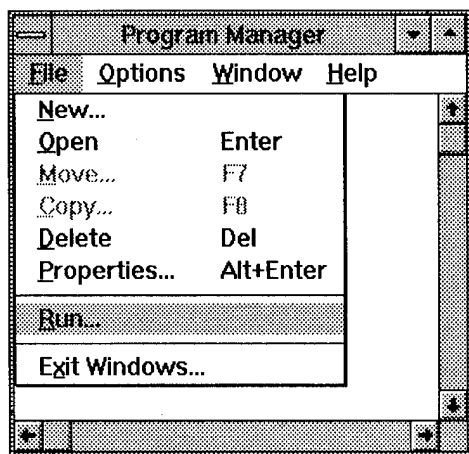
Figure 1.   Program run menu selection.

Run

Command Line:

B:\INSTALIT

☐ Run Minimized

OK

Cancel

Browse

Help
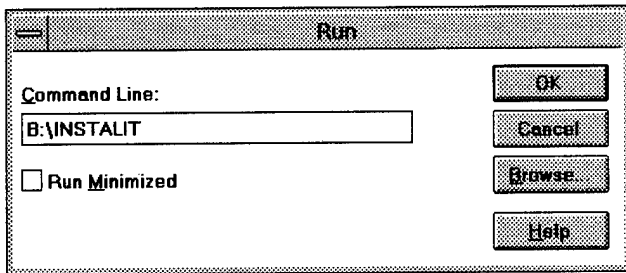
Figure 2. Program run dialog box.

start the installation program. The installation program can be cancelled at any time during the installation process by double clicking on the close icon in the upper left corner of the main installation window or by pressing the <Esc> key.

Have You Installed The Database Software?

If you have not yet installed the software pick the No button to cancel installation.

Yes   No

Figure 3. Verifying database software installed dialog box.

A message box will appear to determine if the SQLBase® database engine software has already been installed (Figure 3). The SQLBase® database software should be installed before installing the LCTA program software. The directory name in which the program files are stored and the directory name in which the database files are stored

should be known. For more information see the SQLBase® database documentation. Cancel the installation if the required information is unknown. After obtaining the required information, rerun the LCTA installation software.

INSTALIT

Menu Choices

Install LCTA Windows program files
Install LCTA Handheld Compiler program
Install all files
Quit

OK

Install all program files.
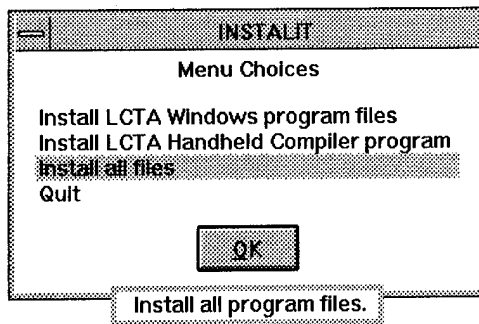
Figure 4. Installation options dialog box.

A dialog box will prompt for the proper sets of files to install (Figure 4). Several sets of software and database files will be listed. Only the files appropriate for an installation have been included on the installation disks. The dialog box menu choice list will include only options appropriate for the installation disks. Additional information is available for each option by selecting the menu item. A

small information box will display the information at the bottom of the dialog box. Most installation setups will require the <Install All Files> option unless only a few selected files are to be reinstalled. Select the desired option and then the <OK> button.

A dialog box will prompt for the desired drive location for the installation (Figure 5). Note, the available disk space for each drive option and the required space for the installation files is provided. Select the desired drive, then select the <OK> button. Generally select the drive with the most available free hard disk space for the
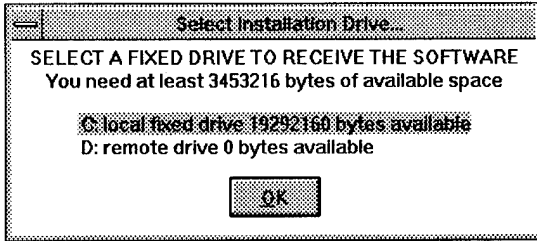
Figure 5. Installation drive dialog box.

database during the database installation because the size of these files may become very large.

A dialog box will prompt for the desired directory in which the installation files should be stored (Figure 6). Select the default value or supply an alternative directory.
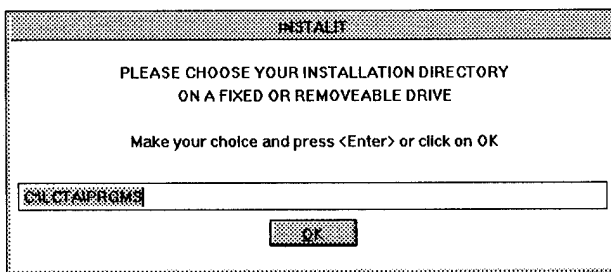
Figure 6. Installation directory dialog box.

If the D drive and the default directory are selected, the installation program will create the following directory structures:

D:\LCTA\PRGMS   {LCTA Front End Program files}
D:\LCTA\PRGMS\HHCOMP   {LCTA Handheld Compiler files}
D:\LCTA\PRGMS\HHFILES   {Handheld data files}
D:\LCTA\PRGMS\FILES   {LCTA Front End Program output files}
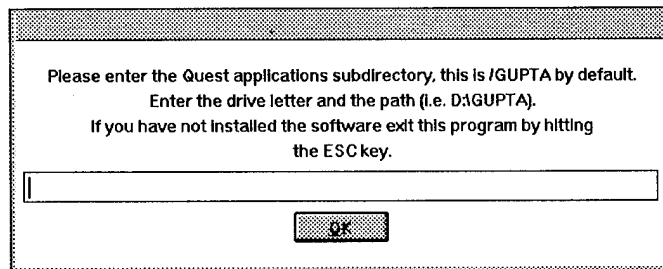
Figure 7. Database files dialog box.

A dialog box (Figure 7) will be displayed and prompt for the drive and directory in which the SQLBase® database engine and associated files are to be stored. If the default installation options were accepted when installing the SQLBase® software, the locations of the files are c:\gupta.

Enter the correct directory, then select the <OK> button.

Subsequent dialog boxes indicate installation progress. Answer each dialog with the appropriate response.

After the files are installed and the Windows™ group created or updated, several icons can be found in the LCTA program group. To start a program, double click on the icon. See the LCTA tutorial for a brief introduction of the software.

4 Program Information

The following is a list of general information on the operation of the users interface program.

Accessing Files

Files can be opened in the program in two ways. Select <Open> from the menu or drag files from the Windows™ File Manager. See the Microsoft® Windows™ documentation for further information on "dragging and dropping."

Canceling Applications

All analyses can be terminated before completion. If the running application has been minimized (appears as an icon), double click the mouse on the icon then select the cancel button (or cancel menu selection).

The application will terminate after a cancel has been selected. The program will properly close the database. The program will not destroy any partially created graphs or files. Usually a message will be placed in the error file indicating that the application was prematurely terminated.

Press the cancel button a few more times if it does not appear to work. The program will cancel only at an appropriate point in the program to ensure data integrity.

Database Information

The LCTA program can access any SQLBase® database on the computer or network that contains LCTA-related information if the database software was properly installed. There is no need to provide any information to the LCTA software for the software to work properly.

Metafiles or Bitmaps?

The program will produce graphics as part of the analysis summaries. The option exists to select metafile or bitmap graphic formats. Each format has certain advantages and limitations. Use the format that is most appropriate.

Metafiles produce small disk files and use less memory space than bitmaps. A metafile takes less time to display than a bitmap. A metafile can be resized to any dimension. However, if text is displayed in a metafile, the display will not look correct if the window dimensions are considerably different from the original shape.

Bitmaps produce large disk files and use more memory than metafiles, and they take longer to display. Bitmaps can be resized and shaped without the problems of metafiles.

Other commercial and custom software may require either metafile or bitmap formats.

Starting Programs

Data analyses can be started in several different ways:

- Double click the left mouse button on the appropriate icon in the LCTA group.
- Start the LCTA Program Manager and use the menu selections to start an analysis.
- Start the LCTA Program Manager and open the toolbox from the menu. Analyses then can be started from the toolbox.

The best method used to run an analysis depends on program use patterns. In general, run analyses from the LCTA Program Manager. The Program Manager automates much of the process of providing the data analysis options.

Command line options can be specified in the properties list. The options allowed for most programs are server name and database name. Options must be specified in the following order:

Server Name:	The server name or "local" if a local database.
Database Name:	LCTAXXX where XXX is the first three letters of the installation name.

5   Program Menu Items

The main menu options at the top of the LCTA Program Manager window are visible when the program starts. The main menu options are: "File," "Edit," "Analyses," "Data Entry," "Utilities," "Programs," "Windows™," "Help." The following sections describe each menu selection and menu subselections.

File Menu Options

The following menu options are displayed in the pull down menu when the "File" menu option in the "Main" menu has been selected. File menu options create, open, close, and print files. File menu options also connect the program to database servers and files.

New Text

Open a new empty text document by selecting <File> <New> from the menu. The document will be titled "Untitled" until the document is saved. The document does not exist as a disk file until the document is saved (<Save> or <Save As>). These are ASCII files. The program provides some word processing features for use with these text windows as a convenience.

New text windows are useful for entering and executing SQL commands, recording notes, and combining data summaries.

New Spreadsheet

The <New Spreadsheet> menu selection will open a new empty spreadsheet. Empty spreadsheet windows are useful when combining data from multiple data analyses.

New Picture

The <New Picture> menu selection will open a new empty graphics window. Empty graphics windows are useful when importing maps and pictures from other software with the Windows™ clipboard.

Open

The <Open> command opens a document that already exists on the disk. Files with the .WMF are opened as Windows™ metafiles, files with the .BMP are opened as device independent bitmaps, files with .PSS are opened as spreadsheet windows, and all other extensions are opened as simple ASCII files.

The standard Windows™ open dialog box will appear after the open menu item is selected (Figure 8). The default directory will automatically be the output directory of the LCTA program software. The files type list box will allow selection of LCTA data analysis file group types. Select a single file or a group of files.
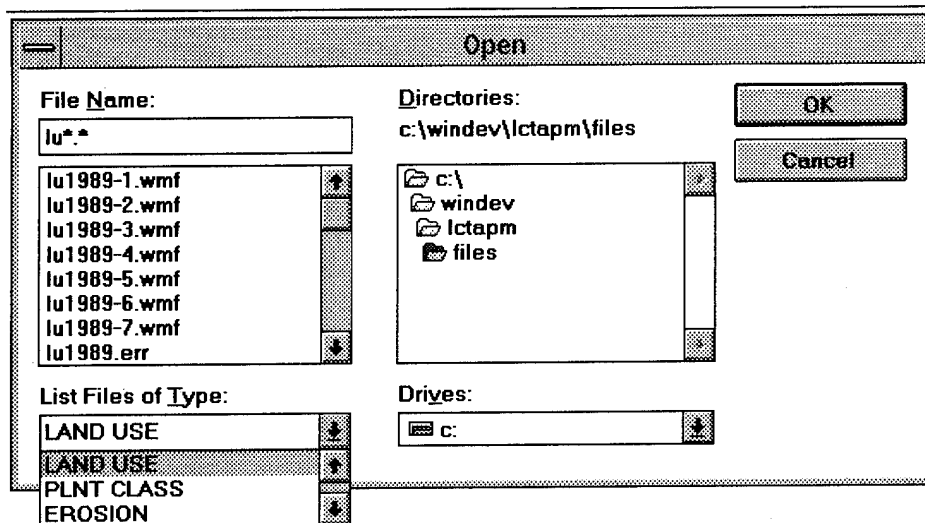
Figure 8. File open dialog box.

Instead of using the <Open> menu selection to open a file, a file can be dragged from the Windows™ Program Manager (see windows documentation) on to the LCTA Program Manager, and the file will open automatically. This method is especially convenient for quickly opening groups of files from multiple directories.

Save

The <Save> command saves the currently active window contents to the currently specified file. The currently specified file is displayed in the window title of the active window. Files should be saved after any major rework in case of computer failure.

An attempt to exit a changed window that has not been saved will cause a warning message. A "Yes" response to the message causes the <Save> command to be executed.

An attempt to save a document titled "Untitled" that has no associated disk file will produce the "Save As" dialog box. See the <Save As> menu item section for more information.

Save As

The <Save As> command causes the contents of the active window to be saved to a new file. A dialog box will prompt for a new file name. The "Save As" dialog box will default to the currently active working directory and will provide file name listings of files in the directory by file grouping. The new file name will appear in the active window title to indicate the file was saved.

Any attempt to overwrite an existing file will generate warning messages.

The "Save As" dialog box is the standard windows "Save As" dialog box found in many commercial software packages.

Print

The <Print> command prints the contents of the current window to the current printer. See <Printer Setup> for information on setting the current printer options. A dialog box will appear providing print request information. The print dialog box is the standard windows print dialog box found in many commercial software packages.

Printer Setup

The <Printer Setup> command is used to specify options that are supported by the printer and print manager. The printer setup dialog box is the standard windows print setup dialog box found in many commercial software packages.

Database

The <DataBase> command is used to select the SQLBase® database server and LCTA database to use with all subsequent commands. The <Data-Base> command will provide a dialog box that shows only servers and databases that relate to the LCTA program (Figure 9). If the desired database is not available, see the SQLBase® data-

Figure 9. Database connect dialog box.

base documentation and make sure the database software is installed and configured correctly.

If a user name or password is not provided, the default values will be used. See the database documentation for default user name and password values.

Select a database server from the drop down list. If the list is empty, only a local database engine is available. A database server name is not required if only a local database engine is available. After selecting a server, the database lists will be updated with the databases available to that server. Use the <Servers> menu selection to permanently add and delete servers to the server list box.

Select a database from the database drop down list.

After a database has been selected, the current database and server will be listed in the message bar at the bottom of the LCTA Program Manager window.

Server

To add database server names to the program, use the <Server> menu selection. The modify database server list dialog box will appear (Figure 10). When a database is located on a remote network server, add the server name with this selection. The server then will

Figure 10. Modify database server list dialog box.

appear in all the appropriate dialog boxes. Server names also can be removed. An invalid name added to the server list usually will be ignored, and information will be provided for the local server.

Enter the server name in the edit box, then select the <Add> or <Delete> button.

Exit

The <Exit> command causes the termination of the program. A dialog box will prompt for each changed window that has not been saved before the program exits. If the <Save Workspace> menu selection has been set, the program will save the program configuration before terminating.

Edit Menu Options

The following menu options are displayed in the pull down menu after the "Edit" menu option in the "Main" menu has been selected. Menu selections that are not relevant to the current window are grayed and inactive. Edit menu options are used to edit text files, locate text, and copy information to and from the Windows™ clipboard.

Undo

The <Undo> command reverses the last edit action performed. If an edit action was completed with unwanted results, the results can be reversed with the <Undo> command.

Cut

The <Cut> command removes highlighted text from the active text window and places the text in the Windows™ clipboard. The clipped text is available to other edit functions in the LCTA Program Manager and to other Windows™ software. Use the <Cut> command to edit standardized text output from data analyses.

Copy

The <Copy> command copies highlighted text from the active window and places the text in the Windows™ clipboard. For spreadsheet windows, the highlighted cells are copied to the clipboard. For graphics windows, the entire picture is copied to the clipboard. Clipped material is available to other edit functions in the LCTA Program Manager and other Windows™ software.

Paste

The <Paste> command inserts the current Windows™ clipboard contents into the active window at the current cursor position. If the appropriate window information is not available in the clipboard, the <Paste> selection will be disabled for the window.

Delete

The <Delete> command removes highlighted text from the active window and does not place the text in the clipboard. This deleted text is not available to other edit functions in the LCTA Program Manager and other Windows™ software.

Select All

The <Select All> command highlights all text in the currently active text window. Use <Select All> to copy the entire contents of a text window to the Windows™ clipboard.

Word Wrap

The <Word Wrap> command turns word wrapping on and off. When word wrapping is off, text is displayed in the original format and a horizontal scroll bar is added to the window so any hidden text can be made visible. When word wrapping is turned on, the horizontal scroll bar is removed, and sentences wider than the window are wrapped to the next line so all text is visible.

Find

The <Find> command allows searching for any text string in the current text window document. The "Find" dialog box will prompt for the required information (Figure 11).
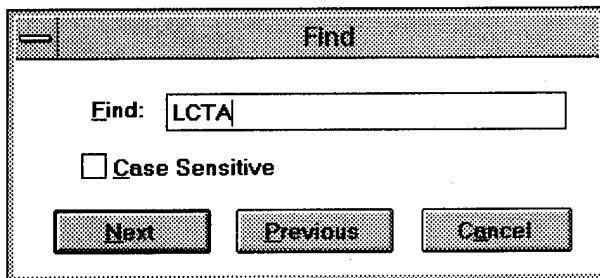
Figure 11. Find dialog box.

Enter the text string to be located. Check the <Case Sensitive> option for an exact text string match. Select <Next> to find the next occurrence of the text string after the current cursor location. Select <Previous> to find the next occurrence of the text string before the current cursor location.

If text is highlighted when the <Find> command is selected, the highlighted text will automatically appear in the text entry field of the dialog box. If no text is highlighted, the text field will be empty.

Next

The <Next> command repeats the last <Find> command on the current text window document. The next string match will be found after the current cursor position in the document. This command allows repeated searches for the same text string.

Prev

The <Prev> command repeats the last <Find> command on the current window document. The next string match will be found before the current cursor position in the document. This command allows repeated searches for the same text string.

Analysis Menu Options

The following menu options are displayed in a pull down menu once the "Analysis" menu option in the "Main" menu has been selected. All analysis menu selections summarize data from the currently active LCTA database. The currently active LCTA database is listed in the status bar at the bottom of the LCTA Program Manager window. If no database has been selected, the <Analysis> menu selection options will be grayed and inactive.

The LCTA Program Manager provides five major data summaries: land use, plant cover surface disturbance, erosion, plant community classification, and belt summaries. Most data analysis menu selections contain several analysis options. The data summary options include: base, trend, group, and group trend. Base summaries calculate the raw summaries by plot and year. Trend, group, and group trend summaries use the base summary plot data output to provide the information in a user-specified groupings. The base summaries always should be completed before running the trend, group, and group trend summaries. The base summaries check for a variety of errors. The other summaries assume that the errors have been properly corrected.

Each of the following data analysis sections consists of nine subsections. The introduction subsection provides a short description of the data summary. The uses subsection provides a description of the intended use of the data summary. The access subsection describes how to initiate a data summary. The database inputs and outputs subsection describes which database data is used in the data analysis. A database diagram shows which tables are used in the analysis. The database diagram allows for comparisons between data analyses. Table and column lists describe each variable used in the analysis and describes how the variable is used. The file output and sample windows subsection provides a list of all output files and example output windows. The errors checked during the processing subsection provide a list of all potential error messages. These lists of errors define the range of error checking included in each analysis. The data correction subsection provides a list of SQL commands that correct the most likely cause of an error message. These commands are provided to help make data correction easier. The supplemental information

subsection provides a list of other sources of information relevant to understanding and using the data summary.

The LCTA database diagram is presented in IDEF1X format. A database diagram is an information model that shows the major entities and relationships contained in the database. Entities or data tables are represented by boxes. A table is a collection of data records. Relationships describe the associations between entities and are identified by lines between tables. For a more complete description of database diagrams and complete LCTA database documentation refer to the land condition trend analysis data dictionary (Sprouse and Anderson, April 1995). The database diagrams are provided to help compare input and output data for each analysis. The diagram for each data analysis differs by only the input and output table designations. The same data may be used differently for two analyses, or different data may be used for similar analyses. Understanding what data is used is important for correcting errors, understanding the analysis, and understanding the assumptions of the analysis.
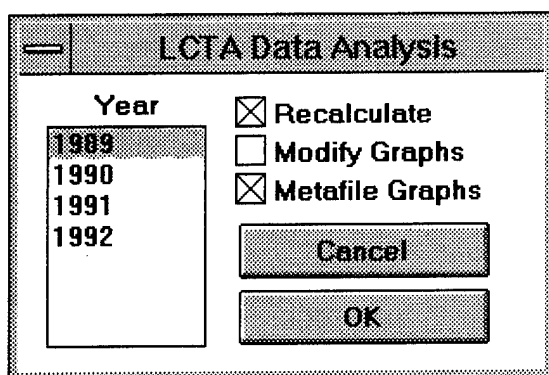
Figure 12. Analysis options dialog box.

When a base summary is selected, an analysis dialog box will prompt for the appropriate analysis year (Figure 12).

If the <Recalculate> option is checked, the data summary is calculated from the raw data. If data has been recently edited or added, the <Recalculate> option should be checked. If the <Recalculate> option is not checked, output data and graphs are created from the summary output database tables. Data summaries are completed faster if the summary does not have to be completely recalculated.

If the <Metafile Graphs> option is checked, all output graphs will be Windows™ metafile format. If this option is not checked, all output graphs will be Windows™ bitmaps. Metafile graphic files produce small disk files and use less memory space than bitmap graphic files. A metafile takes less time to display than a bitmap. A metafile can be resized to any dimensions. However, if text is displayed in a metafile, the display will not look correct if the dimensions of the graphics window are considerably different than the intended shape. Bitmaps produce large disk files, use more memory than metafiles, and take longer to display. Bitmaps can be resized and shaped without the problems of metafiles. Other commercial and custom software may require either metafile or bitmap formats.

Check the <Modify Graphs> option to change the colors, patterns, and titles of the output graphics. A dialog box will appear and prompt for the required information (Figure 13).
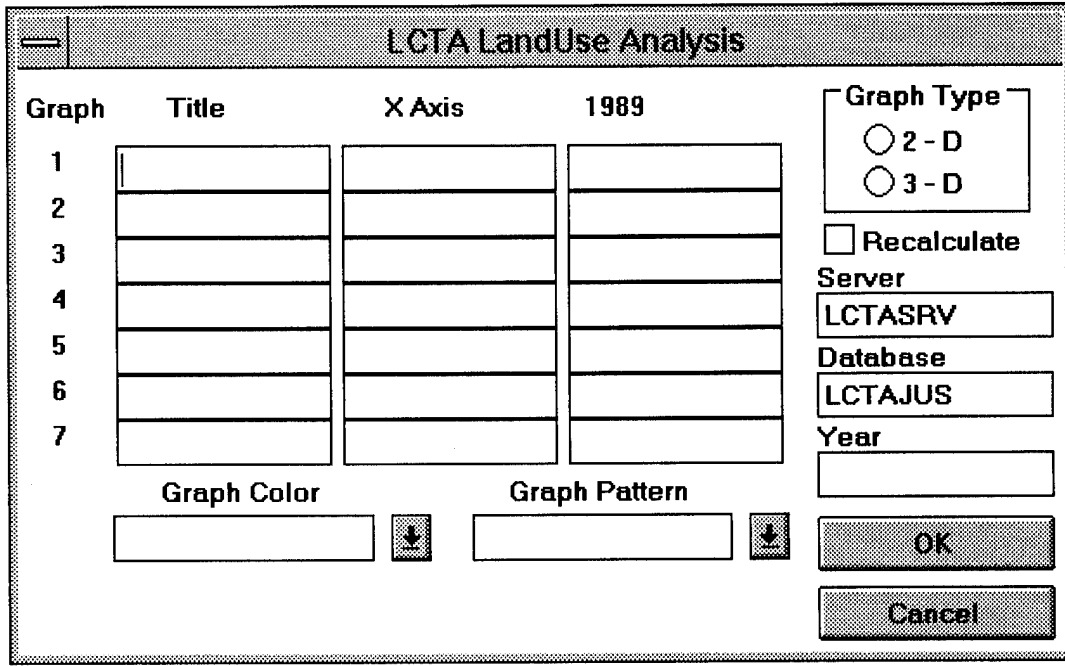
Figure 13. Modify graph options dialog box.
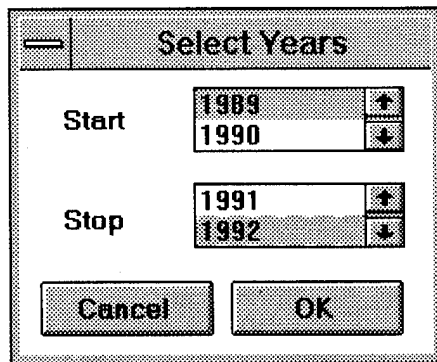
Figure 14. Begin, end year dialog box.

Trend summaries display installation data summaries for a series of years. A dialog box will prompt for the beginning and ending year of the summary (Figure 14).

Group summaries display the summary data grouped by various plot groupings. A dialog box will prompt for the desired plot groupings (Figure 15). Several plot groupings exist for all installations: plant community classification (pcc), most common plant classification (mcc), plot, raw data, soil type, training area, and vegetation type. Raw data and plot summaries provide the same summary if only one observation exists per plot.
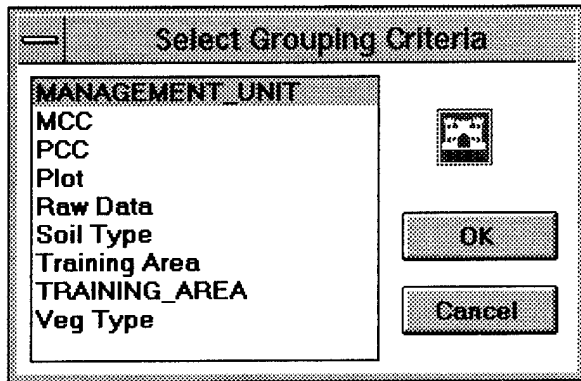
Figure 15. Plot grouping criteria dialog box.

The option is available to provide installation-specific plot groupings for these summaries. The groupings table in the database stores installation-specific plot groupings. The groupings table contains one column for the installation plot numbers. Add an additional column for each plot grouping to be added to the database. Add grouping values for each plot. Leave the value null for a plot if the plot does not belong to any group. If only core plots are used in the plot grouping, all special use plots should be left null. Each plot grouping provided will appear in the "Select Grouping Criteria" dialog box.
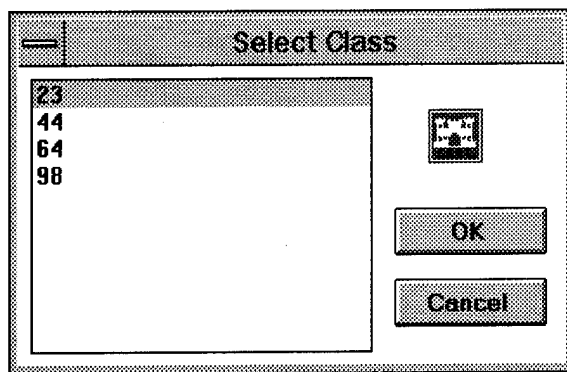
Figure 16. Plot group dialog box.

Group trend summaries display data for a particular group of plots for a series of years. Select a grouping criteria from the "Grouping Criteria" dialog box (Figure 16). Then select one of the individual plot groupings for display. Only one grouping is displayed at a time because all of the groupings in one graph is too confusing. However, a group trend can be run repeatedly to obtain trends for several groups. Copy data to a common spreadsheet window, then graph the combined data.

Landuse
Analyses

Land Use

The "Land Use" application summarizes military and nonmilitary disturbances, wind and water erosion observations, and maintenance activities observed on the belt transect.

Uses. Land use activity-measures document recent land use activities, maintenance activities, and evidence of wind and water erosion. The analysis summaries provide

an indication of changes in the amount and location of military and nonmilitary land use. Land use data can be related to maintenance activities, visual evidence of wind and water erosion, estimated soil erosion, and changes in vegetation cover and composition.

Access. To run a land use summary, select the <Analysis> menu option and the <Land Use> submenu (Figure 17). Entering <Alt-A,L> from the computer keyboard also will start the summary. Then select base, trend, group, or group trend summary. The base summary will summarize all core plot land use information. Trend, group, and group trends require a land use activity selection.
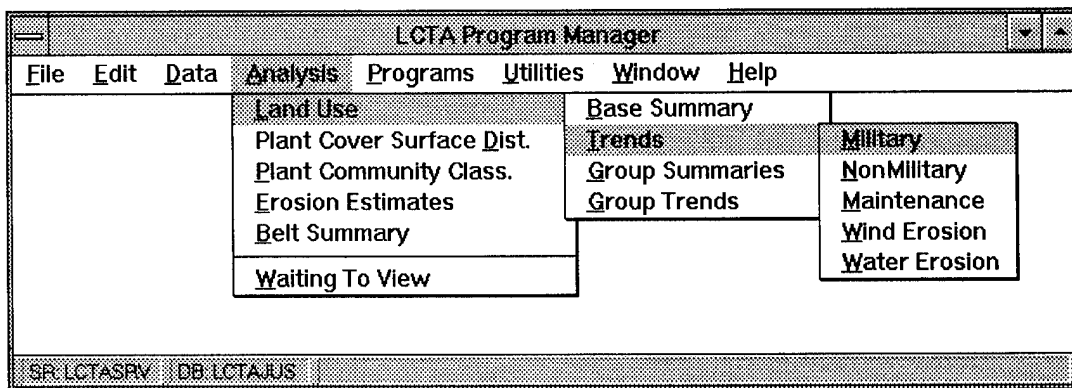
Figure 17. Land use menu selections.

Database inputs and outputs. The database diagram in Figure 18 lists all database tables used for each land use data summary. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.

CLIMATEDATA   CLIMATESTATIONS   HISTORY   ENVCONST

FED_STATUS   HERBRIUM   PCTYEARSUM

STATE_STATUS   PCSDYEARSUM

POINT_CODE   INSTMAST   LANDUSEYEARSUM

BIRDS   BIRDSURV   MAMSURV   MAMMALS

MATED_STATUS_CODE   GENDER_CODE   METHODS_CODE

SOILSMPL

GROUPING   HERPSURV   HERPS
                                    Z
PLOTMAPS   EROSION   COMMCLASSPLOTSUM

TACTCONA   SOILMAST

PCSDPLOTSUM   VERTLIST

                              PLOTMAST   PLNTLIST

MAINT_CODE   MAINTACT   BELTSURV

LANDUSE_CODE   LANDUSE   BELTMON

EROS_CODE   EROSEVID   BELTTRAN

DISTURB_CODE   GNDCOVER   P   BASALA
                                              PLOTSURV
AERCOV_CODE   LINEMON   SOILLS

GNDCOV_CODE   AERCOVER   F_COUNT

Grey boxes = input tables; black box = output table; white boxes = not used

Figure 18. LCTA reduced entity relationship diagram and land use input tables.

Table 1 lists all database tables and columns used for each land use data summary.

Table 1. Land use summary database tables and columns table.

Table Name	Column Name	Column Use	Base	Trend	Group	Group Trend	Contents
PlotSurv	PlotID	C	I	I	I	I	plot number
	RecDate	C	I	I	I	I	measurement date
	PlotType	I	I	I	I	I	measurement type
	Train	I	N	N	I	I	training area
	VegType	I	N	N	I	I	vegetation type
LandUse	PlotID	C	I	I	I	I	plot number
	RecDate	C	I	I	I	I	measurement date
	LandUse	D	I	I	I	I	land use type
MaintAct	PlotID	C	I	I	I	I	Plot number
	RecDate	C	I	I	I	I	measurement date
	Maintain	D	I	I	I	I	maintenance type
ErosEvid	PlotID	C	I	I	I	I	plot number
	RecDate	C	I	I	I	I	measurement date
	Status	D	I	I	I	I	erosion Status type
Grouping	PlotID	C	N	N	I	I	plot number
	Other Cols	D	N	N	I	I	plot groupings
PlotMast	PlotID	C	N	N	I	I	plot number
	SoilSer	I	N	N	I	I	plot soil series
CommClas PlotSum	PlotID	C,I	N	N	I	I	plot number
	AnalYear	C,I	N	N	I	I	analysis year
	PccCode	I	N	N	I	I	plant comm. code
	PccType	I	N	N	I	I	plant comm. type
	MccCode	I	N	N	I	I	plant comm. code
	MccType	I	N	N	I	I	plant comm. type
LandUse YearSum	AnalYear	C,I	O	N	N	N	analysis year
	MObs	D	O	N	N	N	# mil. plots
	MNone	D	O	N	N	N	# plots, no mil. obs
	Wheel	D	O	N	N	N	# wheeled plots
	Track	D	O	N	N	N	# tracked plots
	Exca	D	O	N	N	N	# excavation plots

Table Name	Column Name	Column Use	Base	Trend	Group	Group Trend	Contents
	Foot	D	O	N	N	N	# foot traffic plots
	Biv	D	O	N	N	N	# bivouac plots
	Demo	D	O	N	N	N	# demolition plots
	MOther	D	O	N	N	N	# mil. other plots
	NMObs	D	O	N	N	N	# non-mil. plots
	NMNone	D	O	N	N	N	# plots, no non-mil. obs
	Grazing	D	O	N	N	N	# grazing plots
	Crop	D	O	N	N	N	# row crop plots
	Forest	D	O	N	N	N	# forestry plots
	Hay	D	O	N	N	N	# hay production plots
	NMOther	D	O	N	N	N	# non-mil. other plots
	MaObs	D	O	N	N	N	# maintenance plots
	MaNone	D	O	N	N	N	# maint. plots, no use
	PreBurn	D	O	N	N	N	# prescribed burn plots
	AccBurn	D	O	N	N	N	# accidental burn plots
	Till	D	O	N	N	N	# plots with tillage
	Mow	D	O	N	N	N	# plots with mowing
	Seed	D	O	N	N	N	# plot seeded
	Plant	D	O	N	N	N	# tree planted plots
	Chemical	D	O	N	N	N	# chemical appl. plots
	MaOther	D	O	N	N	N	# maint. other plots
	WiObs	D	O	N	N	N	# wind erosion plots
	WiNone	D	O	N	N	N	# wind plots, no erosion
	Drifting	D	O	N	N	N	# plots with drifting
	Scouring	D	O	N	N	N	# scouring plots
	WiPedPlnt	D	O	N	N	N	# pedestal plants plots
	WaObs	D	O	N	N	N	# water erosion plots
	WaNone	D	O	N	N	N	# water plots, no erosion
	Sheet	D	O	N	N	N	# plots with sheet erosion
	Gully	D	O	N	N	N	# active gully plots
	WaPedPlnt	D	O	N	N	N	# pedestal plant water plots
	DebDam	D	O	N	N	N	# debris dam water plots
	MEAllObs	D	O	N	N	N	# plots with erosion and valid maintenance activity

Table Name	Column Name	Column Use	Base	Trend	Group	Group Trend	Contents
	MEAllVis	D	O	N	N	N	# plots with erosion and visible maint. activity
	LEAllObs	D	O	N	N	N	# plots with erosion and valid landuse activity
	LEAllVis	D	O	N	N	N	# plots with erosion and visible landuse activity
	MEWaObs	D	O	N	N	N	# plots with water erosion and valid maint.
	MEWaVis	D	O	N	N	N	# plots with water erosion and visible maint.
	LEWaObs	D	O	N	N	N	# plots with water erosion and valid landuse
	LEWaVis	D	O	N	N	N	# plots with water erosion and visible landuse
	MEWiObs	D	O	N	N	N	# plots with wind erosion and valid maint. activity
	MEWiVis	D	O	N	N	N	# plots with wind erosion and visible maint. activity
	LEWiObs	D	O	N	N	N	# plots with wind erosion and valid landuse
	LEWiVis	D	O	N	N	N	# plots with wind erosion and visible landuse

Column Use:
    C   Connector   Column values used to properly join information from multiple tables
    D   Data   Column values used as data in summary
    I   Identifier   Column values used to identify data elements

Base, Trend, Group, Group Trend:
    N   Column not used in summary
    I   Input column for summary
    O   Output column for summary

File outputs and sample output windows. The following list describes each output file created by a data summary. An example output window (Figures 19, 20, 21, and 22) for each data summary also is provided.

Base Summary Output Files

LU####.txt	Combined tabular summaries
LU####.err	Combined error messages
LU####-1.wmf or LU####-1.bmp	Military land use graph
LU####-2.wmf or LU####-2.bmp	Nonmilitary land use graph
LU####-3.wmf or LU####-3.bmp	Maintenance activity graph
LU####-4.wmf or LU####-4.bmp	Wind erosion graph
LU####-5.wmf or LU####-5.bmp	Water erosion graph
LU####-6.wmf or LU####-6.bmp	Land use erosion interaction graph
LU####-7.wmf or LU####-7.bmp	Maintenance erosion interaction graph

where #### is the analysis year selected.
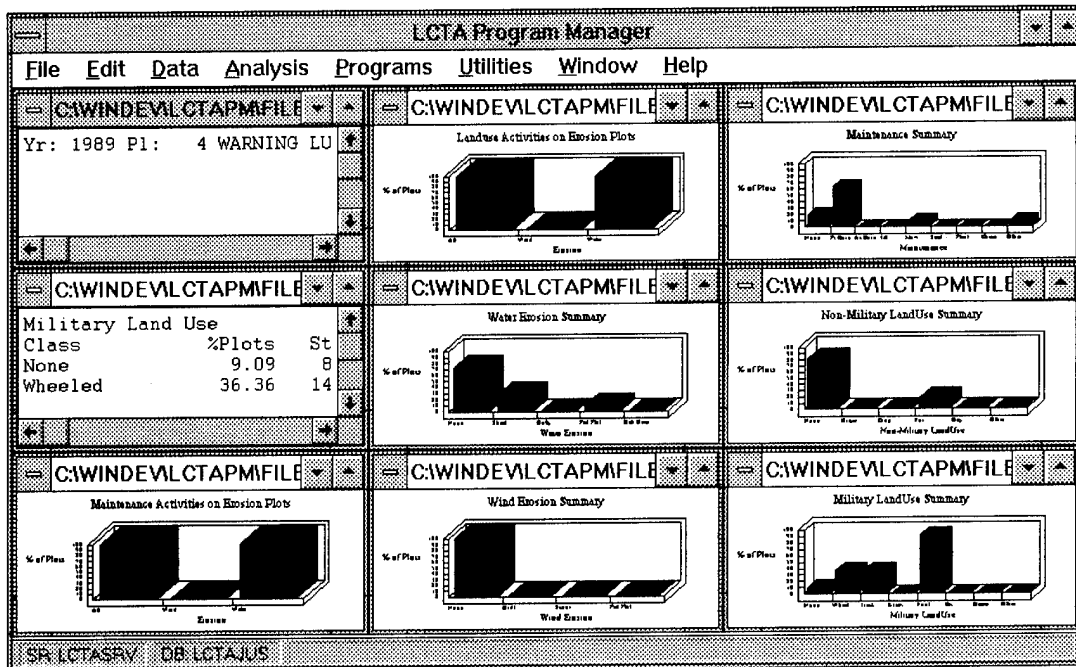
Figure 19. Land use base summary output windows.

Trend Summary Output Files

LU??TR.pss	Land use trend tabular data
LU??T.hgw	Land use trend hot spot graph

where ?? is Mil, NM, Man, Wi, Wa for military, nonmilitary, maintenance, wind erosion, and water erosion summaries.
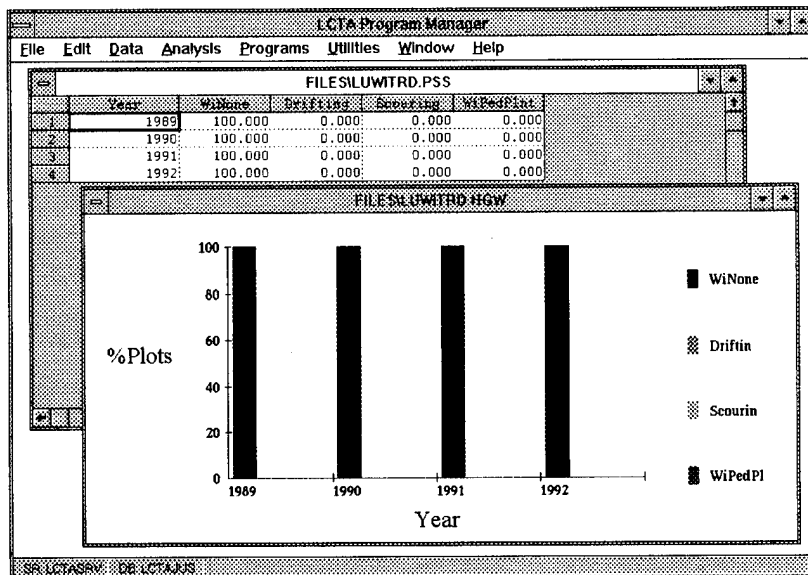
Figure 20. Land use trend output windows.

Group Summary Output Files

LU??????.pss   Land use group tabular data

where ?????? is the first six characters of the plot grouping name.
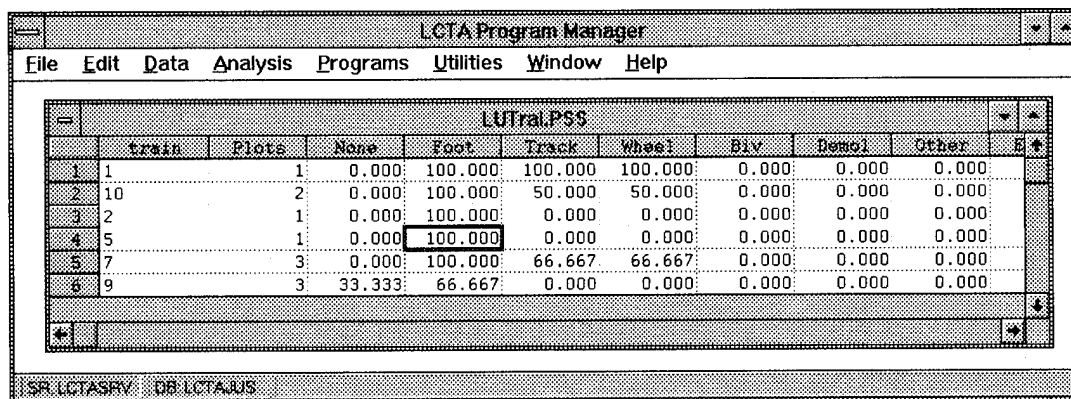
Figure 21. Land use group summary output windows.

Group Trend Summary Output Files

LU??????.pss   Land use group trend tabular data

where ?????? is the first six characters of the plot grouping name.

Figure 22. Land use group trend summary output windows.

Methods. A land use form is filled out for each LCTA plot each measurement year. Visual evidence of military and nonmilitary land uses, maintenance activities, and wind and water erosion are recorded for each plot.

Land use activities are broken down into the following categories:

Military	Nonmilitary	Maintenance
None	None	None
Wheeled	Grazing	Prescribed Burn
Tracked	Row Crop	Accidental Burn
Excavation	Forestry	Tillage
Foot	Hay	Mowing
Bivouac	Other	Seeding
Demolition		Tree Planting
Other		Chemical Application
		Other

Erosion is broken down into the following categories:

Wind	Water
None	None
Drifting	Sheet/Rill
Scouring	Active Gully
Pedestal Plants	Pedestal Plants
	Debris Dams

During the base data summary, data is summarized for the selected year. The percent of plots with evidence of each military, nonmilitary, maintenance, wind erosion, and water erosion category are reported. The standard deviation associated with each

estimate also is provided. Only core plots are used in the analysis so the results can be extrapolated to the whole installation and comparisons can be made between years. The number of plots with evidence of occurrence for each category is stored in the output table so the same data is available as number of plots rather than as percent of plots. The following equations show the summary calculations:

$$p = B/n$$

where p is the probability of occurrence or proportion of plots with activity

$$s = (p(1-p)/n)^{1/2}$$

s is the standard deviation

n is the number of plots with valid observations

B is the number of plots with occurrence.

During the base data summary, erosion-maintenance and erosion-land use cross tabulation summaries are calculated. Cross tabulations are used to determine if a relationship exists between the activity and erosion. The cross tabulation summaries are calculated for wind, water, and combined wind/water erosion categories. Use the erosion category most appropriate for the installation. Cross tabulation summaries use only plots that had visible erosion. The number of plots with observed activity are tallied for the erosion plots. If no relationship between erosion and activity exists, approximately half the plots should show activity and half the plots should show no activity. The observed proportion of plots that show use and erosion can be compared with the expected proportion of plots. The following equations show the summary calculations:

$$T=(B-np_0)/(np_0(1-np_0))^{1/2}$$

where T is the test statistic

p_0 is the probability of comparison

Ho: $p=p_0$ Ho is the null hypothesis, no relationship

Ha: $p \neq p_0$ Ha is the alternate hypothesis, two sided.

The base summary output uses an α value of 0.5 for the erosion cross-tabulation tests. If the test is significant, an asterix will appear next to the output value.

Trend, group, and group trend summaries calculate the proportion of plots (p) that have observed occurrence of the use for each category selected.

Errors checked during processing. During program execution, the input data is examined for a variety of potential errors. Any data errors encountered are listed in the error output file. The error messages provide a short description of the problem. A more detailed description can be obtained from the online help program. Highlight the error code and select <Help For Selection> from the <Help> menu for online help. The online help session will display the detailed error message and describe how the

data error was handled. When an error occurs, data is ignored, an assumption about the data is made, or the program aborts the data summary.

Errors should be corrected before the data summaries are used. Some error messages can affect the final results considerably. Not all data errors can be detected by the program. Most error messages include an SQL statement that will display a subset of the data that caused the error. To execute the SQL statement, place the cursor on the SQL line and select <SQL Selection> from the <Utilities> menu. The data causing the problem will be displayed in a spreadsheet window.

Only the base summary checks for data errors. Always run the base summary and correct errors before running the trend, group, and group trend summaries.

The following list includes each error code checked during the base summary. One of these errors will be displayed in the error output file when an error occurs. An SQL command will be provided along with the error message. When executed, this SQL command displays the subset of the data that caused the error. Examining the list of errors will indicate the range of data checks made during the summary.

Yr: YYYY Pl: PPPP WARNING LU001 Missing landuse value
Yr: YYYY Pl: PPPP WARNING LU002 Invalid landuse
Yr: YYYY Pl: PPPP WARNING LU003 Plot missing from mil. dist. summary
Yr: YYYY Pl: PPPP WARNING LU004 Plot missing a military obs.
Yr: YYYY Pl: PPPP WARNING LU005 Duplicate Mil. Obs.
Yr: YYYY Pl: PPPP WARNING LU006 None and a Mil. use marked
Yr: YYYY Pl: PPPP WARNING LU007 Plot missing from NonMil. Dist.
Yr: YYYY Pl: PPPP WARNING LU008 Missing a NonMil. Obs.
Yr: YYYY Pl: PPPP WARNING LU009 Duplicate NonMil. Obs.
Yr: YYYY Pl: PPPP WARNING LU010 None and a NonMil. use marked
Yr: YYYY Pl: PPPP WARNING LU011 Invalid plot
Yr: YYYY Pl: PPPP WARNING LU012 Invalid plot
Yr: YYYY Pl: PPPP WARNING LU013 Missing mainact designation in MaintAct
Yr: YYYY Pl: PPPP WARNING LU014 Invalid MaintAct: MMMM in MaintAct
Yr: YYYY Pl: PPPP WARNING LU015 Plot missing from MaintAct
Yr: YYYY Pl: PPPP WARNING LU016 Missing a mainact in MaintAct
Yr: YYYY Pl: PPPP WARNING LU017 Identical maintenance obs in MaintAct
Yr: YYYY Pl: PPPP WARNING LU018 None and Maintenance marked
Yr: YYYY Pl: PPPP WARNING LU019 Invalid plot in ErosEvid
Yr: YYYY Pl: PPPP WARNING LU020 Missing status in ErosEvid
Yr: YYYY Pl: PPPP WARNING LU021 Invalid status: SSSS in ErosEvid
Yr: YYYY Pl: PPPP WARNING LU022 Plot missing from wind ErosEvid

Yr: YYYY Pl: PPPP WARNING LU023 Missing wind obs in ErosEvid
Yr: YYYY Pl: PPPP WARNING LU024 Identical wind obs in ErosEvid
Yr: YYYY Pl: PPPP WARNING LU025 None and a wind erosion marked
Yr: YYYY Pl: PPPP WARNING LU026 Plot missing from water erosion
Yr: YYYY Pl: PPPP WARNING LU027 Plot missing a water obs in ErosEvid
Yr: YYYY Pl: PPPP WARNING LU028 None and a water obs in ErosEvid
Yr: YYYY Pl: PPPP WARNING LU029 Invalid plot type:TTTT
Yr: YYYY Pl: PPPP ERROR   LU030 Duplicate Entries in Plotsurv
Yr: YYYY Pl: PPPP ERROR   LU031 No plots exist

The following list gives SQL commands that can be used to correct data which caused the associated error message. Understand what changes the SQL command will cause before executing the command. An error may have more than one cause. The following corrections are for the most prevalent cause of the error.

LU001   UPDATE LANDUSE SET LANDUSE = '?' WHERE @YEARNO
        (RECDATE)=YYYY AND PLOTID=PPPP AND LANDUSE IS NULL;
LU002   UPDATE LANDUSE SET LANDUSE = '?' WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND @UPPER(LANDUSE)='?';
LU003   INSERT INTO LANDUSE (INSTALID,PLOTID,RECDATE,LANDUSE)
        VALUES ('III',PPPP,DD-MMM-YYYY,'LLLL');
LU004   INSERT INTO LANDUSE (INSTALID,PLOTID,RECDATE,LANDUSE)
        VALUES ('III',PPPP,DD-MMM-YYYY,'LLLL');
LU005   SET CURSORNAME REMOVEDUP; PREPARE SELECT * FROM
        LANDUSE WHERE @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP
        AND @UPPER(LANDUSE)='?'; PERFORM; SET SCROLLROW 0;
        FETCH 1; CONNECT 2; DELETE FROM LANDUSE WHERE CURRENT
        OF REMOVEDUP; DISCONNECT 2; SET SCROLL OFF;
LU006   DELETE FROM LANDUSE WHERE @YEARNO(RECDATE)=YYYY AND
        PLOTID=PPPP AND @UPPER(LANDUSE)='?';
LU007   INSERT INTO LANDUSE (INSTALID,PLOTID,RECDATE,LANDUSE)
        VALUES ('III',PPPP,DD-MMM-YYYY,'LLLL');
LU008   INSERT INTO LANDUSE (INSTALID,PLOTID,RECDATE,LANDUSE)
        VALUES ('III',PPPP,DD-MMM-YYYY,'LLLL');
LU009   SET CURSORNAME REMOVEDUP; PREPARE SELECT * FROM
        LANDUSE WHERE @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP
        AND @UPPER(LANDUSE)='?'; PERFORM; SET SCROLLROW 0; FETCH 1;
        CONNECT 2; DELETE FROM LANDUSE WHERE CURRENT OF
        REMOVEDUP; DISCONNECT 2; SET SCROLL OFF;
LU010   DELETE FROM LANDUSE WHERE @YEARNO(RECDATE)=YYYY AND
        PLOTID=PPPP AND @UPPER(LANDUSE)='?';
LU011   UPDATE LANDUSE SET PLOTID = ? WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP;

LU012   UPDATE MAINTACT SET PLOTID=? WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP;

LU013   UPDATE MAINTACT SET MAINTAIN='?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND MAINTAIN IS NULL;

LU014   UPDATE MAINTACT SET MAINTAIN='?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND @UPPER(MAINTAIN) = 'MMMM';

LU015   INSERT INTO MAINTACT (INSTALID,PLOTID,RECDATE,MAINTAIN)
         VALUES ('III',PPPP,DD-MMM-YYYY,'MMMM');

LU016   UPDATE MAINTACT SET MAINTAIN='?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND MAINTAIN IS NULL;

LU017   SET CURSORNAME REMOVEDUP; PREPARE SELECT * FROM
         MAINTACT WHERE @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP
         AND @UPPER(MAINTAIN)='?'; PERFORM; SET SCROLLROW 0; FETCH
         1; CONNECT 2; DELETE FROM MAINTACT WHERE CURRENT OF
         REMOVEDUP; DISCONNECT 2; SET SCROLL OFF;

LU018   DELETE FROM MAINTACT WHERE @YEARNO(RECDATE)=YYYY AND
         PLOTID=PPPP AND @UPPER(MAINTAIN)='?';

LU019   UPDATE EROSEVID SET PLOTID=? WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP;

LU020   UPDATE EROSEVID SET STATUS = '?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND STATUS IS NULL;

LU021   UPDATE EROSEVID SET STATUS = '?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND @UPPER(STATUS) = 'SSSS';

LU022   INSERT INTO EROSEVID (INSTALID,PLOTID,RECDATE,STATUS)
         VALUES ('III',PPPP,DD-MMM-YYYY,'EEEE');

LU023   UPDATE EROSEVID SET STATUS = '?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND STATUS IS NULL;

LU024   SET CURSORNAME REMOVEDUP; PREPARE SELECT * FROM
         EROSEVID WHERE @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP
         AND @UPPER(STATUS)='?'; PERFORM; SET SCROLLROW 0; FETCH 1;
         CONNECT 2; DELETE FROM EROSEVID WHERE CURRENT OF
         REMOVEDUP; DISCONNECT 2; SET SCROLL OFF;

LU025   DELETE FROM EROSEVID WHERE @YEARNO(RECDATE)=YYYY AND
         PLOTID=PPPP AND @UPPER(STATUS)='?';

LU026   INSERT INTO EROSEVID (INSTALID,PLOTID,RECDATE,STATUS)
         VALUES ('III',PPPP,DD-MMM-YYYY,'EEEE');

LU027   UPDATE EROSEVID SET STATUS = '?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND STATUS IS NULL;

LU028   DELETE FROM EROSEVID WHERE @YEARNO(RECDATE)=YYYY AND
         PLOTID=PPPP AND @UPPER(STATUS)='?';

LU029   UPDATE PLOTSURV SET INVTYPE = '?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND @UPPER(INVTYPE) = 'TTTT';

LU030   SET CURSORNAME REMOVEDUP; PREPARE SELECT * FROM
         PLOTSURV WHERE @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP;
         PERFORM; SET SCROLLROW 0; FETCH 1; CONNECT 2; DELETE FROM

PLOTSURV WHERE CURRENT OF REMOVEDUP; DISCONNECT 2; SET
SCROLL OFF;
LU031 <LOAD HH FILES>

Supplemental information. The following sources of online and hard copy
documentation contain relevant land use data information.

Online help sources:
LCTA Help
Field Manual Help

Hard copy sources:
Tazik, D.J., S.D. Warren, V.E. Diersing, R.B. Shaw, R.J. Brozka, C.F. Bagley,
and W.R. Whitworth, *U.S. Army Land Condition-Trend Analysis (LCTA)
Plot Inventory Field Methods,* Technical Report N-92/03/ADA247931
(USACERL, February 1992).
Sprouse, W.L., and A.B. Anderson, *Land Condition Trend Analysis (LCTA)
Program Data Dictionary,* ADP Report 95/03/ADA295608 (USACERL,
April 1995).

PCSD

Plant Cover Surface Disturbance

Plant cover surface disturbance (PCSD) summarizes aerial cover, ground cover, cover
above 4 m, and ground disturbance.

Uses. PCSD summaries document ground cover, surface disturbance, and canopy
cover of the individual plots and the installation. The analysis summaries provide an
indication of changes in the amount and location of military disturbance. The
summaries also indicate changes in the amount and type of plant cover. Information
from PCSD summaries also can be used to evaluate military concealment cover and
provide ground-truthing data for remote sensed imagery.

Access. To run a plant cover surface disturbance summary, select the <Analysis>
menu option and the <Plant Cover Surface Dist.> submenu (Figure 23). Entering
<Alt-A,D> from the computer keyboard also will start the summary. Then select base,
trend, group, or group trend summary. The base summary will summarize all plots

for surface disturbance and cover information. Trend, group, and group trends require a PCSD activity selection.
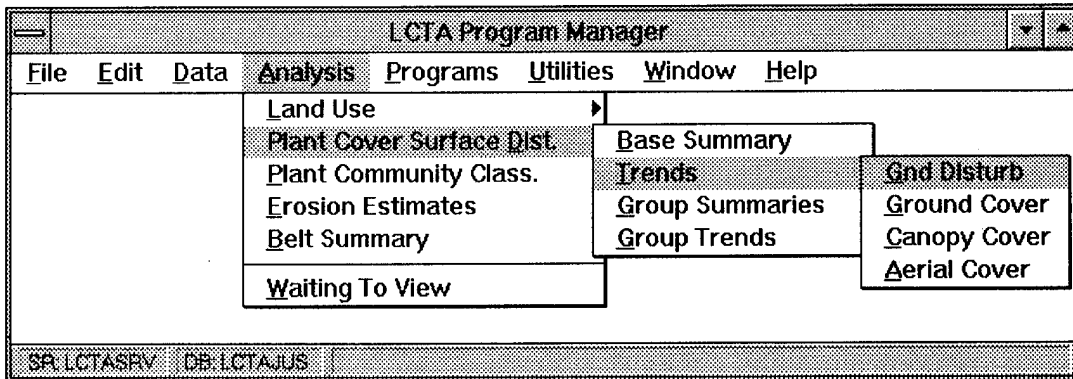
Figure 23. Plant cover surface disturbance menu selections.

Database inputs and outputs. The database diagram in Figure 24 lists all database tables used for each PCSD data summary. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.

Grey boxes = input tables; black box = output table; white boxes = not used
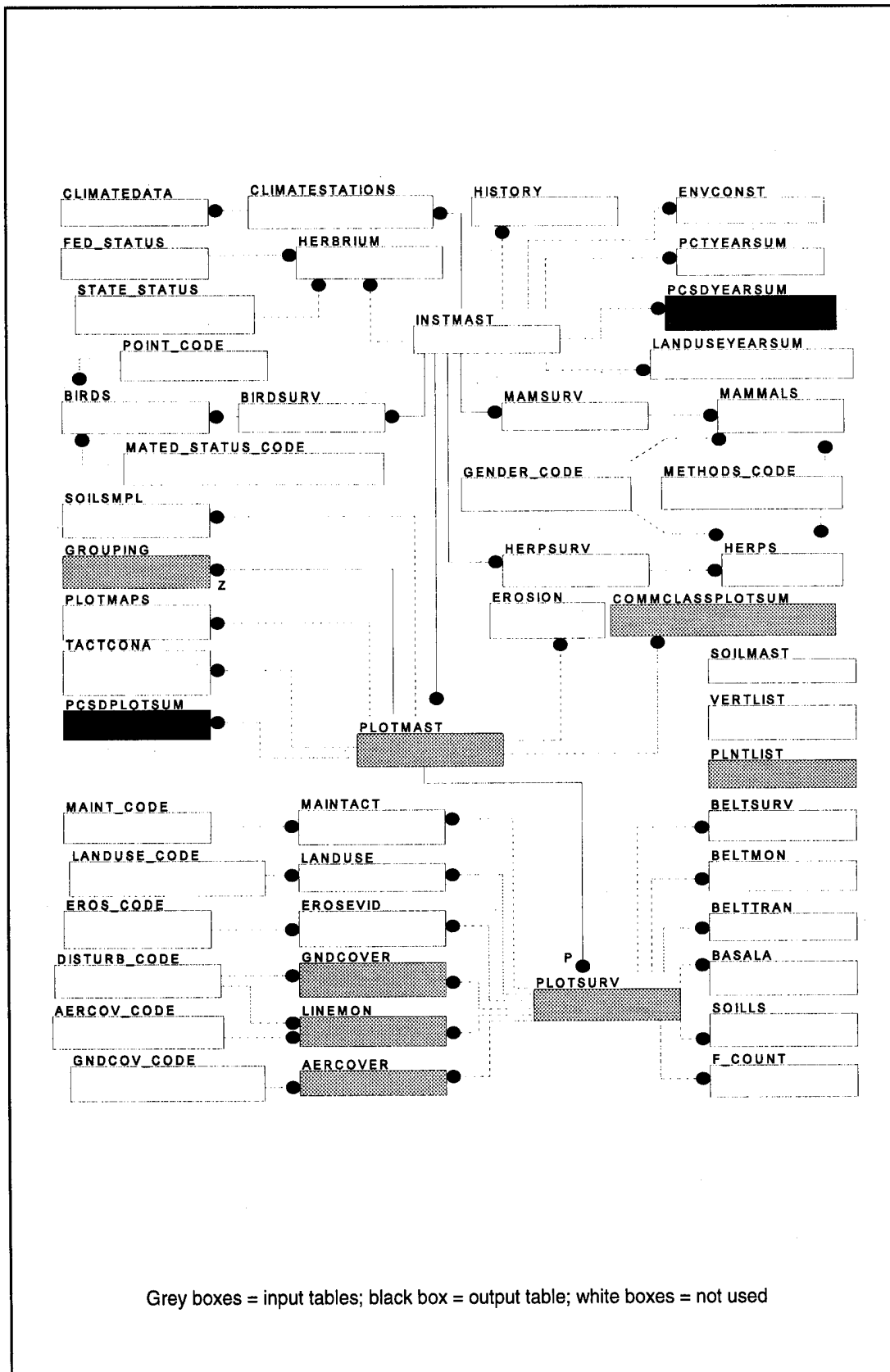
Figure 24. LCTA reduced entity relationship diagram and PCSD input tables.

Table 2 lists all database tables and columns used for each PCSD data summary.

Table 2. Plant cover surface disturbance summary database tables and columns table.

Table Name	Column Name	Column Use	Base	Trend	Group	Group Trend	Contents
PlotSurv	PlotID	C	I	I	I	I	plot number
	RecDate	C	I	I	I	I	measurement date
	InvType	I	I	I	I	I	inventory type
	PlotType	I	I	I	I	I	plot measurement type
	Train	I	N	N	I	I	training area
	VegType	I	N	N	I	I	vegetation type
GndCover	PlotID	C	I	N	N	N	plot number
	RecDate	C	I	N	N	N	measurement date
	Disturb	D	I	N	N	N	disturbance category
	VegLoc	I	I	N	N	N	vegetation location
	VegID	D	I	N	N	N	vegetation code
AerCover	PlotID	C	I	N	N	N	plot number
	RecDate	C	I	N	N	N	measurement date
	VegLoc	I	I	N	N	N	vegetation location
	VegID	D	I	N	N	N	vegetation code
	VegHt	I	I	N	N	N	vegetation height
LineMon	PlotID	C	I	N	N	N	plot number
	RecDate	C	I	N	N	N	measurement date
	Disturb	D	I	N	N	N	disturbance category
	GndCov	D	I	N	N	N	ground cover code
	AerCov	D	I	N	N	N	aerial cover plant code
PlntList	VegID	C	I	N	N	N	vegetation code
	Life	I	I	N	N	N	vegetation life form
	Form1	I	I	N	N	N	vegetation form class
Grouping	PlotID	C	N	N	I	I	plot number
	Other Cols	D	N	N	I	I	plot groupings
PCSDPlotSum	PlotID	C,I	O	I	I	I	plot number
	AnalYear	C,I	O	I	I	I	analysis year
	PlotType	I	O	I	I	I	plot measurement type
	GDObs	D	O	I	I	I	# ground disturbance pts
	GDNone	D	O	I	I	I	# pts. with no disturbance

Table Name	Column Name	Column Use	Base	Trend	Group	Group Trend	Contents
	GDRoad	D	O	I	I	I	# road points
	GDPass	D	O	I	I	I	# vehicle pass points
	GDTrail	D	O	I	I	I	# trail points
	GDOther	D	O	I	I	I	# other disturbance points
	GCObs	D	O	I	I	I	# ground cover points
	GCBare	D	O	I	I	I	# bare ground points
	GCLitter	D	O	I	I	I	# litter covered points
	GCRock	D	O	I	I	I	# rock covered points
	GCPlant	D	O	I	I	I	# plant covered points
	GCMicro	D	O	I	I	I	# microphyte covered pts.
	CCObs	D	O	I	I	I	# canopy cover obs. points
	CCNone	D	O	I	I	I	# points with no canopy
	CCAnn	D	O	I	I	I	# pts. annual cover only
	CCPer	D	O	I	I	I	# pts. perennial cover only
	CCAnnPer	D	O	I	I	I	# pts. both cover types
	ACObs	D	O	I	I	I	# aerial cover points
	ACGt4m	D	O	I	I	I	# pts. cover above 4m
PCSDYear Sum	AnalYear	C,I	O	N	N	N	analysis year
	GDNoneM	D	O	N	N	N	mean % transect no dist.
	GDNoneSt	D	O	N	N	N	std. dev of above
	GDRoadM	D	O	N	N	N	mean % transect road
	GDRoadSt	D	O	N	N	N	std. dev of above
	GDPassM	D	O	N	N	N	mean % transect pass
	GDPassSt	D	O	N	N	N	std. dev of above
	GDTrailMe	D	O	N	N	N	mean % transect trail
	GDTrailSt	D	O	N	N	N	std. dev of above
	GDOthMe	D	O	N	N	N	mean % transect other
	GDOthStd	D	O	N	N	N	std. dev of above
	GCBareM	D	O	N	N	N	mean % transect bare
	GCBareSt	D	O	N	N	N	std. dev of above
	GCLitMea	D	O	N	N	N	mean % transect litter
	GCLitStde	D	O	N	N	N	std. dev of above
	GCRockM	D	O	N	N	N	mean % transect rock

Table Name	Column Name	Column Use	Base	Trend	Group	Group Trend	Contents
	GCRockSt	D	O	N	N	N	std. dev of above
	GCPlantM	D	O	N	N	N	mean % transect plants
	GCPlantSt	D	O	N	N	N	std. dev of above
	GCMicroM	D	O	N	N	N	mean % ts. microphytes
	GCMicroS	D	O	N	N	N	std. dev of above
	CCNoneM	D	O	N	N	N	mean % transect none
	CCNoneSt	D	O	N	N	N	std. dev of above
	CCAnnMe	D	O	N	N	N	mean % transect annuals
	CCAnnStd	D	O	N	N	N	std. dev of above
	CCPerMe	D	O	N	N	N	mean % tran. perennials
	CCPerStd	D	O	N	N	N	std. dev of above
	CCAPMea	D	O	N	N	N	mean % transect both
	CCAPStde	D	O	N	N	N	std. dev of above
	ACMean	D	O	N	N	N	mean aerial coverage
	AC00	D	O	N	N	N	% plots no cover above
	AC20	D	O	N	N	N	% plots 0-20% cover
	AC40	D	O	N	N	N	% plots 20-40% cover
	AC60	D	O	N	N	N	% plots 40-60% cover
	AC80	D	O	N	N	N	% plots 60-80% cover
	AC100	D	O	N	N	N	% plots 80-100% cover

Column Use:

C   Connector   Column values used to properly join information from multiple tables
D   Data   Column values used as data in summary
I   Identifier   Column values used to identify data elements

Base, Trend, Group, Group Trend:

N   Column not used in summary
I   Input column for summary
O   Output column for summary

File outputs and sample output windows. The following lists describe each output file created by a data summary. An example output window (Figures 25, 26, 27, and 28) for each data summary also is provided.

Base Output Files

SD####.txt   Tabular summaries

SD####.err   Error messages

SD####-1.wmf or SD####-1.bmp   Disturbance

SD####-2.wmf or SD####-2.bmp   Ground cover

SD####-3.wmf or SD####-3.bmp   Canopy cover

SD####-4.wmf or SD####-4.bmp   Aerial concealment

where #### is the analysis year selected.
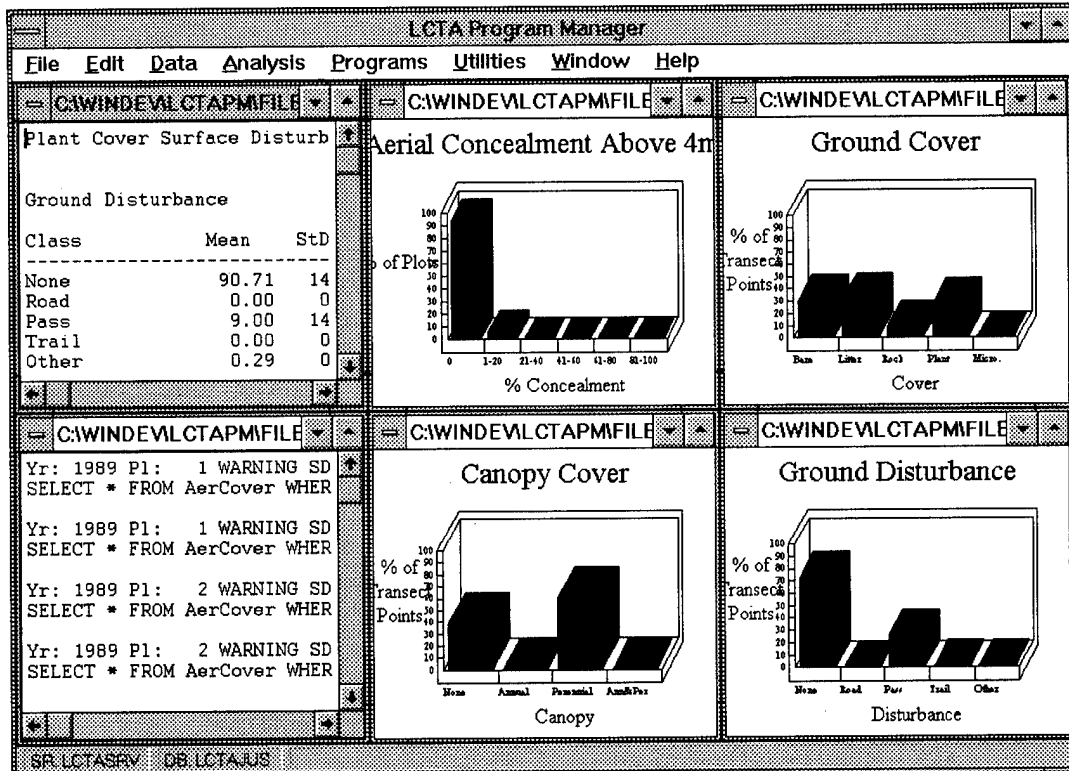
Figure 25. Plant cover surface disturbance base summary output windows.

Trend Summary Output Files

??T.pss   PCSD trend tabular data

??T.hgw   PCSD trend hot spot graph

where ?? is GD, GC, CC, AC for ground disturbance, ground cover, canopy
cover, and aerial cover summaries
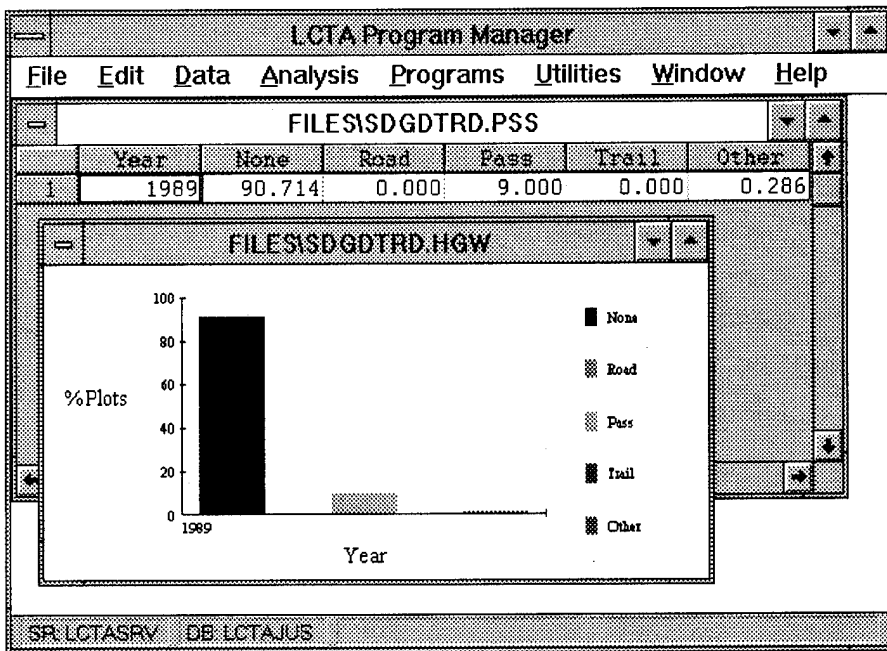
Figure 26. Plant cover surface disturbance trend summary output windows.

Group Summary Output Files

PCSD????.pss   PCSD group tabular data

where ???? is the first four characters of the plot grouping name.

Figure 27. Plant cover surface disturbance group summary output windows.

Group Trend Summary Output Files

      PCSD????.pss   PCSD group trend tabular data

      where ???? is the first four characters of the plot grouping name.
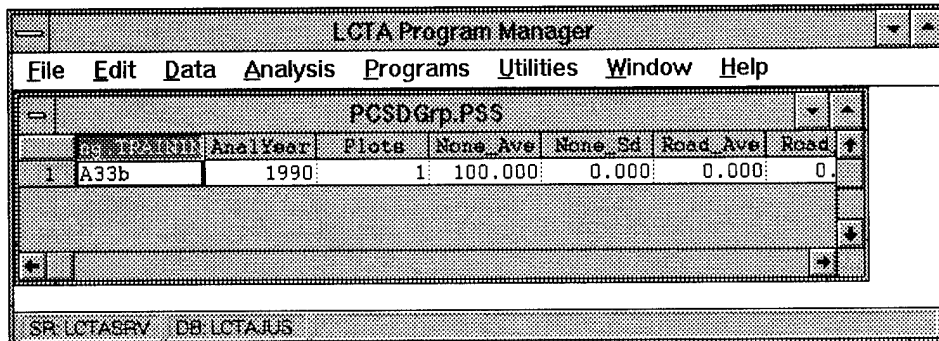
Figure 28. Plant cover surface disturbance group trend summary output windows.

Methods. PCSD summaries use line transect data. Line transect data documents ground cover, canopy cover, and surface disturbance. Line transect data used in PCSD summaries are grouped into the following categories:

Disturbance	Ground Cover	Canopy Cover	Aerial Cover Above 4 m
None	Bare	None	0
Road	Litter	Annuals	1-20
Pass	Rock	Perennials	21-40
Trail	Plant	Both	41-60
Other	Microphyte		61-80
			81-100

In the base data summary, plot data is summarized and reported as the percent of transect with evidence of the disturbance and cover categories. For plot summaries, values are calculated for all plots regardless of the plot measurement type or inventory type. Data is obtained from Aercover and Gndcover database tables for inventory and long-term inventory years. Data is obtained from the Linemon database table for monitoring inventory years. The following equation shows the plot summary calculations:

$$\overline{X} = \left(\sum_{i=1}^{n} x_i \right) / n$$

where   X is the proportion of transect with the category present

$$x_i \text{ is 1 if ith transect point has the category,}$$
$$\text{otherwise 0}$$
$$n \text{ is the number of valid transect points}$$
$$(0<=n<=100).$$

In the base data summary, installation data is summarized and reported as the average percent of transect with evidence of disturbance and cover categories for core plots. Standard deviations of the average also are reported for each value. Only core plots are used in the analysis so the results can be extrapolated to the whole installation and comparisons can be made between years. The following equations show the installation summary calculations:

$$\overline{X} = \left(\sum_{i=1}^{n} x_i \right) / n$$

where   X is the average proportion of transect with the category present

x_i is proportion of ith transect with category present

n is the number of plots

$$s^2 = \frac{1}{(n-1)} \Sigma(x_i - \overline{X})^2$$

s^2 is the variance of the X

$$s = \sqrt{s^2}$$

s is the standard deviation of X.

Trend, group, and group trend summaries calculate information in the same manner as the installation summary, except that values are for specific groups of plots rather than all plots. Only core plots are used in the summaries, except for user-defined plot groups that specifically include special use plots. For user-defined groups, the user is responsible for determining which plots are valid for use.

The aerial concealment summary cannot be calculated for short-term inventory years. Information for this summary is not collected for short-term inventories. A message (in the error window) will record if the summary graph was not constructed. In addition, a message box will display a message that the file was not found when opening the graph window; this also indicates that no disk file was created for the graph.

Errors checked during processing. During program execution, the input data is examined for a variety of potential errors. Any data errors encountered are listed in

the error output file. The error messages provide a short description of the problem. A more detailed description can be obtained from the online help program. Highlight the error code and select <Help For Selection> from the <Help> menu for online help. The online help session will display the detailed error message and describe how the data error was handled. Generally data is ignored, an assumption about the data is made, or the program aborts the data summary.

Errors should be corrected before the data summaries are used. Some error messages can affect the final results considerably. Not all data errors can be detected by the program. Most error messages include an SQL statement that will display a subset of the data which caused the error. To execute the SQL statement, place the cursor on the SQL line and select <SQL Selection> from the <Utilities> menu. The data causing the problem will be displayed in a spreadsheet window.

Only the base summary checks for data errors. Always run the base summary and correct errors before running the trend, group, and group trend summaries.

The following list includes each error code checked during the base summary. These errors will be displayed in the error output file if an error occurs. Along with the error message, an SQL command will be provided. When executed, this SQL command will display the subset of the data that caused the error. Examining the list of errors will indicate the range of data checks made during the summary.

Yr: YYYY Pl:PPPP WARNING SD001 Duplicate Entries in PlotSurv
Yr: YYYY Pl:PPPP WARNING SD002 Invalid Plot Type: TTTT
Yr: YYYY Pl:PPPP WARNING SD003 No plots exist
Yr: YYYY Pl:PPPP WARNING SD004 Missing Obs. in LineMon or GndCov
Yr: YYYY Pl:PPPP WARNING SD005 Missing VegLoc in LineMon
Yr: YYYY Pl:PPPP WARNING SD006 Missing Disturb in LineMon
Yr: YYYY Pl:PPPP WARNING SD007 Missing GndCov in LineMon
Yr: YYYY Pl:PPPP WARNING SD008 Missing AerCov in LineMon
Yr: YYYY Pl:PPPP WARNING SD009 Invalid Vegloc of LLLL in LineMon
Yr: YYYY Pl:PPPP WARNING SD010 invalid disturbance: DDDD in LineMon
Yr: YYYY Pl:PPPP WARNING SD011 invalid cover: CCCC in LineMon.
Yr: YYYY Pl:PPPP WARNING SD012 invalid AerCov: AAAA in LineMon
Yr: YYYY Pl:PPPP WARNING SD013 invalid Plot Number in LineMon
Yr: YYYY Pl:PPPP WARNING SD014 Missing VegLoc in GndCov
Yr: YYYY Pl:PPPP WARNING SD015 Missing Disturb in GndCov
Yr: YYYY Pl:PPPP WARNING SD016 Missing VegID in GndCov
Yr: YYYY Pl:PPPP WARNING SD017 Invalid VegLoc of LLLL in GndCov
Yr: YYYY Pl:PPPP WARNING SD018 invalid disturbance: DDDD in GndCover

Yr: YYYY Pl:PPPP WARNING SD019 missing ground cover in GndCover.
Yr: YYYY Pl:PPPP WARNING SD020 Missing VegLoc in AerCov
Yr: YYYY Pl:PPPP WARNING SD021 Missing VegHt in AerCov
Yr: YYYY Pl:PPPP WARNING SD022 Missing VegID in AerCov
Yr: YYYY Pl:PPPP WARNING SD023 invalid VegLoc: LLLL in AerCov
Yr: YYYY Pl:PPPP WARNING SD024 invalid VegHt:HHHH in AerCov
Yr: Pl: WARNING SD025 Missing Life in PlntList
Yr: Pl: WARNING SD026 Missing Form1 in PlntList
Yr: YYYY Pl:PPPP WARNING SD027 invalid information in PlntList for XXXX.
Yr: YYYY Pl:PPPP WARNING SD028 VVVV not in PlntList.
Yr: YYYY Pl:PPPP WARNING SD029 invalid PlotID;
Yr: YYYY Pl:PPPP WARNING SD030 invalid PlotID in PCSDPlotSum
Yr: YYYY Pl:PPPP WARNING SD031 Invalid Inventory Type: IIII

The following list gives SQL commands that can be used to correct data which caused the associated error message. Understand what changes the SQL command will make to the databases before executing the command. An error may have more than one cause. The following corrections are for the most prevalent cause of the error.

SD001   SET CURSORNAME REMOVEDUP; PREPARE SELECT * FROM
         PLOTSURV WHERE @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP;
         PERFORM;SET SCROLLROW 0; FETCH 1; CONNECT 2; DELETE
         FROM PLOTSURV WHERE CURRENT OF REMOVEDUP; DISCONNECT
         2; SET SCROLL OFF;
SD002   UPDATE PLOTSURV SET PLOTTYPE='?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND @UPPER(PLOTTYPE) = 'TTTT';
SD003   < LOAD HH FILES>
SD004   INSERT INTO GNDCOVER (INSTALID, PLOTID, RECDATE, VEGLOC,
         DISTURB, VEGID, VEGCOND) VALUES ('III',#,DD-MMM-YYYY, #,'DD'
         ,'VVVVVVVV','C'); INSERT INTO LINEMON (INSTALID, PLOTID,
         RECDATE, VEGLOC,DISTURB,GNDCOV,AERCOV) VALUES ('III',#,DD-
         MMM-YYYY,#,'DD','GGG','AAA');
SD005   UPDATE LINEMON SET VEGLOC = ? WHERE @YEARNO (RECDATE)
         =YYYY AND   PLOTID=PPPP AND VEGLOC IS NULL;
SD006   UPDATE LINEMON SET DISTURB = '?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND DISTURB IS NULL AND VEGLOC = ?;
SD007   UPDATE LINEMON SET GNDCOV = '?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND GNDCOV IS NULL AND VEGLOC = ?;
SD008   UPDATE LINEMON SET AERCOV = '?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND AERCOV IS NULL AND VEGLOC = ?;
SD009   UPDATE LINEMON SET VEGLOC = ? WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND VEGLOC = LLLL;

SD010   UPDATE LINEMON SET DISTURB = '?' WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND @UPPER(DISTURB)='DDDD' AND VEGLOC=?;

SD011   UPDATE LINEMON SET GNDCOV = '?' WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND @UPPER(GNDCOV)='CCCC' AND
        VEGLOC = ?;

SD012   UPDATE LINEMON SET AERCOV='?' WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND @UPPER(AERCOV)='AAAA' AND
        VEGLOC = ?;

SD013   UPDATE LINEMON SET PLOTID=? WHERE PLOTID=PPPP AND
        @YEARNO(RECDATE)=YYYY;

SD014   UPDATE GNDCOVER SET VEGLOC=? WHERE VEGLOC IS NULL AND
        @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP;

SD015   UPDATE GNDCOVER SET DISTURB='?' WHERE VEGLOC=? AND
        @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP AND DISTURB IS NULL;

SD016   UPDATE GNDCOVER SET VEGID='?' WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND VEGLOC=? AND VEGID IS NULL;

SD017   UPDATE GNDCOVER SET VEGLOC=? WHERE VEGLOC=LLLL AND
        @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP;

SD018   UPDATE GNDCOVER SET DISTRUB='?' WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND VEGLOC=? AND
        @UPPER(DISTURB)='DDDD';

SD019   UPDATE GNDCOVER SET VEGID='?' WHERE VEGLOC=? AND
        @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP;

SD020   UPDATE AERCOVER SET VEGLOC=? WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND VEGLOC IS NULL

SD021   UPDATE AERCOVER SET VEGHT=? WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND VEGHT IS NULL;

SD022   UPDATE AERCOVER SET VEGID='?' WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND VEGLOC=? AND VEGHT IS NULL;

SD023   UPDATE AERCOVER SET VEGLOC=? WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND VEGHT=HHHH AND VEGLOC = LLLL;

SD024   UPDATE AERCOVER SET VEGHT=? WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND VEGHT=HHHH AND VEGLOC = ?;

SD025   UPDATE PLNTLIST SET LIFE='?' WHERE @UPPER(VEGID)='?';

SD026   UPDATE PLNTLIST SET FORM1='?' WHERE @UPPER(VEGID)='?';

SD027   UPDATE PLNTLIST SET FORM1='?' WHERE @UPPER(VEGID)='?';
        UPDATE PLNTLIST SET LIFE='?' WHERE @UPPER(VEGID)='?';

SD028   UPDATE AERCOVER SET VEGID='?' WHERE @UPPER(VEGID)='VVVV'
        AND @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP;

SD029   UPDATE AERCOVER SET PLOTID=? WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP;

SD030   Rerun all of PCSD summary, do not try to correct.

SD031   UPDATE PLOTSURV SET INVTYPE='?' WHERE @UPPER(INVTYPE)
        ='IIII' AND @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP;

Supplemental information. The following sources of online and hard copy documentation are available for additional information relating to plant cover surface disturbance summaries.

Online help sources:
 LCTA Help
 Field Manual Help

Hard copy sources:
 Tazik, D.J., S.D. Warren, V.E. Diersing, R.B. Shaw, R.J. Brozka, C.F. Bagley, and W.R. Whitworth, *U.S. Army Land Condition-Trend Analysis (LCTA) Plot Inventory Field Methods,* Technical Report N-92/03/ADA247931 (USACERL, February 1992).
 Sprouse, W.L., and A.B. Anderson, *Land Condition Trend Analysis (LCTA) Program Data Dictionary,* ADP Report 95/03/ADA295608 (USACERL, April 1995).

Plant
Communities

Plant Community Classification

Plant community classifications (PCC) provide a common terminology for land use management. This application uses two classification methods for summarizing installation data.

NOTE. Before running PCC, be sure the information in the PLNTLIST table (a local species listing) is updated. Run the <Update Species List> under the <Utilities> menu option in the main menu.

Uses. A standard PCC procedure is needed to provide aggregation of plot data for summary of other LCTA data (wildlife, diversity, species composition, DA and MACOM summary capabilities, profile installation landscapes, supervised classification of satellite imagery, and to detect changes in vegetation communities). A standardized classification procedure allows comparisons between installations.

Access. To run a PCC summary, select the <Analysis> menu selection and the <Plant Community Class.> submenu (Figure 29). Entering <Alt-A,P> from the computer keyboard also will start the summary.
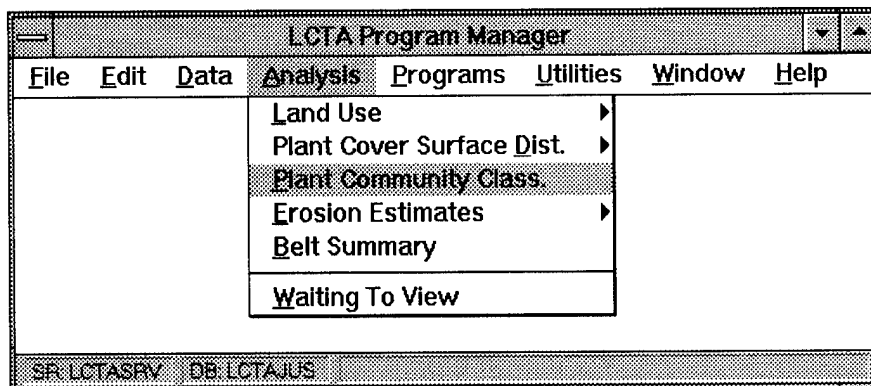
Figure 29. Plant community classification menu selection.

Database inputs and outputs. The database diagram in Figure 30 lists all database tables used for each plant community data summary. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.

Grey boxes = input tables; black box = output table; white boxes = not used
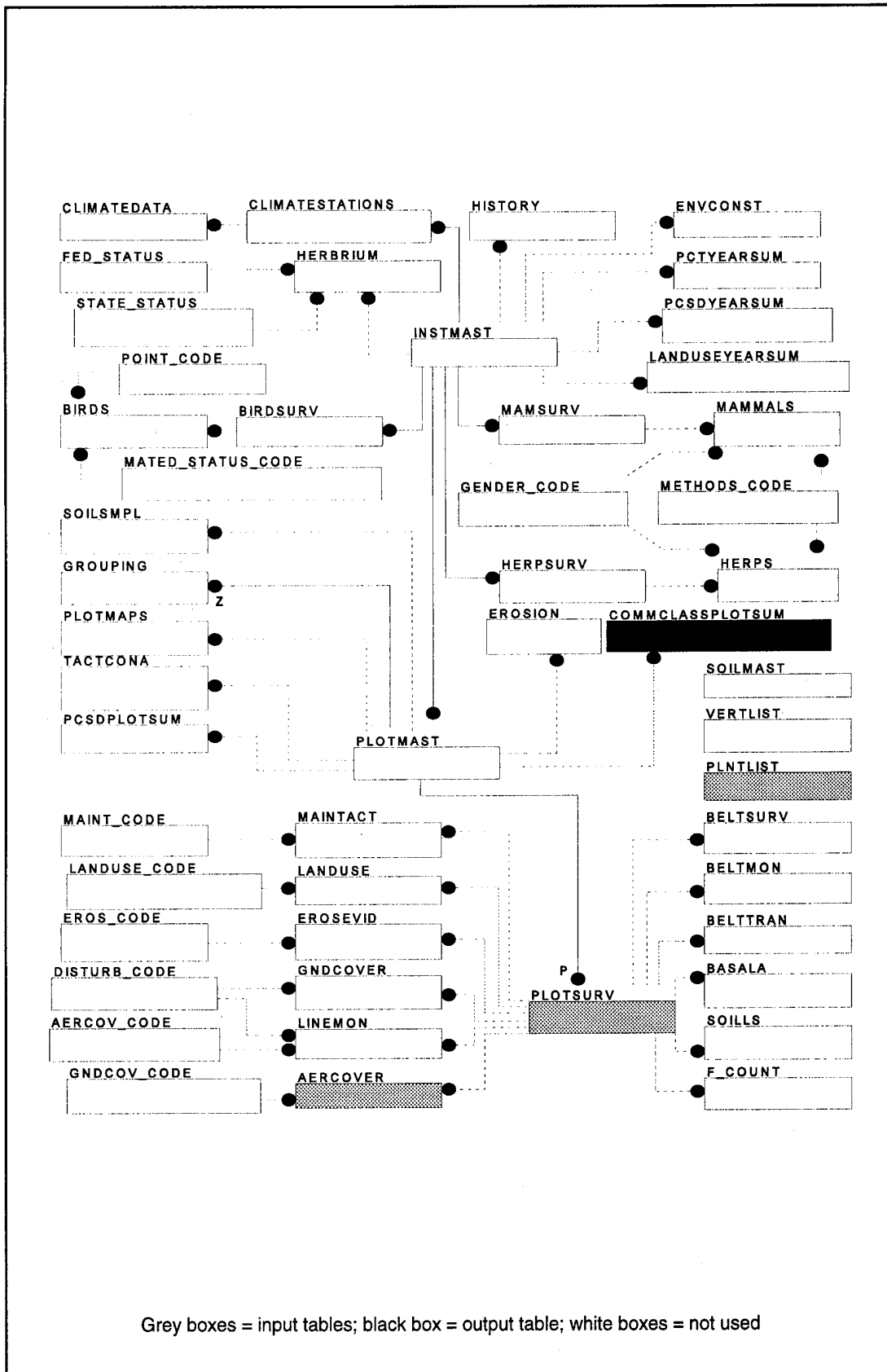
Figure 30. LCTA reduced entity relationship diagram and PCC input tables.

Table 3 lists all database tables and columns used for each plant community data summary.

Table 3. Plant classification summary database tables and columns table.

Table Name	Column Name	Column Use	Base	Contents
PlotSurv	PlotID	C	I	plot number
	RecDate	C	I	measurement date
	InvType	I	I	inventory type
AerCover	PlotID	C	I	plot number
	RecDate	C	I	measurement date
	VegLoc	I	I	vegetation location
	VegID	D	I	vegetation code
	VegHt	I	I	vegetation height
PlntList	VegID	C	I	vegetation code
	Life	D	I	life form, annual or perennial
	Form1	D	I	plant form (grass, tree, shrub, etc.)
	Form2	D	I	plant form modifier
	TSType	D	I	tree shrub type, conifer or deciduous
CommClassPlot Sum	AnalYear	C,I	O	analysis year
	PlotID	C,I	O	plot number
	PccType	D	O	plant community type
	PccCode	D	O	plant community code
	MccType	D	O	plant community type
	MccCode	D	O	plant community code
	ATGa	D	O	# top most hits annual grass
	ATGp	D	O	# top most hits perennial grass
	ATFa	D	O	# top most hits annual forbs
	ATFp	D	O	# top most hits perennial forbs
	ATH	D	O	# top most hits half shrubs
	ATDc	D	O	# top most hits coniferous dwarf
	ATDb	D	O	# top most hits deciduous dwarf
	ATSc	D	O	# top most hits coniferous shrubs
	ATSb	D	O	# top most hits deciduous shrubs
	ATTc	D	O	# top most hits coniferous trees
	ATTb	D	O	# top most hits deciduous trees

Table Name	Column Name	Column Use	Base	Contents
	PAGa	D	O	# points with annual grass
	PAGp	D	O	# points with perennial grass
	PAFa	D	O	# points with annual forbs
	PAFp	D	O	# points with perennial forbs
	PAH	D	O	# points with half shrubs
	PADc	D	O	# points with coniferous dwarf
	PADb	D	O	# points with deciduous dwarf
	PASc	D	O	# points with coniferous shrubs
	PASb	D	O	# points with deciduous shrubs
	PATc	D	O	# points with coniferous trees
	PATb	D	O	# points with deciduous trees
	TCGa	D	O	# total annual grass hits
	TCGp	D	O	# total perennial grass hits
	TCFa	D	O	# total annual forb hits
	TCFp	D	O	# total perennial forb hits
	TCH	D	O	# total half shrub hits
	TCDc	D	O	# total coniferous dwarf shrub hits
	TCDb	D	O	# total deciduous dwarf shrub hits
	TCSc	D	O	# total coniferous shrub hits
	TCSb	D	O	# total deciduous shrub hits
	TCTc	D	O	# total coniferous tree hits
	TCTb	D	O	# total deciduous tree hits

Column Use:

    C   Connector   Column values used to properly join information
                                    from multiple tables
    D   Data   Column values used as data in summary
    I   Identifier   Column values used to identify data elements

Base:

    N   Column not used in summary
    I   Input column for summary
    O   Output column for summary

File outputs and sample output windows. The following lists describe each output file created by a data summary. An example output window (Figure 31) for each data summary also is provided.

<u>Output Files</u>

PC####.txt	Tabular summaries
PC####.err	Error messages
PC####-1.wmf or PC####-1.bmp	Herbaceous plants graph
PC####-2.wmf or PC####-2.bmp	Woody plants graph
PC####-3.wmf or PC####-3.bmp	All plants graph

where #### is the analysis year selected.
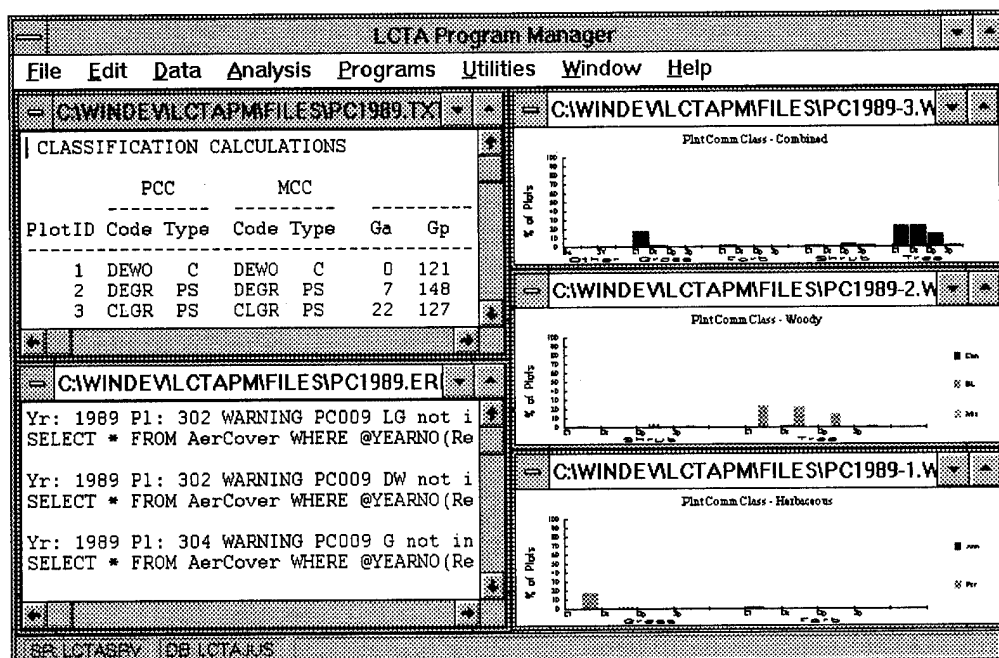
Figure 31. Plant community classification output windows.

Methods. A standard PCC procedure is needed to provide aggregation of plot data for summary of wildlife, species diversity, and species composition data. PCC data also is used in DA and MACOM summaries, installation landscapes profiles, supervised classification of satellite imagery, and detection of changes in vegetation communities. Two a priori classification techniques were developed for summarization and analysis of LCTA data. The two classification methods are:

- plant community classification (PCC) method
- most common classification (MCC) method.

LCTA uses the line transect data from core and special use plots for a class level community classification. The topmost (highest) aerial hit at each line transect location (0.5, 1.5, ...99.5) is used for the summary. Input data is stored in the AerCover database table, thus plant community summaries are only available for initial and long-term inventory years. The species is categorized by life form (grass, forb, shrub, dwarf shrub, half shrub, tree). If the species is herbaceous, it is classified as annual or perennial. If the species is woody, it is then classified as deciduous or coniferous. Deciduous species are angiosperms even if they are evergreen. Coniferous species are gymnosperms even if they drop their leaves.

Classification counts are based on the topmost species occurrence at each location regardless of the number of aerial hits at each location. This gives a maximum number of 100 observations per point. Although not used in the plant community classification, the total number of occurrences by category also are listed in the output. This data is provided as a reference data set for comparison with the data set used for the plant classification. The number of points that had a category present (presence, absence) also is included for comparison purposes. Some plant community classification schemes use this alternative data. The data is provided for this and other purposes.

The program calculates the PCC type and code by determining if the distribution of hit information meets the criteria for a given group. Groups are examined in a hierarchical order. The following list the order in which groups are examined.

> Classification Order
> **Wo**odland
> **Sh**rubland
> **D**warf shrubland
> **H**alfshrub
> **Gr**assland
> **F**orbland
> **Sp**arse **Wo**odland
> **Sp**arse **Sh**rubland
> **Sp**arse **D**warfshrubland
> **Sp**arse **ve**getation
> **B**arren

Each of these categories has a code. The code for each category is made up of the highlighted letters in the name. An additional code is included for each code that has a two letter designation only (those not sparse or barren). These categories are divided into subcategories based on the amount of cover (number of hits): **Closed, Dense,** and

Open. These letters are added to the front of the code. Thus CLWO is a closed woodland and DEGR is a dense grassland.

PCC methodology. The following data variable names are used in the plant classification methodology.

Variable	Description
Tc	Number of coniferous tree hits
Tb	Number of broadleaf tree hits
Sc	Number of coniferous shrub hits
Sb	Number of broadleaf shrub hits
Dc	Number of coniferous dwarfshrub hits
Db	Number of broadleaf dwarfshrub hits
HS	Number of half shrub hits
Ga	Number of annual grass hits
Gp	Number of perennial grass hits
Fa	Number of annual forb hits
Fp	Number of perennial forb hits
Woody	Tc+Tb+Sc+Sb+Dc+Db
TotHerb	Ga+Gp+Fa+Fp

The following data cutoff values are used in the plant classification methodology:

Cutoff	Description
CutOff1 = 75.0%	percent closed canopy cutoff
CutOff2 = 50.0%	percent dense canopy cutoff
CutOff3 = 25.0%	percent open canopy cutoff
CutOff4 = 10.0%	percent herbaceous sparse canopy cutoff
CutOff5 = 0.0%	percent woody sparse canopy cutoff
WoodType = 60.0%	percent coniferous/broadleaf/mixed cover

To calculate PCC code values, calculate the number of topmost hits for each vegetation category for a plot. Then examine each test condition of the following table in order. If the test condition is false, proceed to the next test condition. When the first test condition evaluates true, read the accompanying PCC code from the classification description column. This code is the PCCCode column value in the CommClassPlotSum database table. A PCC code description also is provided.

Test Condition	PCC Code and Description
if ((Tc + Tb) > CutOff1)	CLWO Closed woodland
if ((Tc + Tb) > CutOff2)	DEWO Dense woodland

if ((Tc + Tb) > CutOff3)   OPWO Open woodland

if ((Sc + Sb) > CutOff1)   CLSH Closed shrubland

if ((Sc + Sb) > CutOff2)   DESH Dense shrubland

if ((Sc + Sb) > CutOff3)   OPSH Open shrubland

if ((Tc + Tb) > CutOff1)   CLWO Closed woodland

if ((Tc + Tb) > CutOff2)   DEWO Dense woodland

if ((Tc + Tb) > CutOff3)   OPWO Open woodland

if ((Sc + Sb) > CutOff1)   CLSH Closed shrubland

if ((Sc + Sb) > CutOff2)   DESH Dense shrubland

if ((Sc + Sb) > CutOff3)   OPSH Open shrubland

if ((Dc + Db) > CutOff1)   CLDS Closed dwarfshrubland

if ((Dc + Db) > CutOff2)   DEDS Dense dwarfshrubland

if ((Dc + Db) > CutOff3)   OPDS Open dwarfshrubland

if (HS > CutOff1)   CLHS Closed halfshrubland

if (HS > CutOff2)   DEHS Dense halfshrubland

if (HS > CutOff3)   OPHS Open halfshrubland

if ((Ga+Gp)/TotHerb >= 0.5) and
    (TotHerb > CutOff1) and
    (Woody > CutOff4)   CLGRS Closed grassland, savanna component

if ((Ga+Gp)/TotHerb >= 0.5) and
    (TotHerb > CutOff2) and
    (Woody > CutOff4)   DEGRS Dense grassland, savanna component

  if ((Ga+Gp)/TotHerb >= 0.5) and
    (TotHerb > CutOff3) and
    (Woody > CutOff4)   OPGRS Open grassland, savanna component

 if ((Ga+Gp)/TotHerb >= 0.5) and
    (TotHerb > CutOff4) and
    (Woody > CutOff4)   SPGRS Sparse grassland, savanna component

   if ((Ga+Gp)/TotHerb >= 0.5) and
    (TotHerb > CutOff1)   CLGR Closed grassland

if ((Ga+Gp)/TotHerb >= 0.5) and
    (TotHerb > CutOff2)   DEGR Dense grassland

if ((Ga+Gp)/TotHerb >= 0.5) and
    (TotHerb > CutOff3)   OPGR Open grassland

if ((Ga+Gp)/TotHerb >= 0.5) and
    (TotHerb > CutOff4)   SPGR Sparse grassland

if ((Fa+Fp)/TotHerb > 0.5) and
    (TotHerb > CutOff1) and
    (Woody > CutOff4)   CLFO Closed forbland, savanna component

 if ((Fa+Fp)/TotHerb > 0.5) and
    (TotHerb > CutOff2) and

(Woody > CutOff4)	DEFO Dense forbland, savanna component
if ((Fa+Fp)/TotHerb > 0.5) and	
(TotHerb > CutOff3) and	
(Woody > CutOff4)	OPFO Open forbland, savanna component
if ((Fa+Fp)/TotHerb > 0.5) and	
(TotHerb > CutOff4)and	
(Woody > CutOff4)	SPFO Sparse forbland, savanna component
if ((Fa+Fp)/TotHerb > 0.5) and	
(TotHerb > CutOff1)	CLFO Closed forbland
if ((Fa+Fp)/TotHerb > 0.5) and	
(TotHerb > CutOff2)	DEFO Dense forbland
if ((Fa+Fp)/TotHerb > 0.5) and	
(TotHerb > CutOff3)	OPFO Open forbland
if ((Fa+Fp)/TotHerb > 0.5) and	
(TotHerb > CutOff4)	SPFO Sparse forbland
if ((Tc+Tb) > CutOff5)	SPWO Sparse woodland
if ((Sc + Sb) > CutOff5)	SPSH Sparse shrubland
if ((Dc + Db) > CutOff5)	SPDS Sparse dwarfshrubland
if (TotHerb > CutOff5)	SPVE Sparse vegetative
else (All other data)	BA Barren

The PCC type can be determined after the PCC code is determined. If the PCC code has a classification of woodland, shrubland, or dwarfshrubland, use the following table. Examine the test condition for the first true condition.

Test Condition	PCC Type and Description
if ((100.0*(Tc / (Tc+Tb))) > WoodType)	C coniferous
if ((100.0*(Tb / (Tc+Tb))) > WoodType)	B broadleaf
else (All other data)	M mixed

Use the following table if the PCC code is a grassland or forbland classification. Examine the test condition for the first true condition.

Test Condition	PCC Type and Description
[(100.0*(Ga / (Ga+Gp))) > 50.0%]	A annual
[(100.0*(Ga / (Ga+Gp))) >= 50.0%]	P perennial

All other PCC codes have a null PCC type.

MCC methodology. Like PCC, the MCC method also uses the topmost hit at each transect location point (both methods use the same data). Where PCC used a hierarchical approach to classification (the method looked at groups in certain order to find the first acceptable group), the MCC method classifies the plot by the most common vegetative form. Both methods have the same categories and use the same data, but they can classify a plot differently. Usually both methods produce the same results. However, if a plot is near the boundary of a category, the methods may classify the plot differently.

The same variable names and percent cutoff values are used for MCC as for PCC. The calculation of MCC type uses the same methodology as the calculation of PCC type.

Test Condition	MCC Code and Description
if ((Ga+Gp+Fa+Fp+Sc+Sb+Tc+Tb)<CutOff4)	BA Barren
if ((Ga+Gp)>=(Fa+Fp)) and ((Ga+Gp)>=HS) and ((Ga+Gp)>=(Sc+Sb)) and)((Ga+Gp)>=(Tc+Tb)) and (TotHerb>CutOff1)	CLGR Closed grassland
if ((Ga+Gp)>=(Fa+Fp)) and ((Ga+Gp)>=HS) and ((Ga+Gp)>=(Sc+Sb)) and)((Ga+Gp)>=(Tc+Tb)) and (TotHerb<=CutOff1) and (TotHerb>CutOff2)	DEGR Dense grassland
if ((Ga+Gp)>=(Fa+Fp)) and ((Ga+Gp)>=HS) and ((Ga+Gp)>=(Sc+Sb)) and)((Ga+Gp)>=(Tc+Tb)) and (TotHerb<=CutOff2) and (TotHerb>CutOff3)	OPGR Open grassland
if ((Ga+Gp)>=(Fa+Fp)) and ((Ga+Gp)>=HS) and ((Ga+Gp)>=(Sc+Sb)) and)((Ga+Gp)>=(Tc+Tb)) and (TotHerb<=CutOff3)	SPGR Sparse grassland
if ((Fa+Fp)>=(Ga+Gp)) and ((Fa+Fp)>=HS) and ((Fa+Fp)>=(Sc+Sb)) and ((Fa+Fp)>=(Tc+Tb)) and (TotHerb>CutOff1)	CLFO Closed forbland
if ((Fa+Fp)>=(Ga+Gp)) and ((Fa+Fp)>=HS) and ((Fa+Fp)>=(Sc+Sb)) and ((Fa+Fp)>=(Tc+Tb)) and (TotHerb<=CutOff1) and (TotHerb>CutOff2)	DEFO Dense forbland
if ((Fa+Fp)>=(Ga+Gp)) and ((Fa+Fp)>=HS) and ((Fa+Fp)>=(Sc+Sb)) and ((Fa+Fp)>=(Tc+Tb)) and (TotHerb<=CutOff2) and (TotHerb>CutOff3)	OPFO Open forbland
if ((Fa+Fp)>=(Ga+Gp)) and ((Fa+Fp)>=HS) and ((Fa+Fp)>=(Sc+Sb)) and ((Fa+Fp)>=(Tc+Tb)) and (TotHerb<=CutOff3)	SPFO Sparse forbland
if (HS>=(Ga+Gp)) and (HS>=(Fa+Fp)) and	

(HS>=(Sc+Sb)) and (HS>=(Tc+Tb)) and	
(HS> CutOff1)	CLHS Closed half shrub
if (HS>=(Ga+Gp)) and (HS>=(Fa+Fp)) and	
(HS>=(Sc+Sb)) and (HS>=(Tc+Tb)) and	
(HS<=CutOff1) and (HS>CutOff2)	DEHS Dense half shrub
if (HS>=(Ga+Gp)) and (HS>=(Fa+Fp)) and	
(HS>=(Sc+Sb)) and (HS>=(Tc+Tb)) and	
(HS<=CutOff2) and (HS>CutOff3)	OPHS Open half shrub
if (HS>=(Ga+Gp)) and (HS>=(Fa+Fp)) and	
(HS>=(Sc+Sb)) and (HS>=(Tc+Tb)) and	
(HS<=CutOff3)	SPHS Sparse half shrub
if ((Sc+Sb)>=(Ga+Gp)) and ((Sc+Sb)>=(Fa+Fp)) and	
((Sc+Sb)>=HS)and ((Sc+Sb)>=(Tc+Tb)) and	
((Sc+Sb)>CutOff1)	CLSH Closed shrubland
if ((Sc+Sb)>=(Ga+Gp)) and ((Sc+Sb)>=(Fa+Fp)) and	
((Sc+Sb)>=HS)and ((Sc+Sb)>=(Tc+Tb)) and	
((Sc+Sb)<=CutOff1) and ((Sc+Sb)>CutOff2)	DESH Dense shrubland
if ((Sc+Sb)>=(Ga+Gp)) and ((Sc+Sb)>=(Fa+Fp)) and	
((Sc+Sb)>=HS)and ((Sc+Sb)>=(Tc+Tb)) and	
((Sc+Sb)<=CutOff2) and((Sc+Sb)>CutOff3)	OPSH Open shrubland
if ((Sc+Sb)>=(Ga+Gp)) and ((Sc+Sb)>=(Fa+Fp)) and	
((Sc+Sb)>=HS)and ((Sc+Sb)>=(Tc+Tb)) and	
((Sc+Sb)<=CutOff3)	SPSH Sparse shrubland
if ((Tc+Tb)>=(Ga+Gp)) and ((Tc+Tb)>=(Fa+Fp)) and	
((Tc+Tb)>=HS) and ((Tc+Tb)>=(Sc+Sb)) and	
((Tc+Tb)> CutOff1)	CLWO Closed woodland
if ((Tc+Tb)>=(Ga+Gp)) and ((Tc+Tb)>=(Fa+Fp)) and	
((Tc+Tb)>=HS) and ((Tc+Tb)>=(Sc+Sb)) and	
((Tc+Tb)<=CutOff1) and ((Tc+Tb)>CutOff2)	DEWO Dense woodland
if ((Tc+Tb)>=(Ga+Gp)) and ((Tc+Tb)>=(Fa+Fp)) and	
((Tc+Tb)>=HS) and ((Tc+Tb)>=(Sc+Sb)) and	
((Tc+Tb)<=CutOff2) and ((Tc+Tb)>CutOff3)	OPWO Open woodland
if ((Tc+Tb)>=(Ga+Gp)) and ((Tc+Tb)>=(Fa+Fp)) and	
((Tc+Tb)>=HS) and ((Tc+Tb)>=(Sc+Sb)) and	
((Tc+Tb)<=CutOff3)	SPWO Sparse woodland

Errors checked during processing. During program execution, the input data is examined for a variety of potential errors. Any data errors encountered are listed in the error output file. The error messages provide a short description of the problem. A more detailed description can be obtained from the online help program. Highlight the error code and select <Help For Selection> from the <Help> menu for online help.

The online help session will display the detailed error message and describe how the data error was handled. Generally data is ignored, an assumption about the data is made, or the program aborts the data summary when an error is encountered.

Errors should be corrected before the data summaries are used. Some error messages can affect the final results considerably. Not all data errors can be detected by the program. Most error messages include an SQL statement that will display a subset of the data that caused the error. To execute the SQL statement, place the cursor on the SQL line and select <SQL Selection> from the <Utilities> menu. The data causing the problem will be displayed in a spreadsheet window.

Only the base summary checks for data errors. Always run the base summary and correct errors before running the trend, group, and group trend summaries.

The following list includes each error code checked during the base summary. These errors will be displayed in the error output file if an error occurs. An SQL command will be provided along with the error message. When executed, this SQL command will display the subset of the data that caused the error. Examining the list of errors will indicate the range of data checks made during the summary.

Yr: YYYY Pl: PPPP WARNING PC001 No plots exist
Yr: YYYY Pl: PPPP WARNING PC002 Invalid plot type:TTTT
Yr: YYYY Pl: PPPP WARNING PC003 Duplicate Entries in Plotsurv
Yr: YYYY Pl: PPPP WARNING PC004 WARNING Missing VegLoc in AerCov
Yr: YYYY Pl: PPPP WARNING PC005 WARNING Missing VegHt in AerCov
Yr: YYYY Pl: PPPP WARNING PC006 WARNING Invalid VegLoc: LLLL in AerCov
Yr: YYYY Pl: PPPP WARNING PC007 WARNING Invalid VegHt: HHHH in AerCov
Yr: YYYY Pl: PPPP WARNING PC008 WARNING Invalid info in PlntList for VVVV
Yr: YYYY Pl: PPPP WARNING PC009 WARNING VVVV not in PlntList
Yr: YYYY Pl: PPPP WARNING PC010 WARNING Invalid PlotID

The following list gives SQL commands that can be used to correct data which caused the associated error message. Understand what changes the SQL command will make to the databases before executing the command. An error may have more than one cause. The following corrections are for the most prevalent cause of the error.

PC001   <Load HH Files>
PC002   UPDATE PLOTSURV SET INVTYPE='?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND @UPPER(INVTYPE) = 'TTTT';
PC003   SET CURSORNAME REMOVEDUP; PREPARE SELECT * FROM
         PLOTSURV WHERE @YEARNO(RECDATE)=YYYY AND
         PLOTID=PPPP; PERFORM; SET SCROLLROW 0; FETCH 1;

```
                CONNECT 2; DELETE FROM PLOTSURV WHERE CURRENT OF
                REMOVEDUP; DISCONNECT 2; SET SCROLL OFF;
PC004           UPDATE AERCOVER SET VEGLOC=? WHERE @YEARNO(RECDATE)
                =YYYY AND PLOTID=PPPP AND VEGLOC IS NULL AND VEGHT = ?;
PC005           UPDATE AERCOVER SET VEGHT=? WHERE @YEARNO(RECDATE)
                =YYYY AND PLOTID=PPPP AND VEGHT IS NULL AND VEGLOC = ?;
PC006           UPDATE AERCOVER SET VEGLOC=? WHERE @YEARNO(RECDATE)
                =YYYY AND PLOTID=PPPP AND VEGLOC = LLLL ;
PC007           UPDATE AERCOVER SET VEGHT=? WHERE @YEARNO(RECDATE)
                =YYYY AND PLOTID=PPPP AND VEGHT = HHHH;
PC008           UPDATE PLNTLIST SET FORM1='?' WHERE @YEARNO(RECDATE)
                =YYYY AND PLOTID=PPPP AND @UPPER(VEGID) = 'VVVV'; UPDATE
                PLNTLIST SET FORM2 = '?' WHERE @YEARNO(RECDATE)
                =YYYY AND PLOTID=PPPP AND @UPPER(VEGID) = 'VVVV';
                UPDATE PLNTLIST SET TSTYPE = '?' WHERE @YEARNO(RECDATE)
                =YYYY AND PLOTID=PPPP AND @UPPER(VEGID) = 'VVVV';
                UPDATE PLNTLIST SET LIFE = '?' WHERE YEARNO(RECDATE)
                =YYYY AND PLOTID=PPPP AND @UPPER(VEGID) = 'VVVV';
PC009           UPDATE AERCOVER SET VEGID = '?' WHERE @YEARNO(RECDATE)
                =YYYY AND PLOTID=PPPP AND @UPPER(VEGID) = 'VVVV';
PC010           UPDATE AERCOVER SET PLOTID = ? WHERE @YEARNO(RECDATE)
                =YYYY AND PLOTID=PPPP;
```

Supplemental information. The following online and hard copy documentation is available for additional information related to plant community classification data summaries.

> Online help sources:
> > LCTA Help
> > Field Manual Help

> Hard copy sources:
> > Sprouse, W.L., and A.B. Anderson, *Land Condition Trend Analysis (LCTA) Program Data Dictionary,* ADP Report 95/03/ADA295608 (USACERL, April 1995).
> > Tazik, D.J., S.D. Warren, V.E. Diersing, R.B. Shaw, R.J. Brozka, C.F. Bagley, and W.R. Whitworth, *U.S. Army Land Condition-Trend Analysis (LCTA) Plot Inventory Field Methods,* Technical Report N-92/03/ADA247931 (USACERL, February 1992).
> > United Nations Education, Scientific, and Cultural Organization (UNESCO), *International Classification and Mapping of Vegetation, series 6, Ecology and Conservation* (UNESCO, Paris, France, 1973).

Driscoll, R.S., D.L. Merkel, D.L. Radloff, D.E. Snyder, and J.S. Hagihara, *An Ecological Land Classification Framework for the United States*, Miscellaneous Publication No. 1439, (U.S. Department of Agriculture [USDA], Forest Service, Washington, D.C., 1984).

Francis, R.E., *Phydo-edaphic Communities of the Upper Rio Puerco Watershed, New Mexico* (Rocky Mountain Forest and Range Experiment Station Research Paper RM-272, (USDA Forest Service, Ft. Collins, CO, 1986).

Erosion

Erosion

Military training exercises are generally scheduled without consideration of annual variations in climatic conditions and soil properties. Thus, mechanized maneuvers can cause needless damage to soil and vegetation, which reduces the amount of additional training the land can sustain.

Note. Before running any USLE calculations, data must exist in the table SOILMAST. This table contains soil series, soil name, K value, and T value. In addition, each plot must be assigned a soil series name in the table PLOTMAST. R values also must be added to the PLOTMAST table. This information is not recorded in the field. The data can be obtained from USDA soil survey manuals.

Uses. Erosion loss estimates can be used to determine which areas may require restoration and erosion-control measures. Estimates can be used to monitor changes in erosion status over time. Erosion estimates can be used to identify which areas are more susceptible to erosion.

Access. To run an erosion summary, select the <Analysis> menu option, the <Erosion Estimates> submenu, then the <USLE Estimates> selection (Figure 32). Entering <Alt-A,U,E> from the computer keyboard also will start the summary. Then select base, trend, group, or group trend summary. The base summary will summarize all erosion estimates by plot. Trend, group, and group trends require an erosion activity selection.
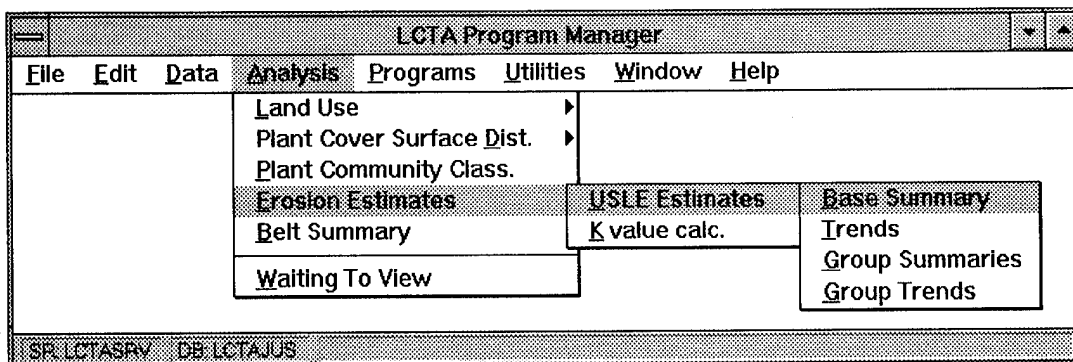
Figure 32. Erosion summary menu selections.

Database inputs and outputs. The database diagram in Figure 33 lists all database tables used for each erosion data summary. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.

Table 4 lists all database tables and columns used for each erosion data summary.

Grey boxes = input tables; black boxes = output tables; white boxes = not used

Figure 33. LCTA reduced entity relationship diagram and erosion input tables.

Table 4. Erosion summary database tables and columns table.

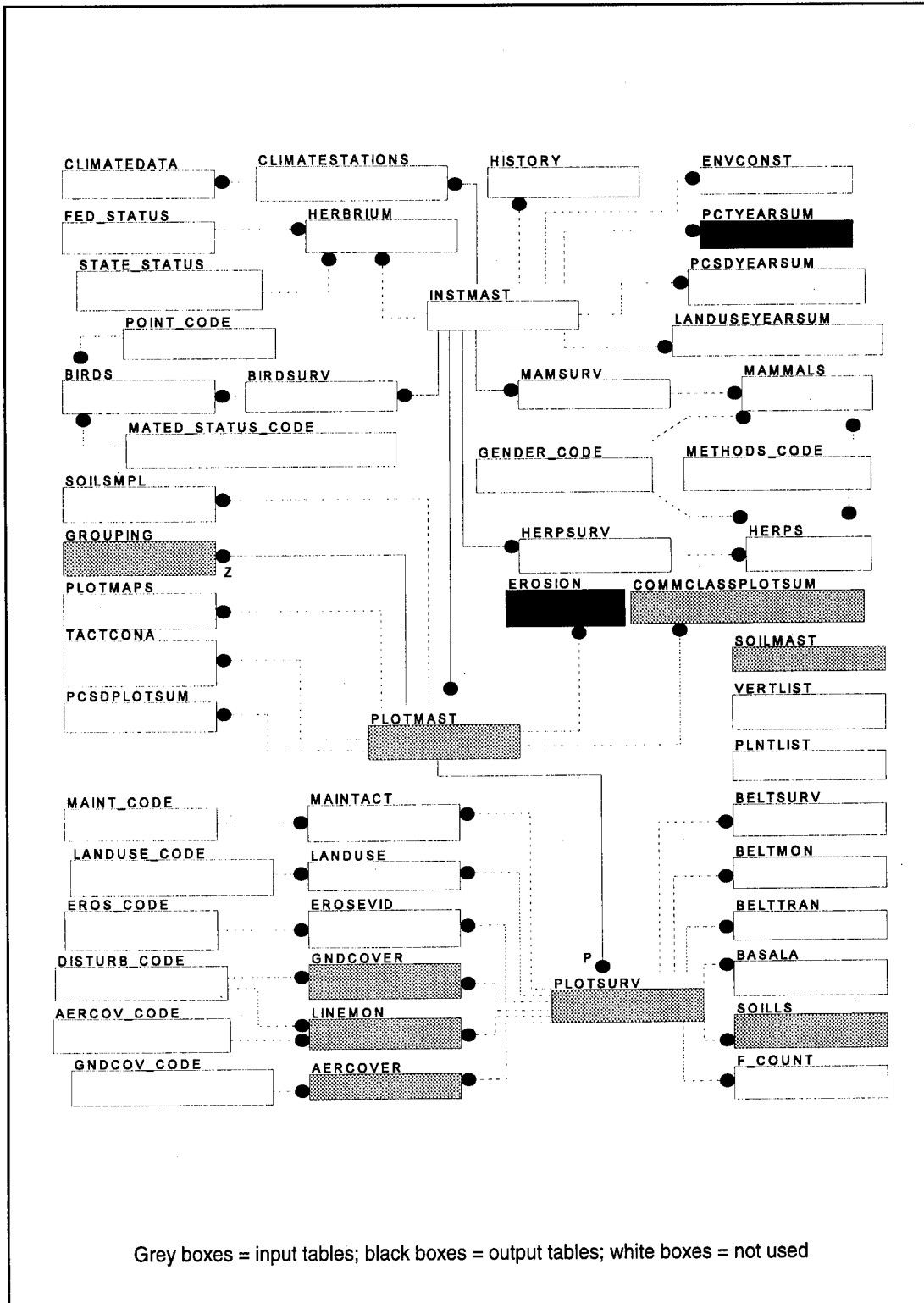| Table Name	Column Name	Column Use	Base	Trend	Group	Group Trend	Contents
PlotSurv	PlotID	C	I	I	I	I	plot number
	RecDate	C	I	I	I	I	measurement date
	InvType	I	I	I	I	I	inventory type
	PlotType	I	I	I	I	I	plot measurement type
	Train	I	N	N	I	I	training area
	VegType	I	N	N	I	I	vegetation type
GndCover	PlotID	C	I	N	N	N	plot number
	RecDate	C	I	N	N	N	measurement date
	VegID	D	I	N	N	N	vegetation code
PlotMast	PlotID	C	I	N	N	N	plot number
	SoilSer	C	I	N	N	N	soil series name
	RVal	D	I	N	N	N	erosion R value
SoilMast	SoilSer	C	I	N	N	N	soil series name
	PublK	D	I	N	N	N	published K value
	CalcKMean	D	I	N	N	N	calculated K value
	T	D	I	N	N	N	soil tolerance value
SoilLS	PlotID	C	I	N	N	N	plot number
	RecDate	C	I	N	N	N	measurement
	TranLoc	I	I	N	N	N	transect location
	Slope	D	I	N	N	N	percent slope
	SlpLen	D	I	N	N	N	slope length
AerCover	PlotID	C	I	N	N	N	plot number
	RecDate	C	I	N	N	N	measurement date
	VegLoc	I	I	N	N	N	vegetation location
	VegHt	I,D	I	N	N	N	vegetation height
	VegID	D	I	N	N	N	vegetation code
LineMon	PlotID	C	I	N	N	N	plot number
	RecDate	C	I	N	N	N	measurement date
	GndCov	D	I	N	N	N	ground cover
	AerCov	D	I	N	N	N	aerial cover
Erosion	AnalYear	C,I	O	I	I	I	analysis year
	PlotID	C,I	O	I	I	I	plot number
	USLEMKPub	D	O	N	N	N	ave. erosion, with K pub

Table Name	Column Name	Column Use	Base	Trend	Group	Group Trend	Contents
	USLE0KPub	D	O	N	N	N	erosion at 0m location
	USLE1KPub	D	O	N	N	N	erosion at 50m location
	USLE2KPub	D	O	N	N	N	erosion at 100m location
	USLEMKCal	D	O	N	N	N	ave. erosion, with K calc
	USLE0KCal	D	O	N	N	N	erosion at 0m location
	USLE1KCal	D	O	N	N	N	erosion at 50m location
	USLE2KCal	D	O	N	N	N	erosion at 100m location
	LSM	D	O	N	N	N	ave. LS value
	LS0	D	O	N	N	N	LS value at 0m point
	LS1	D	O	N	N	N	LS value at 50m point
	LS2	D	O	N	N	N	LS value at 100m point
	PctTKPub	D	O	I	N	N	% of T, K published
	PctTKCal	D	O	I	N	N	% of T, K calculated
	KPubErosIndex	D	O	N	N	N	erosion index, K pub.
	KCalErosIndex	D	O	N	N	N	erosion index, K calc.
	KPub	D	O	N	N	N	published K value
	KCal	D	O	N	N	N	calculated K value
	RVal	D	O	N	N	N	R value
	C	D	O	N	N	N	C value
	C1	D	O	N	N	N	C1 subfactor
	C2	D	O	N	N	N	C1 subfactor
	T	D	O	N	N	N	T value
	PGndCov	D	O	N	N	N	% ground cover
	PAerCov	D	O	N	N	N	% aerial cover
	AveMinHt	D	O	N	N	N	ave. min. drip height
	EffCover	D	O	N	N	N	effective cover
	HabDivis	D	O	N	N	N	habitat diversity

Column Use:

    C   Connector   Column values used to properly join information from multiple tables
    D   Data   Column values used as data in summary
    I   Identifier   Column values used to identify data elements

Base, Trend, Group, Group Trend:

    N   Column not used in summary
    I   Input column for summary
    O   Output column for summary

File outputs and sample output windows. The following lists describe each output file created by a data summary. An example output window (Figures 34, 35, 36, and 37) for each data summary also is provided.

Base Summary Output Files

SE####.txt	Tabular data summaries
SE####.err	Error message file
SE####-1.wmf or SE####-1.bmp	% T distribution graph

where #### is the analysis year selected.
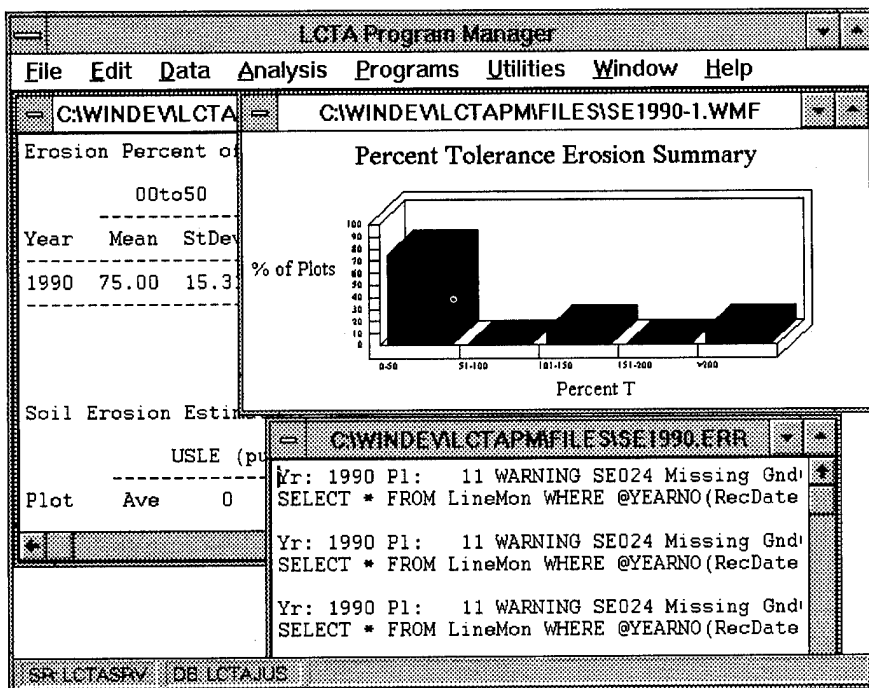
Figure 34. Erosion base summary output windows.

Trend Summary Output Files

SETrend.pss	Percent T trend tabular data
SETrend.hgw	Percent T trend hot spot graph

Figure 35. Erosion trend summary output windows.

Group Summary Output Files

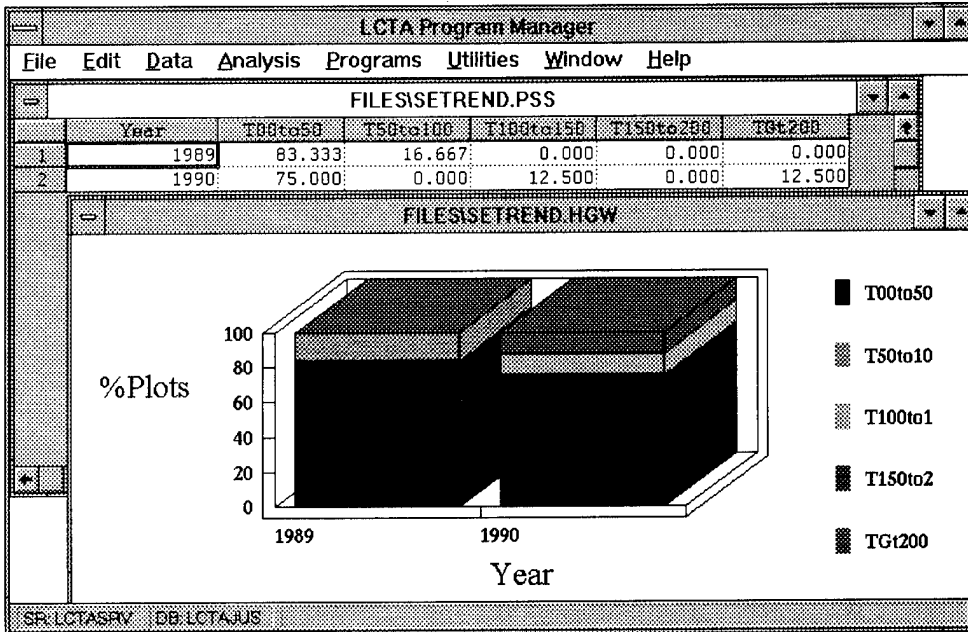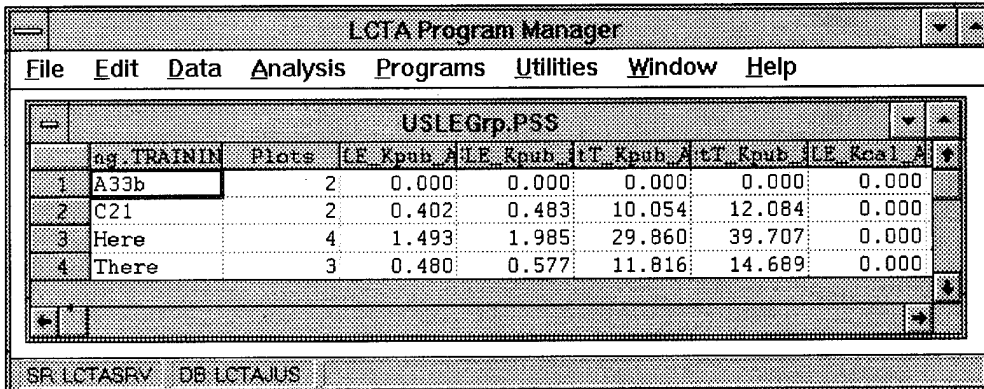USLEGrp.pss   Erosion group tabular data

Figure 36. Erosion group summary output windows.

Group Trend Summary Output Files

USLEGrp.pss   Erosion group trend tabular data

Figure 37. Erosion group trend summary output windows.

Methods. Erosion is estimated with the Universal Soil Loss Equation (USLE)
(Wischmeier and Smith 1978) and is as follows:

$$A = R \times K \times LS \times C \times P$$

where A = Estimated annual soil loss (tons/acre/year)
          R = Rainfall erosivity, climatic factor
          K = Inherent soil erodibility factor
          LS = Topographic factor
          C = Vegetative cover factor
          P = Conservation practice factor.

Factors R and K are derived from published data, and factors LS and C are calculated
from data collected on LCTA transects. Increases in the actual values for any factor
result in increased soil loss estimates. Estimates of annual soil loss are calculated for
each LCTA transect using the data collected at that transect. LS and R values are
constants for the installation. P factor is usually omitted (assumed to be an average
value) for rangelands. Only K and C factors are significantly affected by land use
activity.

The rainfall and runoff factor (R) reflects precipitation patterns of a region. R value
incorporates total precipitation, intensity, and duration patterns of rainfall. High
intensity rainfall has more erosive force than lower intensity. Intensity affects
raindrop size, velocity, impact energy, and particulate detachment and runoff.
Duration affects transport capacity of detached soil particles. R values are derived
from isoerodent maps or climatic data. R values can be found in USDA soil surveys.

The natural erodibility of a soil (K) is largely determined by its texture. Soils with
high silt content are the most erodible. The K factor can be calculated for a soil from
texture, organic matter, permeability, and structure, or obtained from most USDA soil

surveys. Published K values should be used when available. If published values are unavailable, K values calculated from plot soil data can be used.

The LS factor is calculated from measured slope and slope lengths in the field. Increasing slope and slope length result in greater soil loss from increased overland flow of water. LS factor is a ratio of soil loss per unit area for a field measured slope to that of a standard 72.6 ft of uniform 9% slope under otherwise identical conditions. Slopes and slope lengths are measured on each LCTA transect.

The cover factor (C) describes the density and structure of the plant canopy cover and soil cover. The cover factor is calculated from two subfactors: ground cover (C1) and canopy cover (C2). Values for the two subfactors are derived from LCTA line transect data, and a C value is assigned to the transect. The calculation of a C factor involves the calculation of a minimum drip height. An increase in the cover factor actually represents a decrease in ground and/or canopy cover. The C factor is a ration of soil loss from land under specified or observed conditions to the corresponding soil loss from a clean-tilled continuous fallow land under otherwise identical conditions.

Conservation practices (P) usually applied with the USLE include conservation tillage, contour tilling, and other practices associated with cultivated fields. For LCTA USLE calculations, P is assumed to be 1.

During initial inventory and long-term monitoring measurement years, all data required to calculate erosion loss is available from the current year's data. During short-term monitoring years, not all the required data is available from the collected data. For short-term monitoring years, the required missing information is obtained from the most recent previous year the information is available.

To help interpret soil loss estimates, soil loss tolerance (T) for each soil type is provided. T denotes the maximum level of soil erosion that will permit a high level of soil productivity to be sustained economically and indefinitely. T values range from 1 to 5 tons per acre per year. T values are based on soil depth, rooting depth, seeding losses, soil organic matter reduction, and plant nutrient losses.

Erosion status (ES) is an easy way to assess plot erosion status. Erosion status expresses estimated soil loss as a percentage of tolerance (T). Percent of soil loss tolerance relates estimated losses to tolerable losses. Values less than a 100% are acceptable, but values greater than 100% are cause for concern.

Erosion index (EI) describes the erodibility of a soil. Erosion status is useful for making land management decisions. Erosion status uses a subset of the USLE factors.

Values between 1 and 8 represent stable soils. Values between 8 and 16 represent moderately erodible soils. Values greater than 16 represent highly erodible soils.

$$EI = (R*K*LS)/T$$

Plot erosion estimates are calculated for all plots. However, only core plots are used when installation erosion summaries are calculated.

Errors checked during processing. During program execution, the input data is examined for a variety of potential errors. Any data errors encountered are listed in the error output file. The error messages provide a short description of the problem. A more detailed description can be obtained from the online help program by highlighting the error code and selecting <Help For Selection> from the <Help> menu. The online help session will display the detailed error message and describe how the data error was handled. Generally data is ignored, an assumption about the data is made, or the program aborts the data summary when a data error is encountered.

Errors should be corrected before the data summaries are used. Some error messages can affect the final results considerably. Not all data errors can be detected by the program. Most error messages include an SQL statement that will display a subset of the data which caused the error. To execute the SQL statement, place the cursor on the SQL line and select <SQL Selection> from the <Utilities> menu. The data causing the problem will be displayed in a spreadsheet window.

Only the base summary checks for data errors. Always run the base summary and correct errors before running the trend, group, and group trend summaries.

The following list includes each error code checked during the base summary. These errors will be displayed in the error output file if an error occurs. An SQL command will be provided along with the error message. When executed, this SQL command will display the subset of the data that caused the error. Examining the list of errors will indicate the range of data checks made during the summary.

Yr: YYYY Pl: PPPP WARNING SE001 Duplicate Entries in Plotsurv
Yr: YYYY Pl: PPPP WARNING SE002 Invalid plot type:TTTT
Yr: YYYY Pl: PPPP WARNING SE003 No plots exist
Yr: YYYY Pl: PPPP WARNING SE004 Missing Slope in SoilLS
Yr: YYYY Pl: PPPP WARNING SE005 Missing Slope Length in SoilLS
Yr: YYYY Pl: PPPP WARNING SE006 Invalid TranLoc in SoilLS
Yr: YYYY Pl: PPPP WARNING SE007 Invalid Plotid
Yr: YYYY Pl: PPPP WARNING SE008 Missing RVal in PlotMast

Yr: YYYY Pl: PPPP WARNING SE009 Invalid PlotID in GndCover
Yr: YYYY Pl: PPPP WARNING SE010 Invalid PlotID in LineMon
Yr: YYYY Pl: PPPP WARNING SE011 Missing VegLoc in AerCover
Yr: YYYY Pl: PPPP WARNING SE012 Missing VegHt in AerCover
Yr: YYYY Pl: PPPP WARNING SE013 Invalid VegLoc : LLLL in AerCover
Yr: YYYY Pl: PPPP WARNING SE014 Invalid VegHt: HHHH in AerCover
Yr: YYYY Pl: PPPP WARNING SE015 Invalid PlotID in AerCover
Yr: YYYY Pl: PPPP WARNING SE016 Missing GndCover Data
Yr: YYYY Pl: PPPP WARNING SE017 Missing LS Values
Yr: YYYY Pl: PPPP WARNING SE018 No obs. in Erosion table
Yr: YYYY Pl: PPPP WARNING SE020 Invalid Inventory Type:TTTT
Yr: YYYY Pl: PPPP WARNING SE019 Not all PlotSurv plots where used
Yr: YYYY Pl: PPPP WARNING SE021 Missing SoilSer in PlotMast
Yr: YYYY Pl: PPPP WARNING SE022 Missing TranLoc in SoilLS
Yr: YYYY Pl: PPPP WARNING SE023 Missing VegID in GndCover
Yr: YYYY Pl: PPPP WARNING SE024 Missing GndCov in LineMon
Yr: YYYY Pl: PPPP WARNING SE025 Missing AerCov in LineMon

The following list gives SQL commands that can be used to correct data which caused
the associated error message. Understand what changes the SQL command will make
to the databases before executing the command. An error may have more than one
cause. The following corrections are for the most prevalent cause of the error.

SE001   SET CURSORNAME REMOVEDUP; PREPARE SELECT * FROM
         PLOTSURV WHERE @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP;
         PERFORM; SET SCROLLROW 0; FETCH 1; CONNECT 2; DELETE FROM
         PLOTSURV WHERE CURRENT OF REMOVEDUP; DISCONNECT 2; SET
         SCROLL OFF;
SE002   UPDATE PLOTSURV SET INVTYPE = '?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND @UPPER(INVTYPE) = 'TTTT';
SE003   <Load HH Files>
SE004   UPDATE SOILLS SET SLOPE =? WHERE @YEARNO(RECDATE)=YYYY
         AND PLOTID=PPPP AND TRANLOC = LLLL;
SE005   UPDATE SOILLS SET SLPLEN=? WHERE @YEARNO(RECDATE)=YYYY
         AND PLOTID=PPPPAND TRANLOC = LLLL;
SE006   UPDATE SOILLS SET TRANLOC=? WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP AND TRANLOC = ?;
SE007   UPDATE SOILLS SET PLOTID=? WHERE @YEARNO(RECDATE)=YYYY
         AND PLOTID=PPPP;
SE008   UPDATE PLOTMAST SET RVAL = ? WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP;
SE009   UPDATE GNDCOVER SET PLOTID = ? WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID=PPPP;

SE010   UPDATE LINEMON SET PLOTID = ? WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP;

SE011   UPDATE AERCOVER SET VEGLOC = ? WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND VEGHT=? AND VEGLOC IS NULL AND
        @UPPER(VEGID)='?';

SE012   UPDATE AERCOVER SET VEGHT = ? WHERE @YEARNO(RECDATE)
        =YYYY AND   PLOTID=PPPP AND VEGHT IS NULL AND VEGLOC=?
        AND @UPPER(VEGID)='?';

SE013   UPDATE AERCOVER SET VEGLOC = ? WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND VEGLOC = LLLL;

SE014   UPDATE AERCOVER SET VEGHT = ? WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND VEGHT = HHHH;

SE015   UPDATE AERCOVER SET PLOTID = ? WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP;

SE016   ** CORRECT OTHER ERRORS FIRST. THIS IS GENERALLY A **
        ** SECOND MESSAGE. IF NOT A SECOND MESSAGE THEN **
        ** DATA IS MISSING **
        INSERT INTO GNDCOVER (INSTALID,PLOTID,RECDATE,
        VEGLOC,DISTURB,VEGID,VEGCOND) VALUES ('III',#,DD-MMM-YYYY,
        #,'DD', 'VVVVVVVV','C');

SE017   ** CORRECT OTHER ERRORS FIRST. THIS IS GENERALLY A **
        ** SECOND MESSAGE. IF NOT A SECOND MESSAGE THEN **
        ** DATA IS MISSING **
        INSERT INTO SOILLS (INSTALID, PLOTID, RECDATE, TRANLOC,
        SLOPE, SLPLEN) VALUES ('III',#,DD-MMM-YYYY,#,#,#');

SE018   **RERUN DATA SUMMARY WITH RECALCULATE DATA CHECKED**

SE020   UPDATE PLOTSURV SET INVTYPE='?' WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND @UPPER(INVTYPE) = 'TTTT';

SE019   ** LOAD HANDHELD FILES INTO DATABASE **

SE021   UPDATE PLOTMAST SET SOILSER= '?' WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP;

SE022   UPDATE SOILLS SET TRANLOC = ? WHERE @YEARNO(RECDATE)=
        YYYY AND PLOTID = PPPP AND TRANLOC IS NULL;

SE023   UPDATE GNDCOVER SET VEGID = '?' WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND VEGID IS NULL AND VEGLOC = ?;

SE024   UPDATE LINEMON SET GNDCOV = '?' WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND GNDCOV IS NULL AND VEGLOC = ?;

SE025   UPDATE LINEMON SET AERCOV = '?' WHERE @YEARNO(RECDATE)
        =YYYY AND PLOTID=PPPP AND AERCOV IS NULL AND VEGLOC = ?;

Supplemental information. The following online and hard copy documents provide
additional information related to soil erosion data summaries.

Online help sources:
LCTA Help
Field Manual Help.

Hard copy sources:

Sprouse, W.L., and A.B. Anderson, *Land Condition Trend Analysis (LCTA) Program Data Dictionary,* ADP Report 95/03/ADA295608 (USACERL, April 1995).

Tazik, D.J., S.D. Warren, V.E. Diersing, R.B. Shaw, R.J. Brozka, C.F. Bagley, and W.R. Whitworth, *U.S. Army Land Condition-Trend Analysis (LCTA) Plot Inventory Field Methods,* Technical Report N-92/03/ADA247931 (USACERL, February 1992).

Wischmeier, W.H., and D.D. Smith, *Predicting Rainfall Erosion Losses: A Guide to Conservation Planning,* Agriculture Handbook No. 537 (Science and Education Administration, U.S. Department of Agriculture, Washington, D.C., 1978).

K Value

Erodibility Index

Inherent soil erodibility factor (K) values are required for erosion loss estimates. This program will calculate K values from soil samples.

Uses. The natural erodibility of a soil (K) is largely determined by its texture. Soils with high silt content are the most erodible. The K factor can be calculated for a soil from texture, organic matter, permeability, and structure; or it can be obtained from most USDA soil surveys. Generally the published K values should be used when available. However, some installations do not have access to published K values.

Access. To calculate K values, select the <Analysis> menu option, the <Erosion Estimates> submenu, then the <K value calc.> option (Figure 38). Entering <Alt-A,E,K> from the computer keyboard also will start the summary.
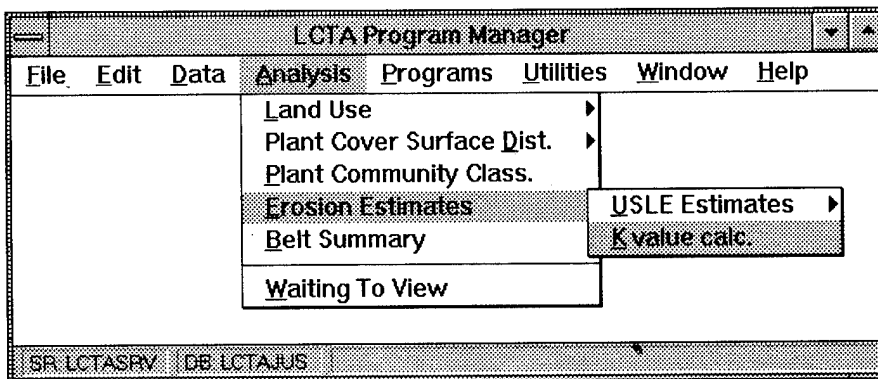
Figure 38. Soil erodibility index menu selection.

Database inputs and outputs. The database diagram in Figure 39 lists all database tables used for the soil erodibility data summary. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.
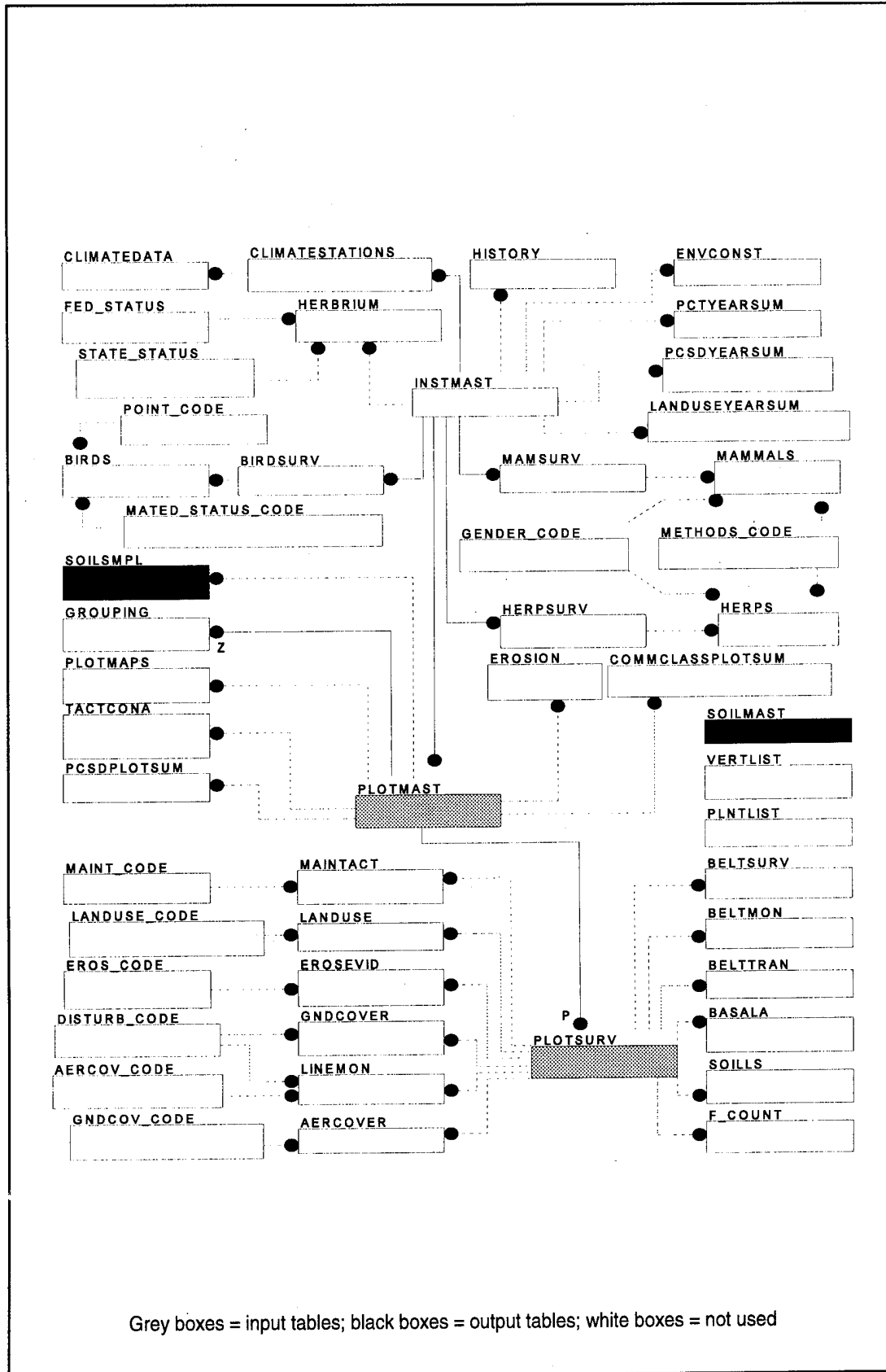
CLIMATEDATA   CLIMATESTATIONS   HISTORY   ENVCONST

FED_STATUS   HERBRIUM   PCTYEARSUM

   STATE_STATUS   PCSDYEARSUM

      POINT_CODE   INSTMAST   LANDUSEYEARSUM

BIRDS   BIRDSURV   MAMSURV   MAMMALS

   MATED_STATUS_CODE   GENDER_CODE   METHODS_CODE

SOILSMPL

GROUPING   HERPSURV   HERPS
                    Z

PLOTMAPS   EROSION   COMMCLASSPLOTSUM

TACTCONA   SOILMAST

PCSDPLOTSUM   VERTLIST
                         PLOTMAST
                                                            PLNTLIST

MAINT_CODE   MAINTACT   BELTSURV

   LANDUSE_CODE   LANDUSE   BELTMON

EROS_CODE   EROSEVID   BELTTRAN

DISTURB_CODE   GNDCOVER   BASALA
                                              P
AERCOV_CODE   LINEMON   PLOTSURV   SOILS

   GNDCOV_CODE   AERCOVER   F_COUNT

Grey boxes = input tables; black boxes = output tables; white boxes = not used

Figure 39. LCTA reduced entity relationship diagram and erodibility index input tables.

Table 5 lists all database tables and columns used for the soil erodibility data summaries.

Table 5. Soil erodibility index summary database tables and columns table.

Table Name	Column Name	Column Use	Base	Contents
PlotSurv	PlotID	C	I	plot number
	RecDate	C	I	measurement date
	PlotType	I	I	plot use type
Soil Sample	PlotID	C	I	plot number
	TotClay	D	I	total % clay
	TotSilt	D	I	total % silt
	vfSand	D	I	% very fine sand
	OrgMatt	D	I	% organic matter
	Struct_Code	D	I	soil structural code
	Perm_Class	D	I	soil permeability class
	LabK	D	O	laboratory K value
SoilMast	SoilSer	C	I	soil series code
	CalcKMean	D	O	mean calculated K value
	CalcKStdev	D	O	standard deviation of calculated K
PlotMast	PlotID	C	I	plot number
	SoilSer	I	I	soil series code

Column Use:

    C   Connector   Column values used to properly join information
                            from multiple tables
    D   Data   Column values used as data in summary
    I   Identifier   Column values used to identify data elements

Base:

    N   Column not used in summary
    I   Input column for summary
    O   Output column for summary

File outputs and sample output windows. The following list describes each output file created by a data summary. An example output window (Figure 40) for each data summary also is provided.

Base Summary Output Files

    KVal.txt   Tabular K value data summaries
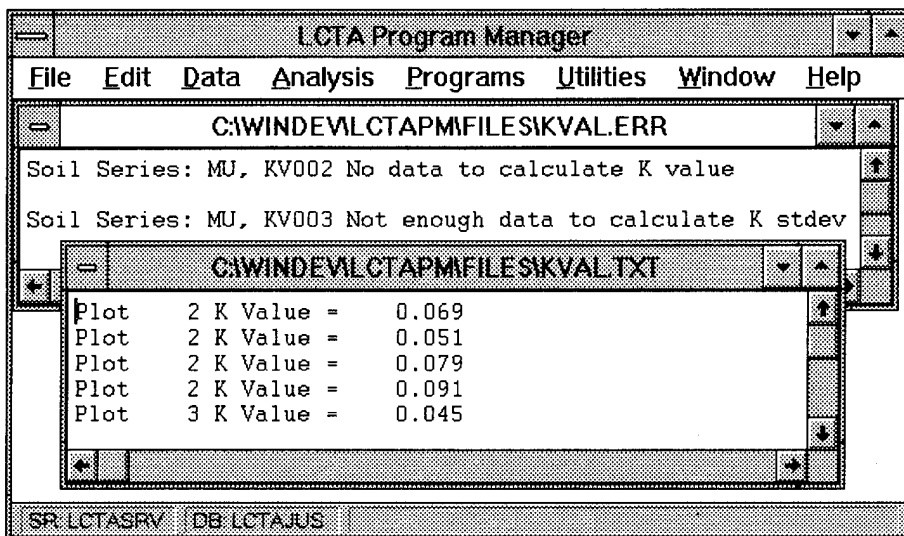   KVal.err   Error message file

Figure 40. Soil erodibility index output windows.

Methods. The K value is the inherent soil erodibility factor used in the USLE calculations. This value is usually obtained from the literature. However, if the installation cannot obtain these values from the literature, an estimate of the K value can be obtained from the soil samples collected from the sample plots.

The program will use all soil sample plot data when calculating a K value for each soil sample. A K value for each soil sample is stored in the SoilSmpl table of the database. An average K value for a soil series is stored in the SoilMast table of the database. Only core plot soil sample data is used to calculate an average soil series K value.

The K value is calculated according to the following equation. Usually permeability class and structure code are not known for a soil sample and are assumed to contain an average value (s=2, p=3). Permeability and structure code values can be used when available. If permeability and structure code values are not supplied in the SoilSmpl database table, default values are used. Vary permeability and structure codes to evaluate the impact of these variables on the erosion estimates.

if o>4 $100K = 2.1((si+vfs)(100-c))^{1.4}(12-o)+3.25(s-2)+2.5(p-3)$

if o<=4 $100K = 2.1((si+vfs)(100-c))^{1.4}(8)+3.25(s-2)+2.5(p-3)$

        where   K = the soil K value

                     si = the percent silt

vfs = the percent very fine sand

c = the percent clay

s = the soil structure code

p = the permeability code

o = the percent organic matter.

Errors checked during processing. During program execution, the input data is examined for a variety of potential errors. Any data errors encountered are listed in the error output file. The error messages provide a short description of the problem.. A more detailed description can be obtained from the online help program. Highlight the error code and select <Help For Selection> from the <Help> menu for online help. The online help session will display the detailed error message and describe how the data error was handled. Generally data is ignored, an assumption about the data is made, or the program aborts the data summary.

Errors should be corrected before the data summaries are used. Some error messages can affect the final results considerably. Not all data errors can be detected by the program. Most error messages include an SQL statement that will display a subset of the data which caused the error. To execute the SQL statement, place the cursor on the SQL line and select <SQL Selection> from the <Utilities> menu. The data causing the problem will be displayed in a spreadsheet window.

The following list includes each error code checked during the base summary. These errors will be displayed in the error output file if an error occurs. Along with the error message, an SQL command will be provided. When executed, this SQL command will display the subset of the data that caused the error. Examining the list of errors will indicate the range of data checks made during the summary.

Plot: PPPP KV001 Invalid data for Trans Loc: LLLL in SoilSmpl.

Soil Series: SSSS, KV002 No data to calculate K value.

Soil Series: SSSS, KV003 Not enough data to calculate K stdev.

The following list gives SQL commands that can be used to correct data which caused the associated error message. Understand what changes the SQL command will make to the databases before executing the command. An error may have more than one cause. The following corrections are for the most prevalent cause of the error.

KV001   UPDATE SOILSMPL SET TRANLOC = ? WHERE PLOTID=PPPP AND
        TRANLOC=LLLL;

KV002   ** Obtain soils data from soil laboratory **

KV003   ** No correction to make if data not missing **

Supplemental information. The following online and hard copy documentation contains relevant soil K value data summary information.

Online help sources:
LCTA Help
Field Manual Help

Hard copy sources:
Sprouse, W.L., and A.B. Anderson, *Land Condition Trend Analysis (LCTA) Program Data Dictionary,* ADP Report 95/03/ADA295608 (USACERL, April 1995).
Tazik, D.J., S.D. Warren, V.E. Diersing, R.B. Shaw, R.J. Brozka, C.F. Bagley, and W.R. Whitworth, *U.S. Army Land Condition-Trend Analysis (LCTA) Plot Inventory Field Methods,* Technical Report N-92/03/ADA247931 (USACERL, February 1992).
Wischmeier, W.H., and D.D. Smith, *Predicting Rainfall Erosion Losses: A Guide to Conservation Planning,* Agriculture Handbook No. 537 (Science and Education Administration, U.S. Department of Agriculture, Washington, D.C., 1978).

Belt
Summary

Belt Summaries

This program summarizes information collected from the belt transect measurement plots.

Uses. The information from these summaries can be used to document species composition, frequency, condition, and size distribution. Belt summaries can be used for tactical concealment. The occurrence and frequency of indicator species can be monitored over time.

Access. To run a belt summary, select the <Analysis> menu selection and the <Belt Summary.> submenu (Figure 41). Entering <Alt-A,B> from the computer keyboard also will start the summary.
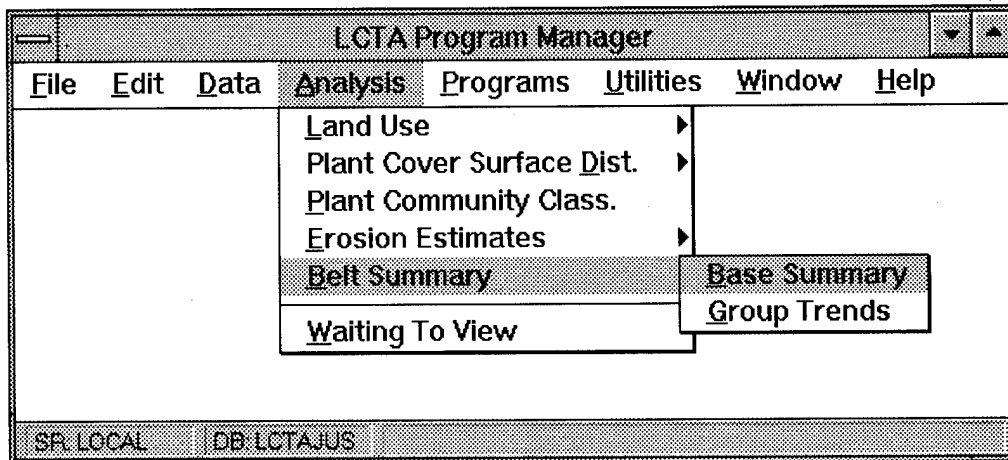
Figure 41. Belt transect summary menu selection.

The group trends submenu selection uses a modified groupings dialog box (Figure 42).
Select the appropriate plot grouping and year options.

Data can be summarized for all plant species or for select species. To summarize data
for all species found on the belt, check the "Use All Species" option. To use only a few
select species, leave the "Use All Species" option unchecked and select the appropriate
species from the species list.

Data can be summarized as individual species or as one combined value. Check the
"Combine Species" option for one combined value. Leave the "Combine Species" option
unchecked for individual species values. Individual species listed or species used in
the combined value are only those species selected from the species list and "Use All
Species" option.

Data can be summarized with or without zero observation. Check the "Drop Zero
Values" option to include only plots in which the species were observed. Leave the
"drop zero values" option unchecked to include plots where the species was not
observed.

Figure 42. Belt transect group trends options dialog box.

Database inputs and outputs. The database diagram in Figure 43 lists all database tables used for each belt data summary. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.

CLIMATEDATA   CLIMATESTATIONS   HISTORY   ENVCONST

FED_STATUS   HERBRIUM   PCTYEARSUM

STATE_STATUS   PCSDYEARSUM

                                              INSTMAST   LANDUSEYEARSUM
POINT_CODE

BIRDS   BIRDSURV   MAMSURV   MAMMALS

          MATED_STATUS_CODE

SOILSMPL   GENDER_CODE   METHODS_CODE

GROUPING   HERPSURV   HERPS
          Z

PLOTMAPS   EROSION   COMMCLASSPLOTSUM

TACTCONA   SOILMAST

                                                      VERTLIST
PCSDPLOTSUM
                                                      PLNTLIST
                         PLOTMAST
                                                      BELTSURV

MAINT_CODE   MAINTACT   BELTMON

LANDUSE_CODE   LANDUSE   BELTTRAN

EROS_CODE   EROSEVID   BASALA

DISTURB_CODE   GNDCOVER   P
                                  PLOTSURV   SOILS
AERCOV_CODE   LINEMON

GNDCOV_CODE   AERCOVER   F_COUNT

Grey boxes = input tables; black box = output table; white boxes = not used

Figure 43. LCTA reduced entity relationship diagram and belt summary input tables.

Table 6 lists all database tables and columns used for each belt data summary.

Table 6. Belt transect summary database tables and columns table.

Table Name	Column Name	Column Use	Base	Group Trend	Contents
PlotSurv	PlotID	C	I	I	plot number
	RecDate	C	I	I	measurement date
	InvType	I	I	I	inventory type
	PlotType	I	I	I	plot measurement type
	Train	I	N	I	training area
	VegType	I	N	I	vegetation type
BeltTran	PlotID	C	I	N	plot number
	RecDate	C	I	N	measurement date
	VegID	D	I	N	vegetation code
	PlantHt	D	I	N	plant height
	VegCond	D	I	N	vegetation condition
BeltMon	PlotID	C	I	N	plot number
	RecDate	C	I	N	measurement date
	VegID	D	I	N	vegetation code
	VegCond	D	I	N	vegetation condition
	CatMinTo1	D	I	N	# shorter than 1 m
	Cat1To2	D	I	N	# between 1 and 2 m
	Cat2To3	D	I	N	# between 2 and 3 m
	Cat3To4	D	I	N	# between 3 and 4 m
	CatGt4	D	I	N	# taller than 4 m
BeltSurv	PlotID	C	I	N	plot number
	RecDate	C	I	N	measurement date
	ExcptSpp	C	I	N	exception species
	SideDist	I	I	N	side distance
	VegCond	D	I	N	vegetation condition
	BeltWide	D	I	N	belt width
	BeltHt	D	I	N	belt height
PlntList	VegID	C	I	N	vegetation code
	Form1	D	I	N	vegetation life form
TactConA	AnalYear	C,I	O	I	analysis year
	PlotID	C,I	O	I	plot number

Table Name	Column Name	Column Use	Base	Group Trend	Contents
	VegID	D	O	I	vegetation code
	LifeForm	D	O	I	vegetation life form
	VegCond	D	O	I	vegetation condition
	HtMinTo1	D	O	I	# shorter than 1 m
	Ht1To2	D	O	I	# between 1 and 2 m
	Ht2To3	D	O	I	# between 2 and 3 m
	Ht3To4	D	O	I	# between 3 and 4 m
	HtGt4	D	O	I	# taller than 4 m

Column Use:

   C   Connector   Column values used to properly join information from multiple tables
   D   Data   Column values used as data in summary
   I   Identifier   Column values used to identify data elements

Base:

   N   Column not used in summary
   I   Input column for summary
   O   Output column for summary

File outputs and sample output windows. The following lists describe each output file created by a data summary. An example output window (Figure 44) for each data summary also is provided.

   <u>Output Files</u>

   TB####.txt   Tabular summaries
   TB####.err   Error messages

   where #### is the analysis year selected.

Figure 44. Belt transect summary output windows.

Methods. For the base summary, the number of occurrences for each species is calculated for each plot, species, life form, condition, and height category. The data values are corrected for differences in individual species plot sizes. Only woody species are included in the summaries.

Errors checked during processing. During program execution, the input data is examined for a variety of potential errors. Any data errors encountered are listed in the error output file. The error messages provide a short description of the problem. A more detailed description can be obtained from the online help program. Highlight the error code and select <Help For Selection> from the <Help> menu for online help. The online help session will display the detailed error message and describe how the data error was handled. Generally data is ignored, an assumption about the data is made, or the program aborts the data summary.

Errors should be corrected before the data summaries are used. Some error messages can affect the final results considerably. Not all data errors can be detected by the program. Most error messages include an SQL statement that will display a subset of the data which caused the error. To execute the SQL statement, place the cursor on the SQL line and select <SQL Selection> from the <Utilities> menu. The data causing the problem will be displayed in a spreadsheet window.

Only the base summary checks for data errors. Always run the base summary and correct errors before running the trend, group, and group trend summaries.

The following list includes each error code checked during the base summary. These errors will be displayed in the error output file if an error occurs. An SQL command

will be provided along with the error message. When executed, this SQL command will display the subset of the data that caused the error. Examining the list of errors will indicate the range of data checks made during the summary.

Yr: YYYY Pl: PPPP WARNING TB001 WARNING Duplicate Entries in Plotsurv
Yr: YYYY Pl: PPPP WARNING TB002 WARNING Invalid Inventory Type: XXXX
Yr: YYYY Pl: PPPP WARNING TB003 WARNING Invalid plot type:TTTT
Yr: YYYY Pl: PPPP WARNING TB004 WARNING No plots exist
Yr: YYYY Pl: PPPP WARNING TB005 WARNING Invalid PlotID in TactConA
Yr: YYYY Pl: PPPP WARNING TB006 WARNING Missing ExcptnSp in BeltSurv
Yr: YYYY Pl: PPPP WARNING TB007 WARNING Missing BeltWide in BeltSurv
Yr: YYYY Pl: PPPP WARNING TB008 WARNING Invalid PlotID in BeltSurv
Yr: YYYY Pl: PPPP WARNING TB009 WARNING Missing VegID in BeltMon
Yr: YYYY Pl: PPPP WARNING TB010 WARNING Missing VegCond in BeltMon
Yr: YYYY Pl: PPPP WARNING TB011 WARNING Missing Data in BeltMon
Yr: YYYY Pl: PPPP WARNING TB012 WARNING Invalid VegCond CCCC in BeltMon
Yr: YYYY Pl: PPPP WARNING TB013 WARNING VegCond D assumed S in BeltMon
Yr: YYYY Pl: PPPP WARNING TB014 WARNING Missing Form1 in PlntList
Yr: YYYY Pl: PPPP WARNING TB015 WARNING Invalid info in PlntList for VVVV
Yr: YYYY Pl: PPPP WARNING TB016 WARNING VVVV not in PlntList
Yr: YYYY Pl: PPPP WARNING TB017 WARNING Invalid PlotID in BeltMon
Yr: YYYY Pl: PPPP WARNING TB018 WARNING Missing VegID in BeltTran
Yr: YYYY Pl: PPPP WARNING TB019 WARNING Missing VegCond in BeltTran
Yr: YYYY Pl: PPPP WARNING TB020 WARNING Missing PlantHt in BeltTran
Yr: YYYY Pl: PPPP WARNING TB021 WARNING Invalid VegCond CCCC in BeltTran
Yr: YYYY Pl: PPPP WARNING TB022 WARNING VegCond D assumed S in BeltTran
Yr: YYYY Pl: PPPP WARNING TB023 WARNING Missing Form1 in PlntList
Yr: YYYY Pl: PPPP WARNING TB024 WARNING Invalid info in PlntList for VVVV
Yr: YYYY Pl: PPPP WARNING TB025 WARNING VVVV not in PlntList
Yr: YYYY Pl: PPPP WARNING TB026 WARNING Invalid PlotID in BeltTran

The following list gives SQL commands that can be used to correct data which caused the associated error message. Understand what changes the SQL command will make to the databases before executing the command. An error may have more than one cause. The following corrections are for the most prevalent cause of the error.

TB001   SET CURSORNAME REMOVEDUP; PREPARE SELECT * FROM
         PLOTSURV WHERE @YEARNO(RECDATE)=YYYY AND PLOTID=PPPP;
         PERFORM; SET SCROLLROW 0; FETCH 1; CONNECT 2; DELETE FROM
         PLOTSURV WHERE CURRENT OF REMOVEDUP; DISCONNECT 2; SET
         SCROLL OFF;
TB002   UPDATE PLOTSURV SET INVTYPE = '?' WHERE @YEARNO(RECDATE)
         =YYYY AND PLOTID= PPPP AND @UPPER(INVTYPE)='XXXX';

TB003 UPDATE PLOTSURV SET PLOTTYPE='?' WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP AND @UPPER(PLOTTYPE) = 'TTTT';

TB004 <Load HH Files>

TB005 ** RERUN THE DATA SUMMARY WITH RECALCULATE CHECKED **

TB006 UPDATE BELTSURV SET EXCPTNSP='?' WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP AND EXCPTNSP IS NULL;

TB007 UPDATE BELTSURV SET BELTWIDE=? WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP AND BELTWIDE IS NULL AND
@UPPER(EXCPTNSP)='?';

TB008 UPDATE BELTSURV SET PLOTID = ? WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP;

TB009 UPDATE BELTMON SET VEGID = '?' WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP AND VEGID IS NULL AND
@UPPER(VEGCOND) = '?';

TB010 UPDATE BELTMON SET VEGCOND = '?' WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP AND VEGCOND IS NULL AND
@UPPER(VEGID) = '?';

TB011 **Missing Data in BeltMon. Enter missing data**

TB012 UPDATE BELTMON SET VEGCOND = '?' WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP AND @UPPER(VEGCOND) = 'CCCC' AND
@UPPER(VEGID) = '?';

TB013 UPDATE BELTMON SET VEGCOND='S' WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP AND @UPPER(VEGCOND) = 'D';

TB014 UPDATE PLNTLIST SET FORM1 = '?' WHERE @UPPER(VEGID) = '?';

TB015 UPDATE PLNTLIST SET FORM1='?' WHERE @UPPER(VEGID)='VVVV' ;

TB016 UPDATE BELTMON SET VEGID = '?' WHERE @YEARNO(RECDATE)
=YYYY AND   PLOTID=PPPP AND @UPPER(VEGID) = 'VVVV';

TB017 UPDATE BELTMON SET PLOTID = ? WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP;

TB018 UPDATE BELTTRAN SET VEGID = '?' WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP AND VEGID IS NULL AND VEGLOC = ?
AND @UPPER(SIDE) = '?' AND SIDEDIST = ?;

TB019 UPDATE BELTTRAN SET VEGCOND='?' WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP AND VEGCOND IS NULL AND
@UPPER(VEGID)='?' AND @UPPER(SIDE)='?'   AND SIDEDIST= ?;

TB020 UPDATE BELTTRAN SET PLANTHT='?' WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP AND @UPPER(VEGCOND)='?' AND
@UPPER(VEGID)='?' AND @UPPER(SIDE)='?' AND SIDEDIST= ?;

TB021 UPDATE BELTTRAN SET VEGCOND='?' WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP AND @UPPER(VEGCOND)='CCCC' AND
@UPPER(VEGID)='?' AND @UPPER(SIDE)='?' AND SIDEDIST= ?;

TB022 UPDATE BELTTRAN SET VEGCOND= 'S' WHERE @YEARNO(RECDATE)
=YYYY AND PLOTID=PPPP AND @UPPER(VEGCOND) = 'D';

TB023 UPDATE PLNTLIST SET FORM1 = '?' WHERE @UPPER(VEGID)='?';

TB024 UPDATE PLNTLIST SET FORM1= '?' WHERE @UPPER(VEGID)='VVVV';

TB025   UPDATE BELTTRAN SET VEGID = '?' WHERE @YEARNO(RECDATE)
          =YYYY AND PLOTID=PPPP AND @UPPER(VEGID)='VVVV';
TB026   UPDATE BELTTRAN SET PLOTID = ? WHERE @YEARNO(RECDATE)
          =YYYY AND PLOTID=PPPP;

Supplemental information. The following online and hard copy documentation contains information relevant to belt transect data summaries.

> Online help sources:
>> LCTA Help
>> Field Manual Help

> Hard copy sources:
>> Sprouse, W.L., and A.B. Anderson, *Land Condition Trend Analysis (LCTA) Program Data Dictionary,* ADP Report 95/03/ADA295608 (USACERL, April 1995).
>> Tazik, D.J., S.D. Warren, V.E. Diersing, R.B. Shaw, R.J. Brozka, C.F. Bagley, and W.R. Whitworth, *U.S. Army Land Condition-Trend Analysis (LCTA) Plot Inventory Field Methods,* Technical Report N-92/03/ADA247931 (USACERL, February 1992).

Waiting To View

The <Waiting To View> command keeps a list of analyses that have completed but have not been viewed. Each time one of the data analysis, load data, update species list, or other activities is run, an entry is added to the waiting to view analysis list when the summary is completed. Even if the LCTA Program Manager is terminated before the analysis is completed, an entry will be added to the waiting to view list. The next time the LCTA Program Manager is started, the analysis output files will appear in the <Waiting To View> list.

When one of the queue list items is selected, a series of windows will open and display data analysis information. The number and type of windows opened will depend on the type of analysis selected. Most data analysis items open an error window, a tabular text window, and a few graph windows.

Having an entry added to the "Waiting To View" queue instead of windows automatically opening when the analysis is completed has a few advantages. If a window is actively being viewed or edited when an analysis is completed, no windows will open and disturb the current work. The order in which output files are to be viewed can be

specified. Analysis summaries can be run overnight, and the results will be added to the list as the summaries are completed.

The contents of the "Waiting To View" dialog box are the current contents at the time the dialog box is opened. Do not leave the dialog box open waiting for a summary to appear. The dialog box list is not updated while the dialog box is open.

Data Entry Menu Options

The following menu options are displayed in pull down menus after the data entry menu option in the main menu has been selected.

Data Editor

Enter/Edit/View

The <Data Entry> command starts up the data entry window. The server, database, year, and plot to be edited, viewed, or created can be specified. The edit screens resemble the field data sheets for ease of data entry. Edit fields are validated for proper input when possible. See "Data Editor Help" for more detailed information.

Plot
Summary

Plot Summary

The plot list summary provides general descriptive plot information frequently requested by users.

Uses. The summary can be used when remeasuring a plot to identify species likely to be encountered. The summary also can provide other users with a general description of the plot.

Access. To run a plot summary, select the <Data> menu option and the <Plot Summary.> submenu (Figure 45). Entering <Alt-D,P> from the computer keyboard also will start the summary.
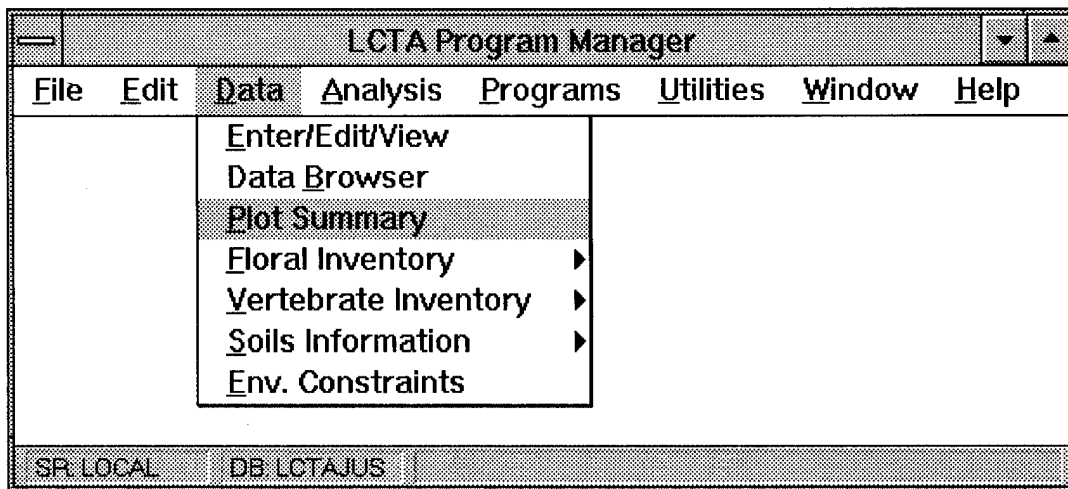
Figure 45. Plot summary menu selection.

Database inputs and outputs. The database diagram in Figure 46 lists all database tables used for the plot data summary. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.
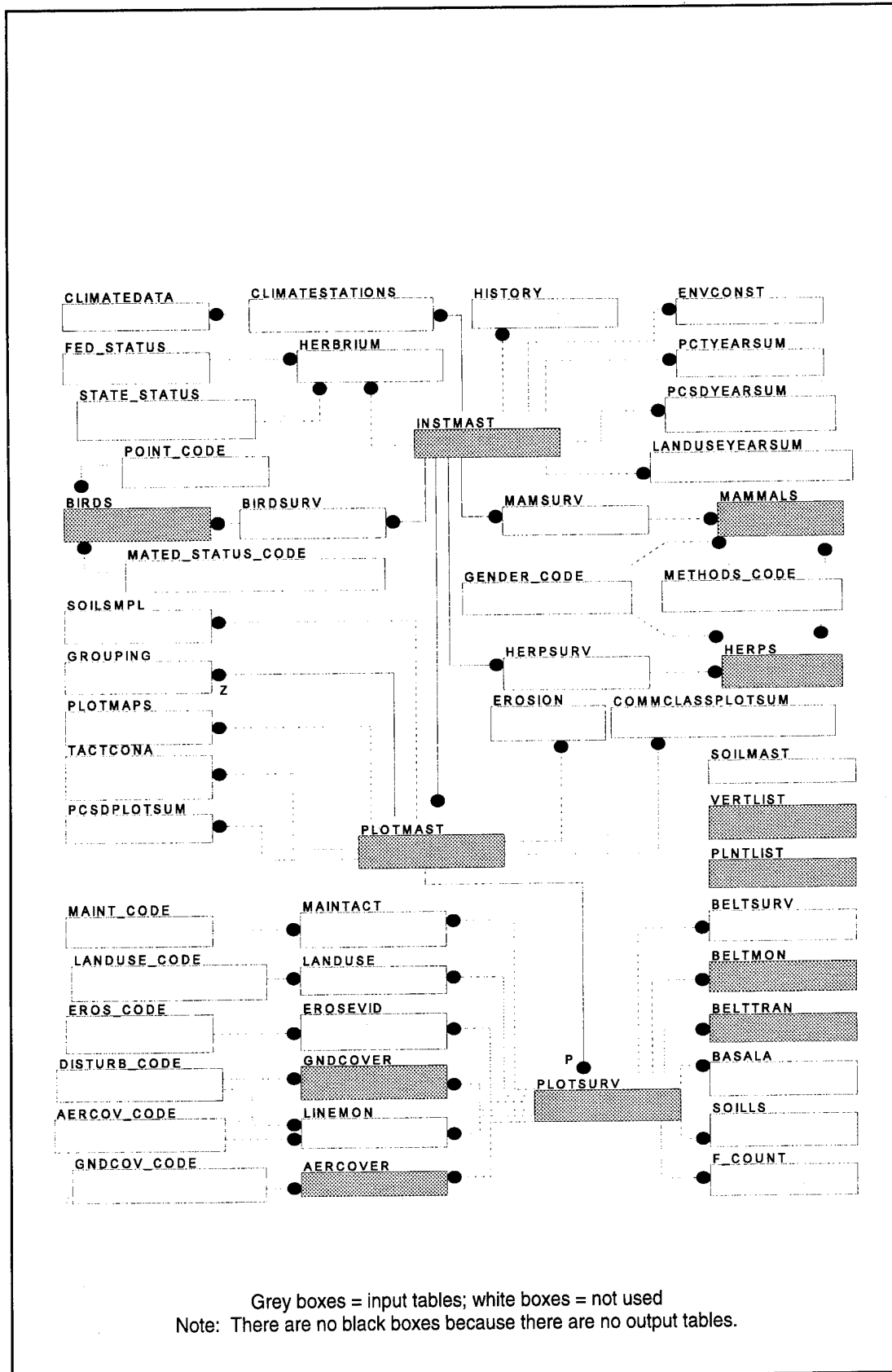
Figure 46. LCTA reduced entity relationship diagram and plot summary input tables.

Table 7 lists all database tables and columns used for the plot data summaries.

Table 7. Plot summary database tables and columns table.

Table Name	Column Name	Column Use	Base	Contents
PlotSurv	PlotID	C	I	plot number
	Train	D	I	training area
	VegType	D	I	vegetation type
	Aspect	D	I	aspect
	SoilDpth	D	I	soil depth
PlotMast	PlotID	D	I	plot number
	DMCE	D	I	defense military coordinates easting
	DMCN	D	I	defense military coordinates northing
	USGS	D	I	United States Geologic Survey quadrant
	SoilSer	D	I	soil series name
InstMast	InName	D	I	installation name
PlntList	VegID	C	I	vegetation code
	Genus	D	I	genus
	Species	D	I	species
VertList	Genus	D	I	genus
	Species	D	I	species
	VertID	C	I	vertibrate code
BeltMon	VegID	D	I	vegetation code
	PlotID	C	I	plot number
BeltTran	VegID	D	I	vegetation code
	PlotID	C	I	plot number
GndCover	VegID	D	I	vegetation code
	PlotID	C	I	plot number
AerCover	VegID	D	I	vegetation code
	PlotID	C	I	plot number
GndCover	VegID	D	I	vegetation code
	PlotID	C	I	plot number
Herps	VertID	D	I	vertibrate code
	PlotID	C	I	plot number
Mammals	PlotID	C	I	plot number
	VertID	D	I	vertibrate code

Column Use:

C   Connector   Column values used to properly join information
                        from multiple tables
D   Data   Column values used as data in summary
I   Identifier   Column values used to identify data elements

Base:

N   Column not used in summary
I   Input column for summary
O   Output column for summary

File outputs and sample output windows. The following lists describe each output file created by a data summary. An example output window (Figure 47) for each data summary also is provided.

Output Files
PlotList.txt   Tabular data summaries
PlotList.err   Error message file
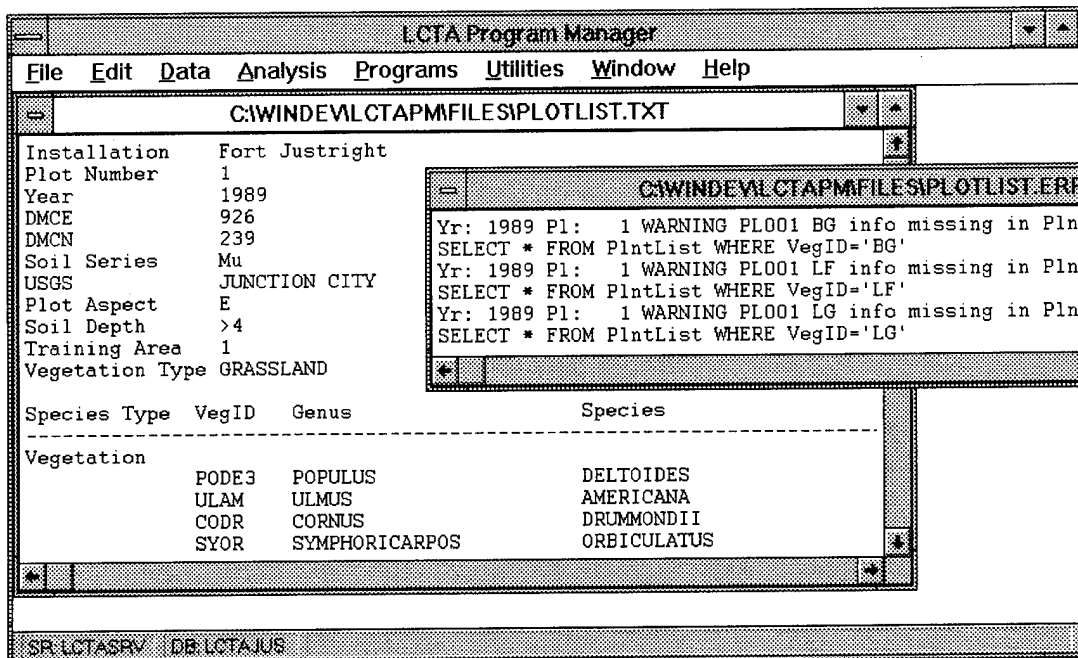
Figure 47. Plot summary output windows.

Methods. The program retrieves, organizes, and displays plot information. No calculations are required.

Data Browser

The <Data Browser> summary provides access to basic plot data by location rather than by plot number.

Uses. Use the <Data Browser> command to view the locations of LCTA plots on GIS maps. Select plot data based on plot location rather than plot number. For users unfamiliar with LCTA plot numbers, the <Data Browser> command provides easy access to data.

Note. The data browser summary requires access to installation maps. Before running a summary, installation maps must be stored in the maps database table. Installation maps can be obtained from the installation geographic information system.

Access. To run a plot summary, select the <Data> menu option and the <Data Browser.> submenu (Figure 48). Entering <Alt-D,B> from the computer keyboard also will start the summary.
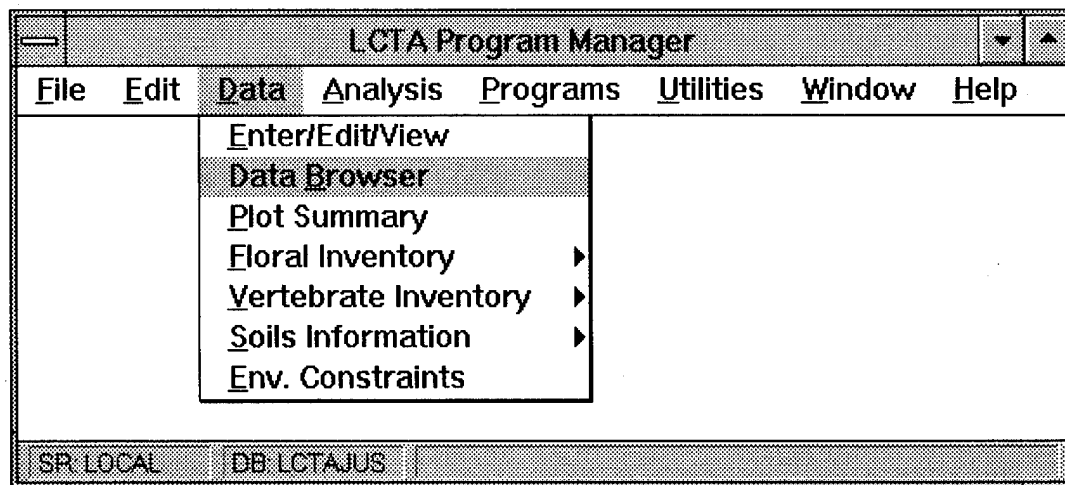
Figure 48. Data browser menu selection.

A dialog box will appear and prompt for the installation map to use when displaying plot locations (Figure 49). Select the desired installation map.

After the installation map is selected, a spreadsheet will appear that lists all LCTA plot numbers and their coordinates (Figure 50). The installation map then will appear in a separate window. A point is located on the map for each plot in the spreadsheet.

Installation Maps

Select Installation Map:

Soils

Cancel   OK
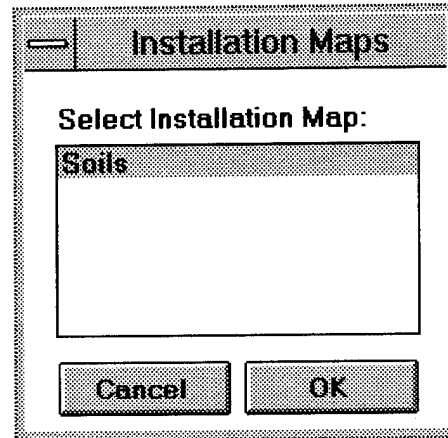
Figure 49. Installation map dialog box.
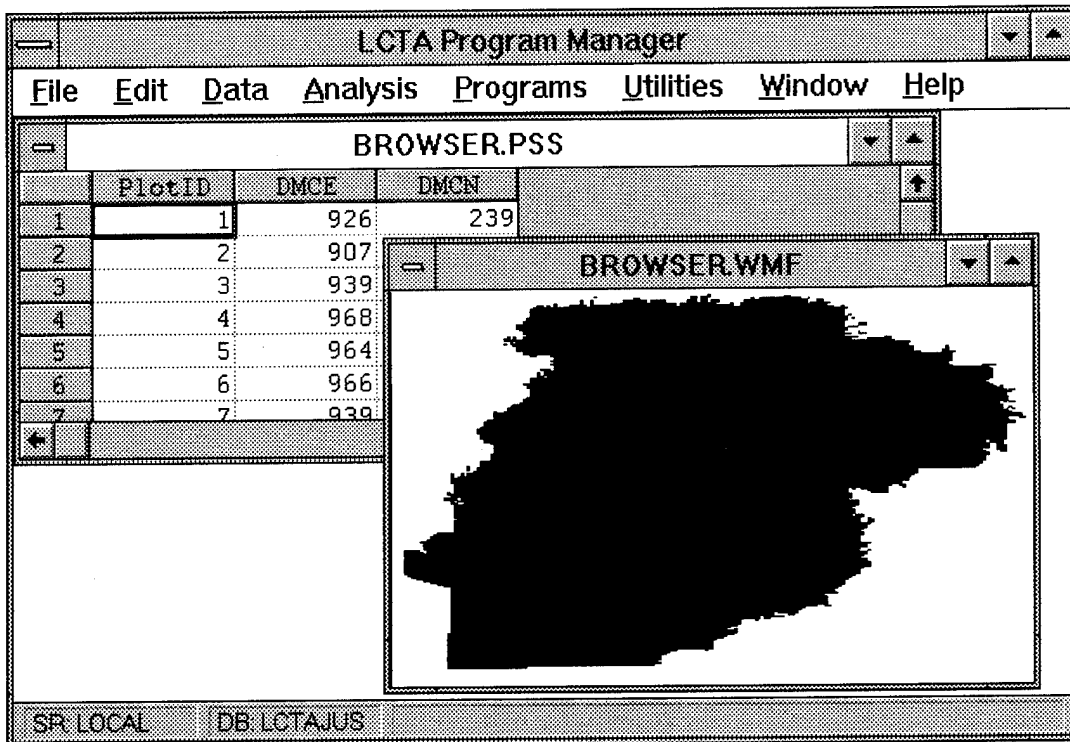
Figure 50. Data browser interactive map and output windows.

To view plot data, locate the mouse pointer over a plot point and press the right mouse button. The pointer does not have to be located directly over the plot point. The program will locate the nearest plot point to the mouse pointer. A dialog will appear and prompt for the desired data (Figure 51).
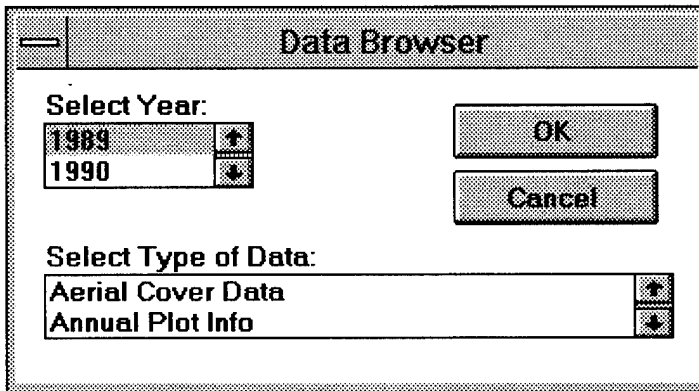
Figure 51. Data browser data type dialog box.

Select the appropriate year and data type. Then select the <OK> button. The spread-sheet will be updated to show the selected data. To view additional information, select another plot and repeat the process.

Database inputs and outputs. The database diagram in Figure 52 lists all database tables used for the data browser data summary. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.

Grey boxes = input tables; white boxes = not used
Note: There are no black boxes because there are no output tables.
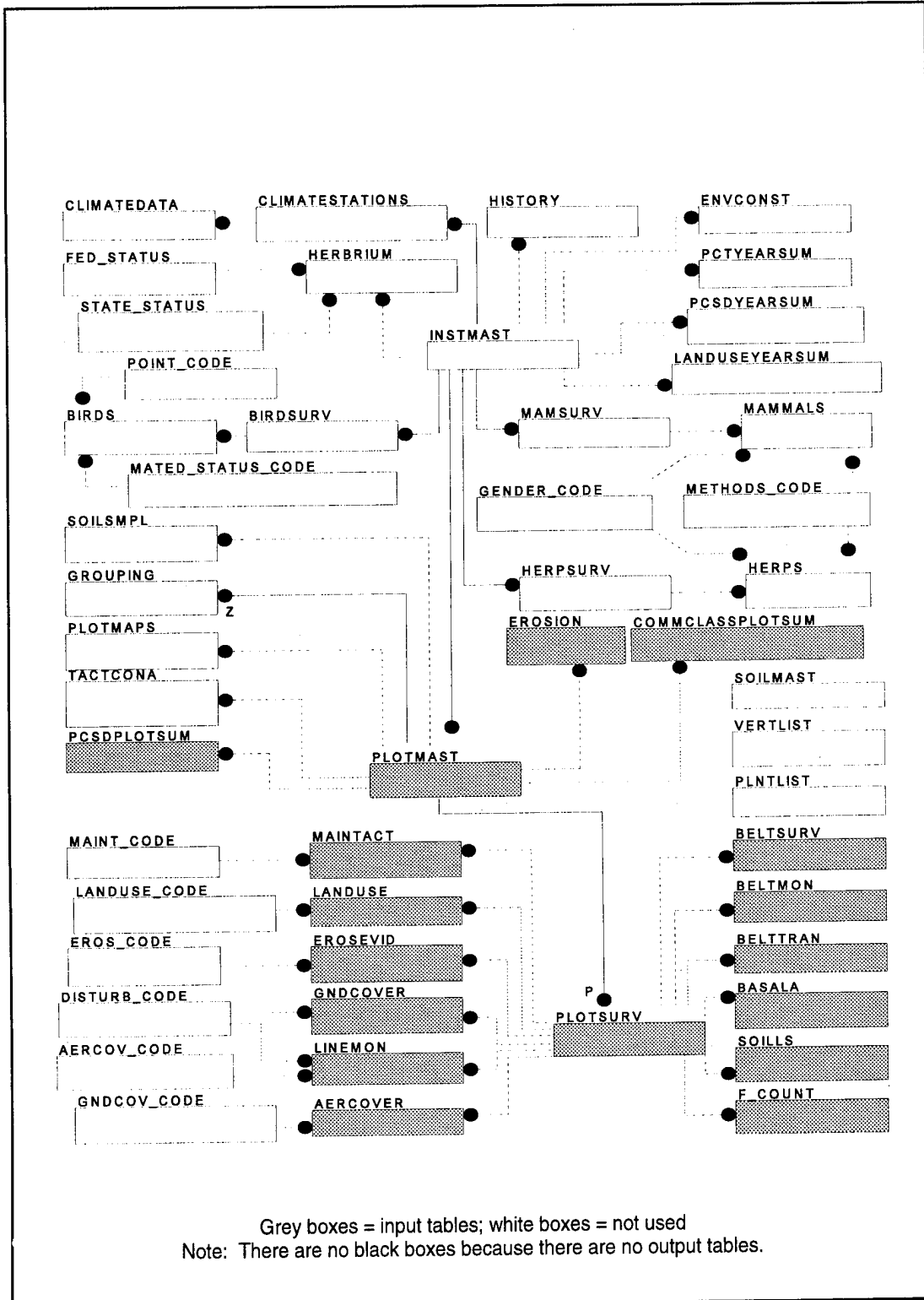
Figure 52. LCTA reduced entity relationship diagram and data browser input tables.

Table 8 lists all database tables and columns used for the data browser data summary.

Table 8. Data browser summary database tables and columns table.

Table Name	Column Name	Column Use	Base	Contents
PlotMast	All Columns	D	I	basic plot information
PlotSurv	All Columns	D	I	annual measurement information
GndCover	All Columns	D	I	ground cover line data
AerCover	All Columns	D	I	aerial cover line data
LineMon	All Columns	D	I	monitoring line data
BeltTran	All Columns	D	I	belt transect data
BeltSurv	All Columns	D	I	belt survey data
BeltMon	All Columns	D	I	belt monitoring data
MaintAct	All Columns	D	I	maintanence data
LandUse	All Columns	D	I	land use data
ErosEvid	All Columns	D	I	erosion evidence data
F_Count	All Columns	D	I	frequency count data
SoilLS	All Columns	D	I	soil slope data
CommClassPlot Sum	All Columns	D	I	plant community classification data
Erosion	All Columns	D	I	erosion estimate data
PCSDPlotSum	All Columns	D	I	plant cover surface disturbance data
BasalA	All Columns	D	I	basal area data

Column Use:

    C   Connector   Column values used to properly join information from multiple tables

    D   Data   Column values used as data in summary

    I   Identifier   Column values used to identify data elements

Base:

    I   Input column for summary

    O   Output column for summary

Output files. No output files are created. However, the contents of both the spreadsheet and installation map can be saved to a file.

Methods. The program organizes and displays information. No calculations are required.

Floral Inventory

The <Floral Inventory> summary provides plant species information in a variety of formats.

Uses. Use the <Floral Inventory> command to create plant species lists for reports. Lists of species by selected plot groupings, locations of species occurrence, or Federal and state endangered status can be obtained. Species lists are useful when defining species composition and determining the proportion of species occurrence on LCTA plots.

Access. To run a plot summary, select the <Data> menu selection and the <Floral Inventory.> submenu (Figure 53). Entering <Alt-D,F> from the computer keyboard also will start the summary.
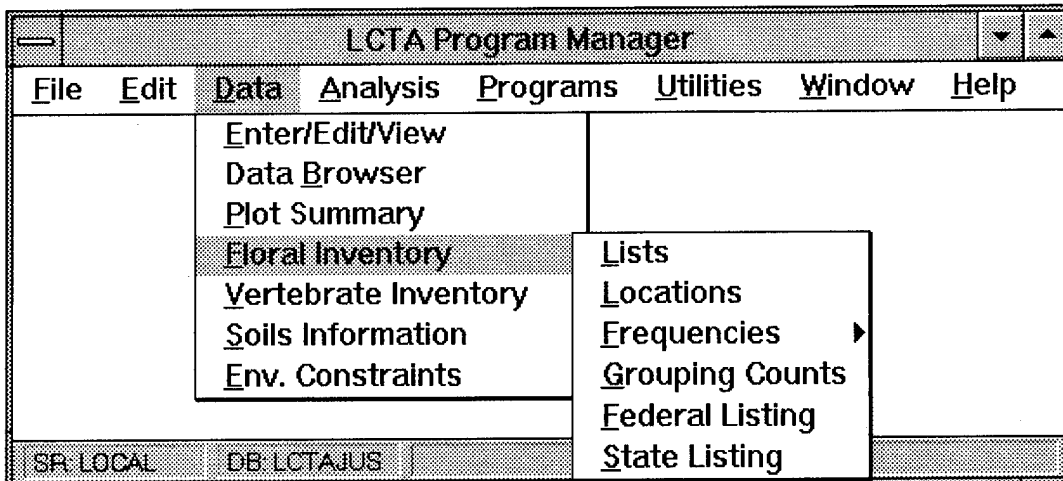
Figure 53. Floral inventory menu selections.

Select one of the submenu selections for specific information. The <Lists> menu option will produce plant species lists for any plot grouping criteria. The dialog box in Figure 54 will give prompts for the appropriate grouping criteria.
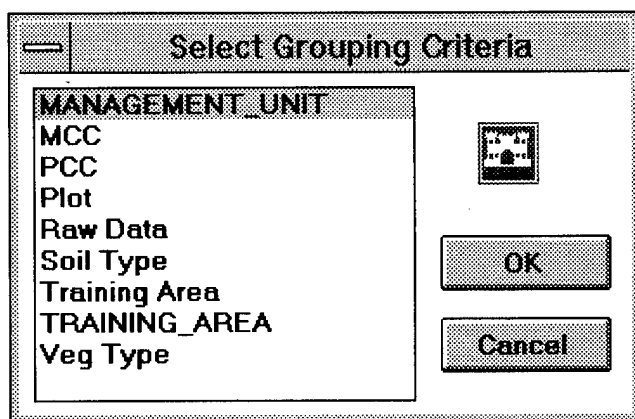
Figure 54. Plot grouping criteria dialog box.

The <Locations> menu option will produce a list of plot numbers and coordinates where a plant species has been found on LCTA plots. The dialog box in Figure 55 will give prompts for the desired species.
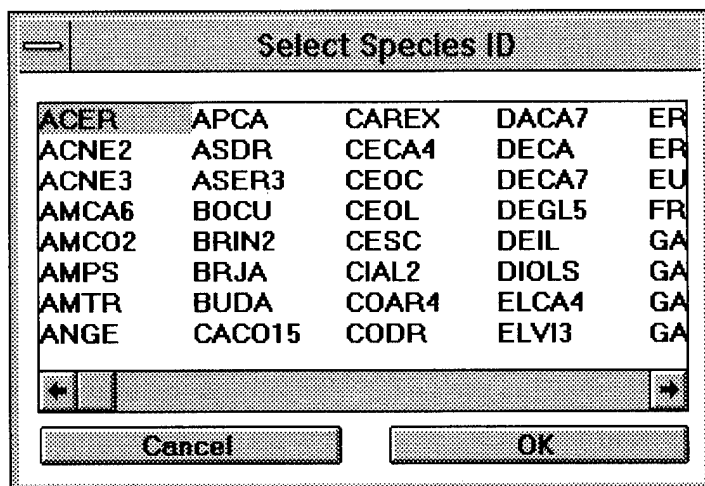

Figure 55. Species selection dialog box.

The <Group Counts> menu option summarizes the number of plant species by life, origin, and form categories. The <Fed List> and <State List> menu options produce lists of plants found on LCTA plots that are listed on Federal and state threatened and endangered lists.

Database inputs and outputs. The database diagram in Figure 56 lists all database tables used for each floral inventory summary. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.

Grey boxes = input tables; white boxes = not used
Note: There are no black boxes because there are no output tables.
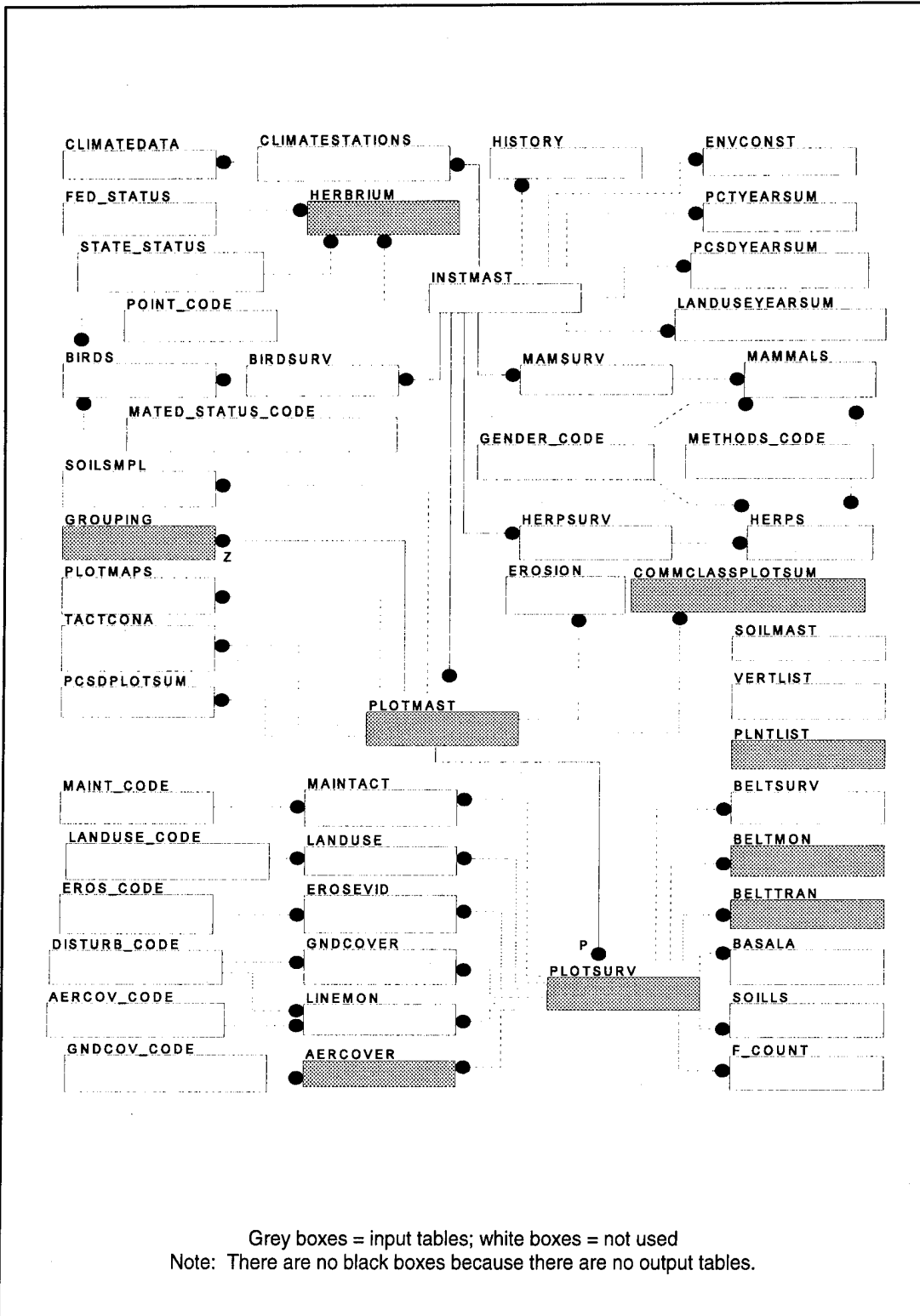
Figure 56. LCTA reduced entity relationship diagram and floral inventory input tables.

Table 9 lists all database tables and columns used for each floral inventory summary.
All database column use is as input only.

Table 9. Floral inventory summary database tables and columns table.

Table Name	Column Name	List	Loc	Grp Cnt	State List	Fed List	Contents
Plnt List	VegID	C	N	N	N	N	vegetation code
	Life	N	N	D	N	N	life form
	Origin	D	N	D	N	N	plant origin
	Form1	D	N	D	N	N	plant form
	Family	D	N	N	N	N	family name
	Genus	D	N	N	N	N	genus name
	Spec	D	N	N	N	N	species name
Herbrium	VegID	N	N	N	D	D	vegetation code
	FedStat	N	N	N	D	D	Federal listing
	StateStat	N	N	N	D	D	state listing
PlotMast	PlotID	N	C	N	N	N	plot number
	DMCE	N	D	N	N	N	map coordinate
	DMCN	N	D	N	N	N	map coordinate
PlotSurv	PlotID	C	N	N	N	N	plot number
	RecDate	I	N	N	N	N	measurement date
	Train	D	N	N	N	N	training area
	VegType	D	N	N	N	N	vegetation type
AerCover	PlotID	N	D	N	N	N	plot number
	VegID	D	C	N	N	N	vegetation code
BeltTran	PlotID	N	D	N	N	N	plot number
	VegID	D	C	N	N	N	vegetation type
BeltMon	PlotID	N	D	N	N	N	plot number
	VegID	D	C	N	N	N	vegetation type
CommClass PlotSum	AnalYear	C	N	N	N	N	analysis year
	PccType	D	N	N	N	N	plant community code
	PccCode	D	N	N	N	N	plant community type
	MccType	D	N	N	N	N	plant community code
	MccCode	D	N	N	N	N	plant community type
Grouping	PlotID	C	N	N	N	N	plot number
	Others	D	N	N	N	N	all other columns

Column Use:

    C   Connector   Column values used to properly join information
                              from multiple tables
    D   Data   Column values used as data in summary
    I   Identifier   Column values used to identify data elements

Output files. The following lists describe each output file created by a data summary.

Output Files

PlntGGG.pss   tabular plant list information

SSS.pss   tabular plant location information

lctacnt.pss   tabular group count information

listing.pss   tabular state or Federal listing information

where GGG is the grouping criteria and SSS is the selected species code.

Methods. The program summarizes floral data by the selected plot grouping criteria. All options produce simple lists. No calculations are required.

Vertebrate Inventory

The <Vertebrate Inventory> summary provides species information in a variety of formats.

Uses. Use the <Vertebrate Inventory> command to create species lists for reports. Lists of species by selected plot grouping, locations of species occurrence, and Federal and state endangered status can be obtained. Species lists are useful when defining species composition and determining the proportion of species occurrence on LCTA plots.

Access. To run a plot summary, select the <Data> menu selection and the <Vertebrate Summary.> submenu (Figure 57). Entering <Alt-D,V> from the computer keyboard also will start the summary.
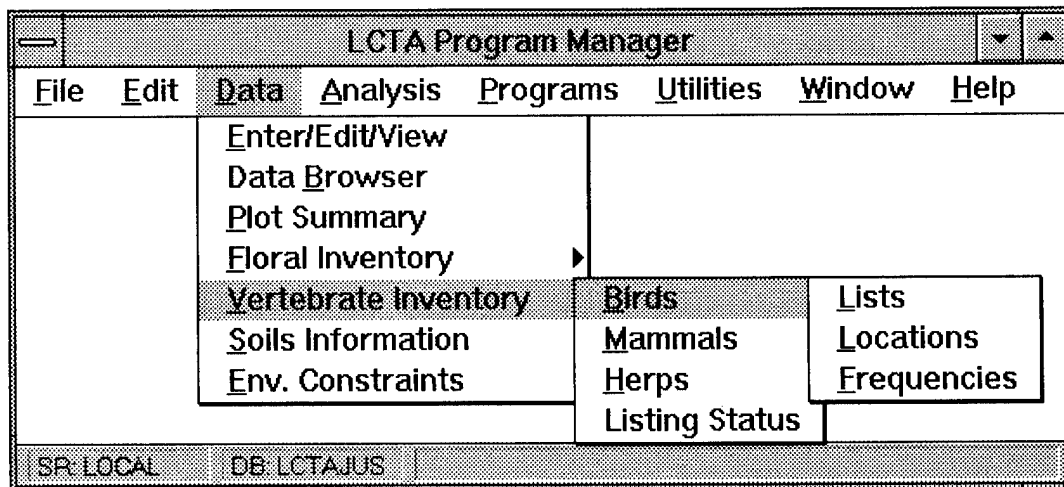
Figure 57. Vertebrate inventory menu selections.

Select one of the submenu options for specific information. The <Birds> menu option
will produce species information from the bird surveys for the selected plot grouping
criteria. The <Mammals> menu option will produce species information from the
small and medium mammal surveys for any selected plot grouping criteria. The
<Herps> menu option will produce species information from the reptile and amphibian
surveys for any selected plot grouping criteria. The <Listing Status> menu option will
produce a list of threatened and endanger vertebrates.

After selecting the appropriate vertebrate type, select one of the submenu options for
the specific type of information required. The <Lists> option will produce species lists
for any selected plot grouping criteria. The plot grouping criteria dialog box will
prompt for the appropriate grouping criteria (Figure 58).
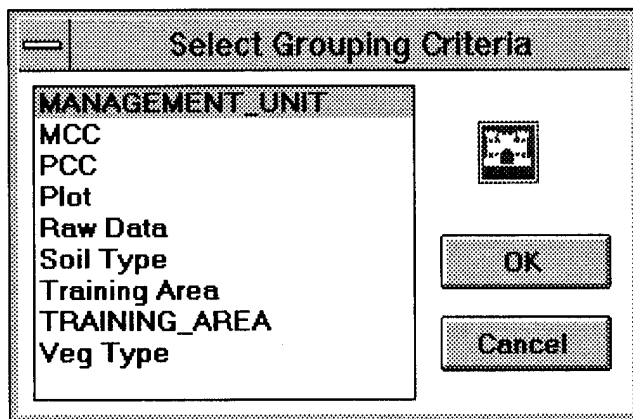
Figure 58. Plot grouping criteria dialog box.

The <Locations> option will produce a list of plot numbers and coordinates when a
species has been found on LCTA plots. The species selection dialog box will prompt for
the desired species (Figure 59).
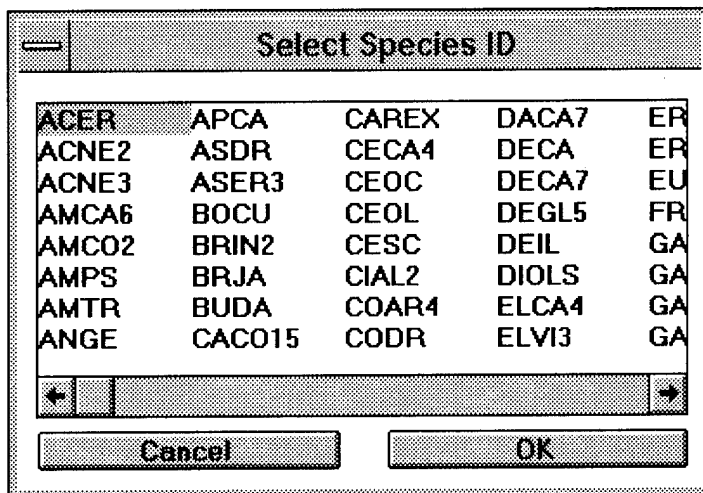
Figure 59. Species selection dialog box.

Database inputs and outputs. The database diagram in Figure 60 lists all database tables used for each vertebrate data summary. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.
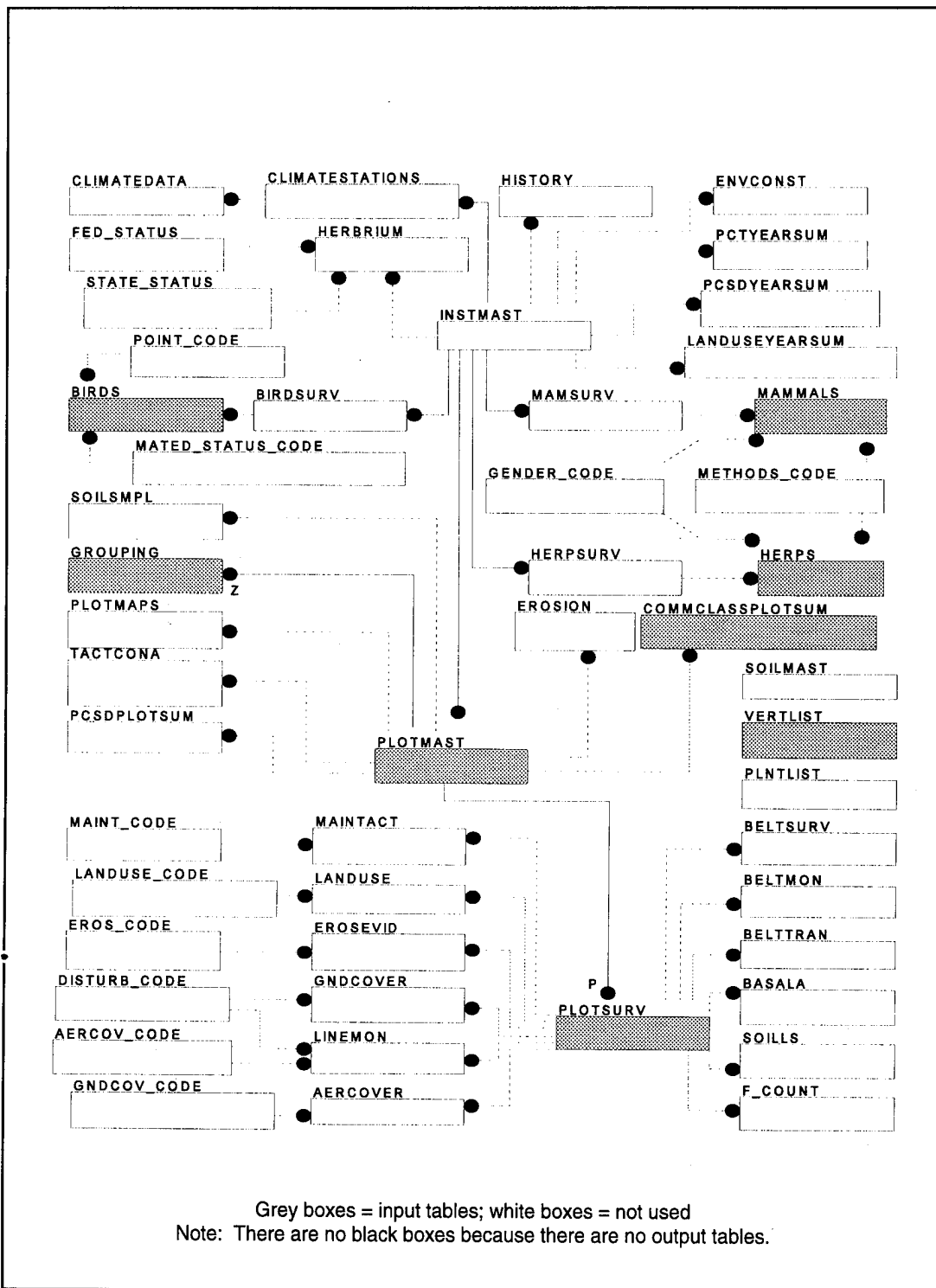
Figure 60. LCTA reduced entity relationship diagram and vertebrate summary input tables.

Table 10 lists all database tables and columns used for each vertebrate data summary. All database column use is as input only. Columns are not broken out by <Bird>, <Mammal>, and <Herp> summaries. Each summary uses only the database table with the same name.

Table 10. Vertebrate inventory database tables and columns table.

Table Name	Column Name	Loc	List	Status	Contents
PlotMast	PlotID	C	N	N	plot number
	DMCE	D	N	N	plot coordinate
	DMCN	D	N	N	plot coordinate
PlotSurv	PlotID	N	C	N	plot number
	Train	N	D	N	training area
	VegType	N	D	N	vegetation type
Birds	PlotID	D	C	N	plot number
	VertID	C	D	N	vertebrate code
Mammals	PlotID	D	C	N	plot number
	VertID	C	D	N	vertebrate code
Herps	PlotID	D	C	N	plot number
	VertID	C	D	N	vertebrate code
VertList	VertID	N	C	D	vertebrate code
	Class	N	I	N	scientific class name
	Genus	N	D	N	scientific genus name
	Spec	N	D	N	scientific species name
	VertStat	N	N	D	listing status
CommClass PlotSum	AnalYear	N	C	N	analysis year
	PlotID	N	C	N	plot number
	PccType	N	D	N	plant community type
	PccCode	N	D	N	plant community code
	MccType	N	D	N	plant community type
	MccCode	N	D	N	plant community code
Grouping	PlotID	N	C	N	plot number
	Others	N	D	N	all other columns

Column Use:

   C   Connector   Column values used to properly join information from multiple tables

   D   Data   Column values used as data in summary

   I   Identifier   Column values used to identify data elements

Output files. The following lists describe each output file created by a data summary.

> <u>Output Files</u>
> VertGGG.pas   tabular vertebrate list information
> SSS.pas   tabular vertebrate location information
> listing.pas   tabular state or Federal listing information

> where GGG is the grouping criteria and SSS is the selected species.

Methods. The program summarizes vertebrate data by the selected plot grouping criteria. No calculations are required.

Soil Information

The <Soil Information> selection displays soils information.

Use. Soils can significantly effect military training, plant productivity, botanical composition, soil erosion, soil loss tolerances, and site productivity. The <Soil Information> menu selection summarizes soil sample and soil series information by user-specified plot groupings.

Access. To run a plot summary, select the <Data> menu option and the <Soils Information.> submenu (Figure 61). Entering <Alt-S,S> from the computer keyboard also will start the plot summary. Select <Soil Sample Data> to summarize soil survey soil type data. Entering <Alt-S,T> also will start the soil type summary.
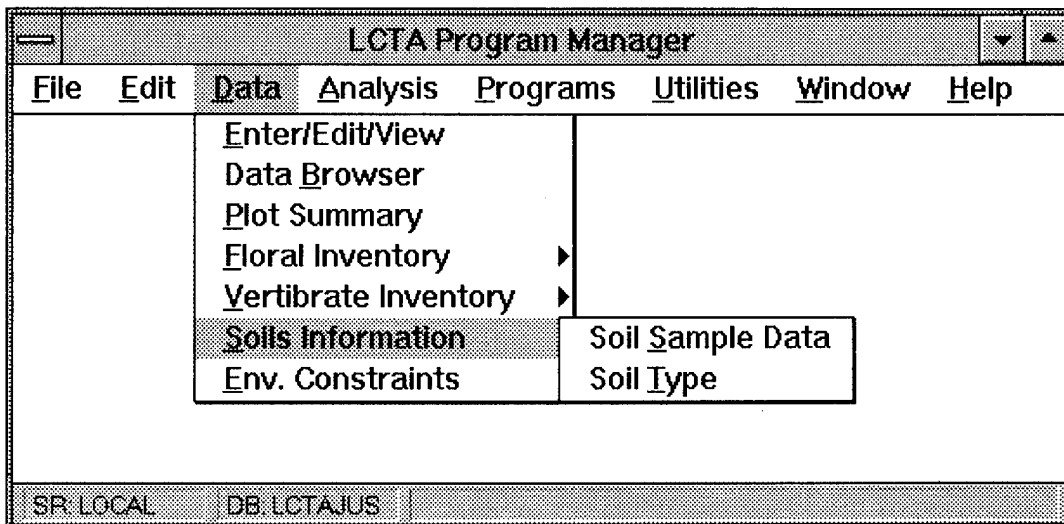
Figure 61. Soils information menu selections.

Database inputs and outputs. The database diagram in Figure 62 lists all database tables used for each soils data summary. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.
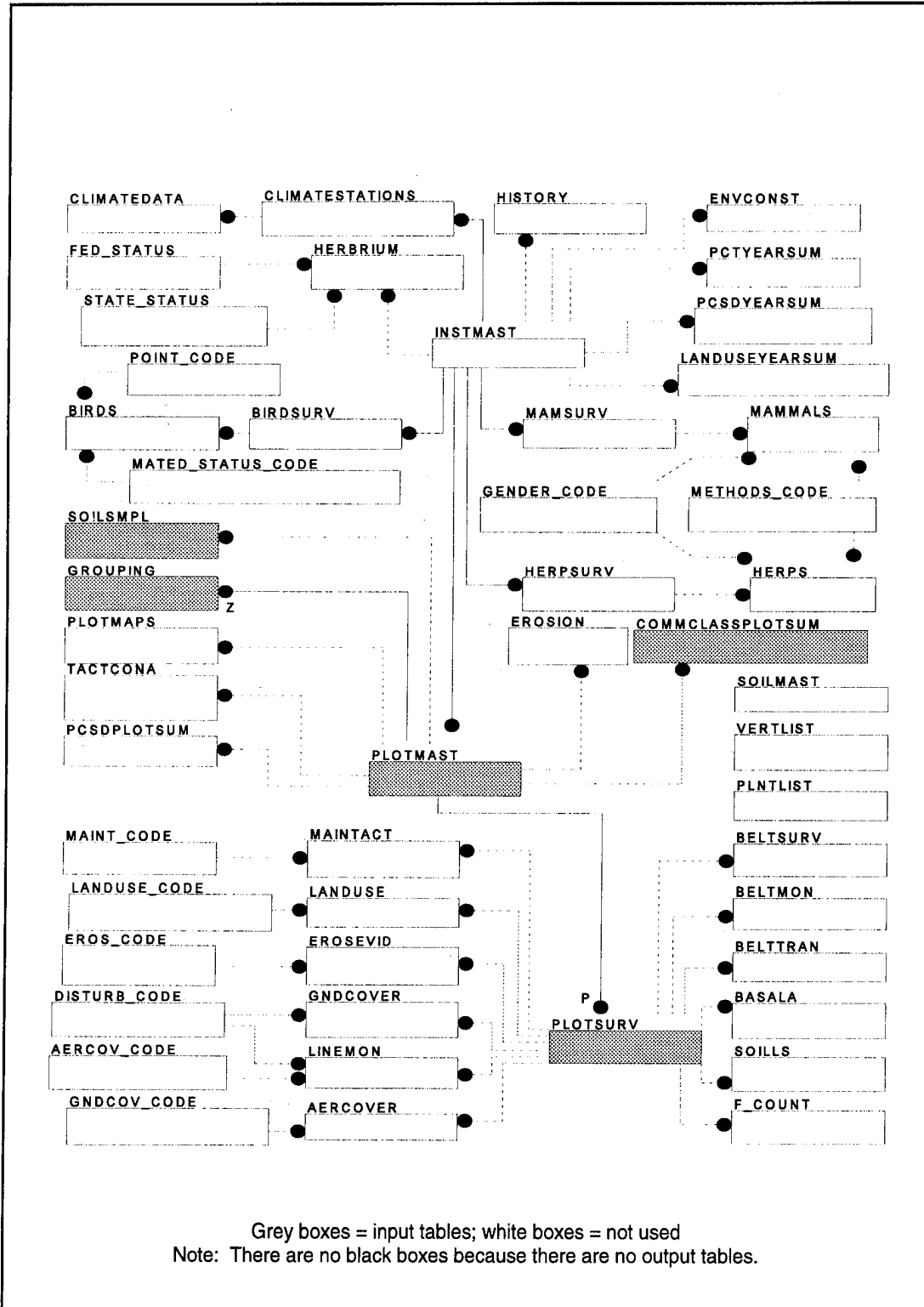

Grey boxes = input tables; white boxes = not used
Note: There are no black boxes because there are no output tables.

Figure 62. LCTA reduced entity relationship diagram and soils input tables.

Table 11 lists all database tables and columns used for each soils data summary.

Table 11. Soils information summary database tables and columns table.

Table Name	Column Name	Column Use	Base	Contents
SoilSmpl	PlotID	I,C	I	plot number
	Year	I	I	sample year
	LabK	D	I	laboratory calculated K value
	TotClay	D	I	total clay
	TotSilt	D	I	total silt
	TotSand	D	I	total sand
	CO3Clay	D	I	CO_3 Clay
	FSilt	D	I	fine silt
	CSilt	D	I	coarse silt
	VFSand	D	I	very fine sand
	MSand	D	I	medium sand
	CSand	D	I	coarse sand
	VCSand	D	I	very coarse sand
	Wt2to5mm	D	I	weight of 2-5mm fraction of sample
	Wt5to20mm	D	I	weight of 5-20mm fraction of sample
	Wt20to75mm	D	I	weight of 20-75mm fraction of sample
	CourFrag	D	I	coarse fragment of sample
	OrgCarb	D	I	organic carbon
	OrgMatt	D	I	organic matter
	BarClay	D	I	water holding capacity
	BarWater	D	I	water holding capacity
	CarLt2mm	D	I	fraction carbonate < 2mm
	PH1to2	D	I	PH base on 1:2 soil to water ratio
	PH1to1	D	I	PH base on 1:1 soil to water ratio
PlotSurv	PlotID	C	I	plot number
	RecDate	C	I	measurement date
	PlotType	I	I	plot sampling type
	Train	I	I	training area
	VegType	I	I	vegetation type
CommClassPlot Sum	AnalYear	I	I	analysis year
	PlotID	C	I	plot number

Table Name	Column Name	Column Use	Base	Contents
	PccCode	D	I	plant community code
	PccType	D	I	plant community type
	MccCode	D	I	plant community code
	MccType	D	I	plant community type
Grouping	PlotID	C	I	plot number
	Others	I	I	all other table columns

Column Use:

C	Connector	Column values used to properly join information from multiple tables
D	Data	Column values used as data in summary
I	Identifier	Column values used to identify data elements

Base:

I	Input column for summary
O	Output column for summary

Output files. The following lists describe each output file created by a data summary. An example output window (Figure 63) for each data summary also is provided.

<u>Output Files</u>

SoilGrp.pas   tabular soil information

Figure 63. Soils information output windows.

Methods. The program summarizes soils data by the selected grouping criteria. The number of plots in each group, the mean soil measurement value, and the standard deviation of the mean is calculated for each plot grouping.

Environmental Constraints

The Environment Constraints utility provides a mechanism to document existing and past environmental constraints. This utility provides a means to document the constraint, the impact on training, and the history of the problem

Use. Use the <Env. Constraint> command to document any environmental constraint to installation training. The utility will allow editing of existing data if any data is incorrect or needs elaboration. As the constraint changes over time, additional information can be appended. The appended information details the current status of the problem, and the previous versions document the history of the problem.

Environmental constraints information provides a means to share current information with various users. The constraints can be used in annual reports and other documentation to describe existing problems.

The information contained in this utility can be used to define plot groupings in the GROUPING database table. Relate LCTA core plots with the training units affected by an environmental constraint by adding a column to the GROUPING database table. Trends on the impacted areas can be isolated when running grouping summaries.

Access. To run a plot summary, select the <Data> menu option and the <Env. Constraints.> submenu (Figure 64). Entering <Alt-D,P> from the computer keyboard also will start the summary.
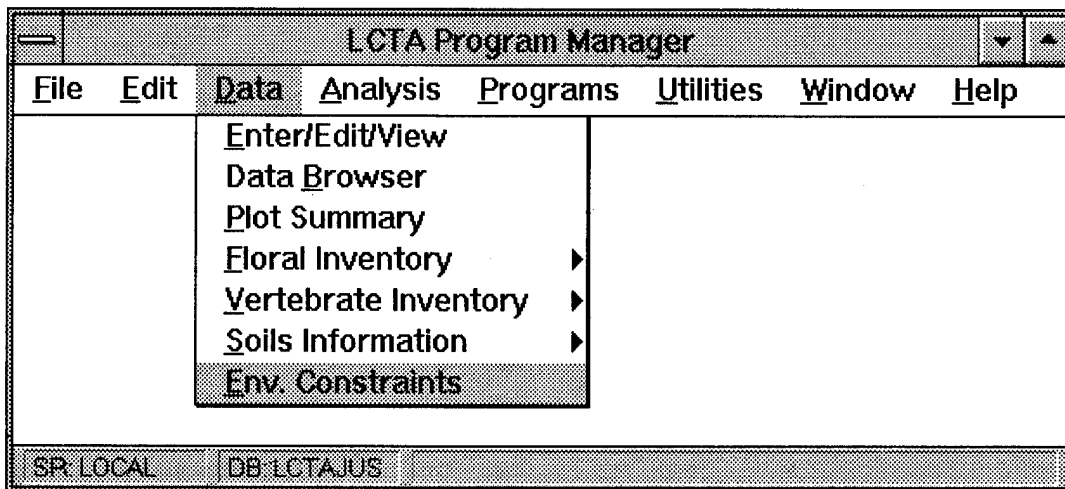

Figure 64. Environmental constraints menu selection.

Database inputs and outputs. The database diagram in Figure 65 lists all database tables used for the environmental constraints data summary. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.
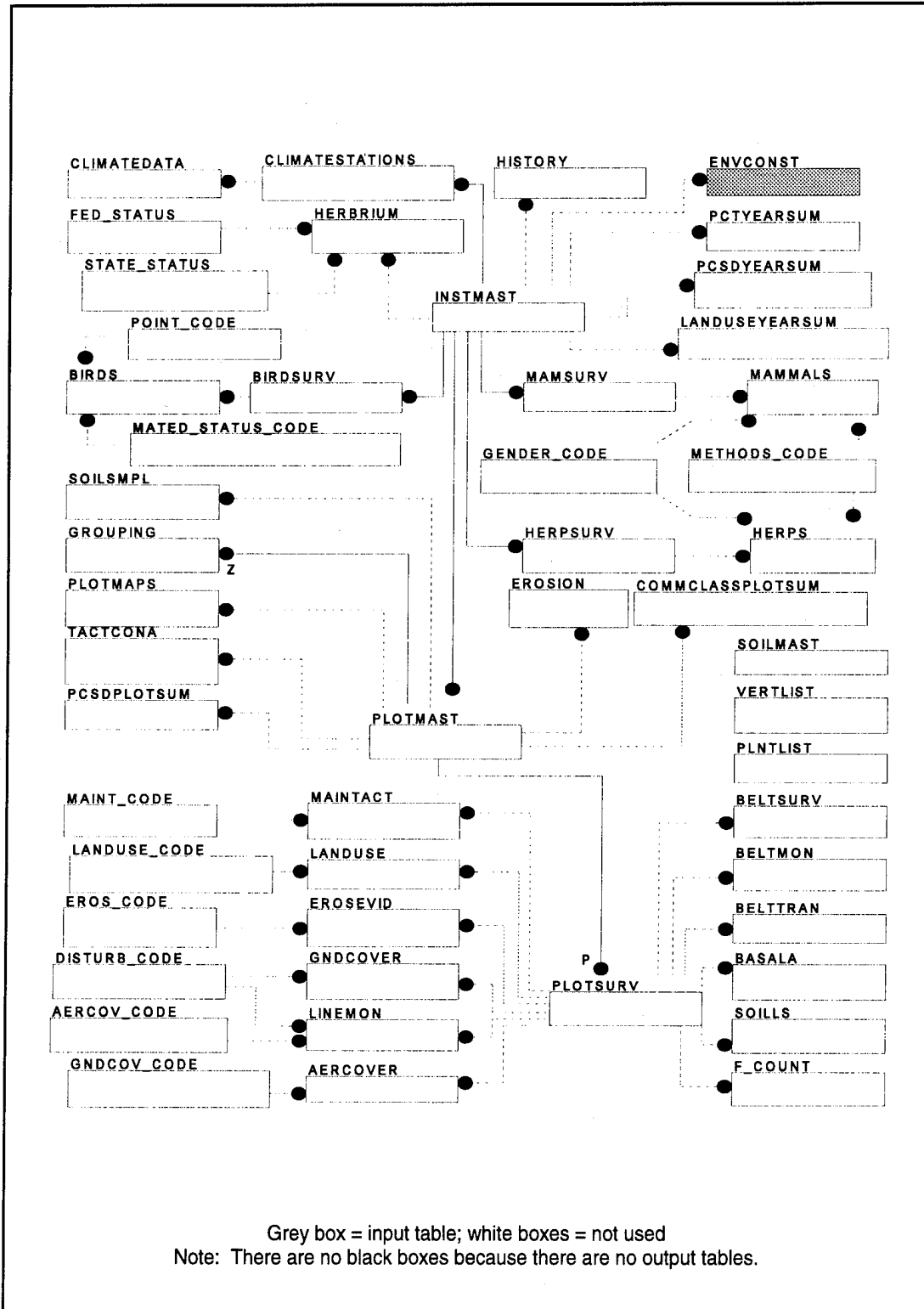

Grey box = input table; white boxes = not used
Note: There are no black boxes because there are no output tables.

Figure 65. LCTA reduced entity relationship diagram and environmental constraints input tables.

Table 12 lists all database tables and columns used for the environmental constraints data summary.

Table 12. Environmental constraints summary database tables and columns table.

Table Name	Column Name	Column Use	Base	Contents
EnvConst	CaseNo	I,C	I,O	case number
	Unit	D	I,O	training units affected
	Restraint	D	I,O	environmental constraint/restraint
	Impact	D	I,O	impact on training
	Realism	D	I,O	loss to training realism
	Mitigation	D	I,O	mitigation strategies
	Research	D	I,O	research needs
	RecDate	I	I,O	date information entered or updated
	UpdateNo	I	I,O	update version number

Column Use:

    C   Connector   Column values used to properly join information
                             from multiple tables
    D   Data   Column values used as data in summary
    I   Identifier   Column values used to identify data elements

Base:

    I   Input column for summary
    O   Output column for summary

Output files. The following lists describe each output file created by a data summary.

    Output Files
    None

Methods. The program organizes, retrieves, and updates database information. No calculations are required.

When the <Env. Constraints> menu item is selected, a separate window will appear with its own menu (Figure 66).
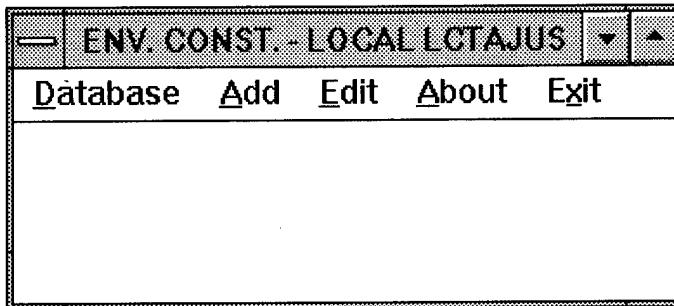
Figure 66. Environmental constraints window.

A database menu item is available to change the active database. The active database will be listed in the window title. The default database is the current database of the LCTA Program Manager.

The <Add> menu selection will create a new environmental constraint entry in the database. An environmental constraint is any constraint that is identified, defined, and documented. Frequent constraints are: cultural resources, wildlife resources, wet lands, restricted use areas, and restoration programs.
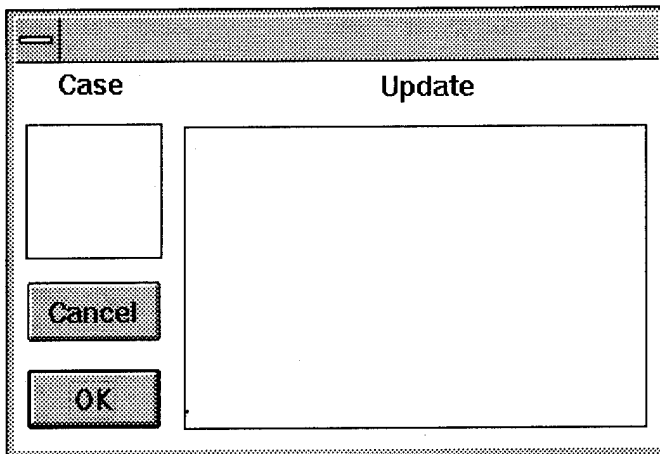
Figure 67. Environmental constraint selection dialog box.

The <Edit> menu selection will modify an existing environmental constraint or append new data to an existing constraint. Select the <Edit> menu item to get a list of case codes and the available update versions available (Figure 67). Select the case desired. The available list will be updated for the selected case. Select the desired update version. Select the OK button to view the selected data.

The selected information will be displayed in the constraint information dialog box (Figure 68).

Figure 68. Environmental constraint add/edit/view dialog box.

Enter or edit the required information. Select <Quit> if changes are not to be saved or data was for viewing only. Select <Update> to save editing changes or newly entered data. Select <Append> to add a new update version of the data. Appending keeps both the original data and the modified data. Update only stores the modified data, the original data is not stored.

Utilities Menu Options

The following menu options are displayed in the pull down menu after the utilities menu option in the main menu has been selected.
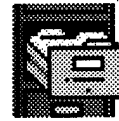
Load

HHFiles

Loading Handheld Files

The Update Handheld Files program automates the entry of data into the database.

Uses. The program automates loading of data from handheld field computer files into the database. The program also checks for errors in the handheld files and reports the type of problem and the location of the problem.

Access. To load handheld files, select the <Utilities> menu option and the <Load HH Files.> submenu. Entering <Alt-U,H> from the computer keyboard also will start the application. To start the application from outside the LCTA Program Manager, select the Load HH Files icon in the Windows™ WinLCTA program group.

Database inputs and outputs. The database diagram in Figure 69 lists all database tables used for the load handheld files utility. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.
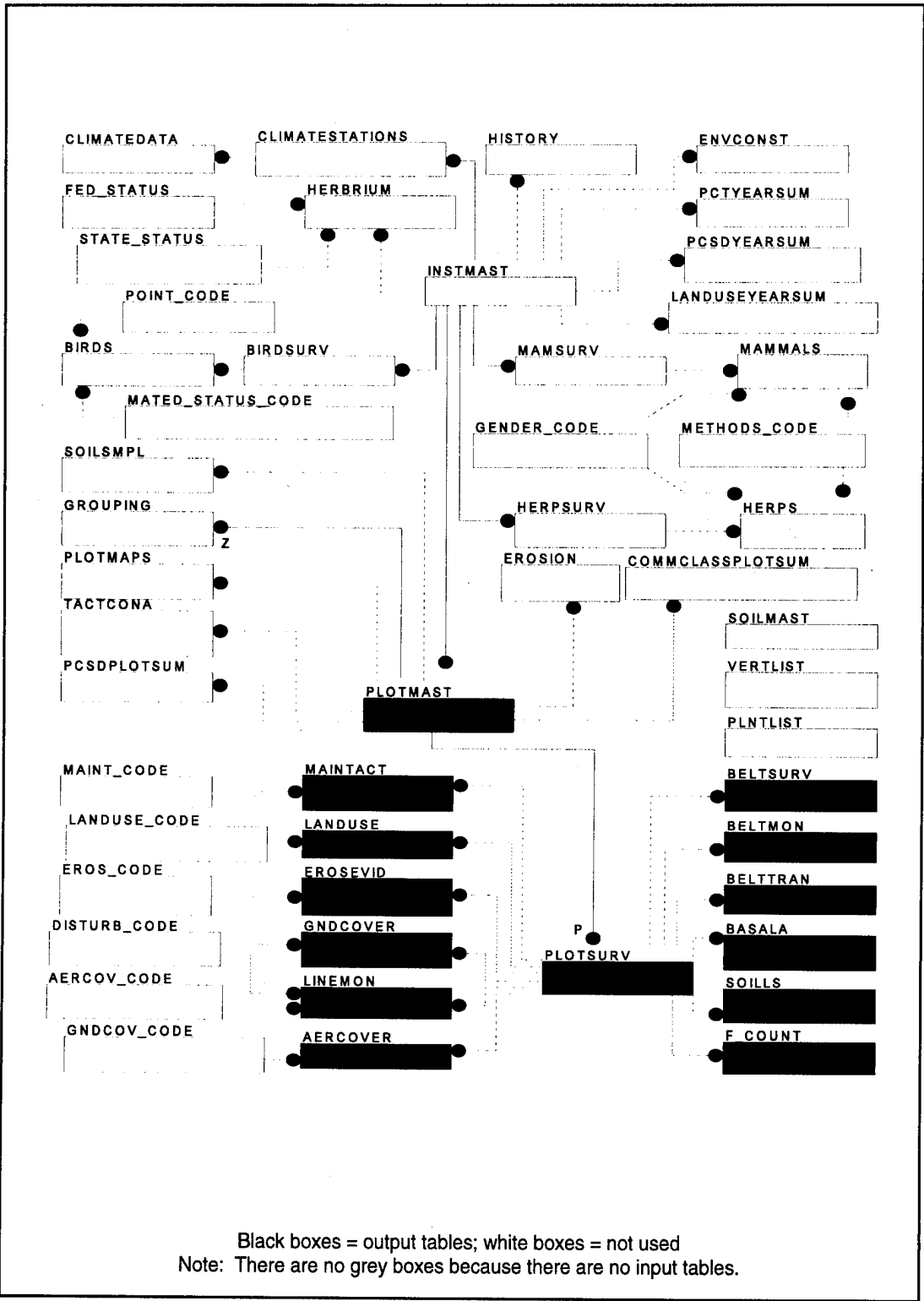
Black boxes = output tables; white boxes = not used
Note: There are no grey boxes because there are no input tables.

Figure 69. LCTA reduced entity relationship diagram and load handheld files utility input tables.

Table 13 lists all database tables and columns used for the load handheld files utility.

Table 13. Load handheld files data utility database tables and columns table.

Table Name	Column Name	Column Use	Base	Contents
PlotMast	All Columns	D	O	basic plot information
PlotSurv	All Columns	D	O	annual measurement information
GndCover	All Columns	D	O	ground cover line data
AerCover	All Columns	D	O	aerial cover line data
LineMon	All Columns	D	O	monitoring line data
BeltTran	All Columns	D	O	belt transect data
BeltSurv	All Columns	D	O	belt survey data
BeltMon	All Columns	D	O	belt monitoring data
MaintAct	All Columns	D	O	maintenance data
LandUse	All Columns	D	O	land use data
ErosEvid	All Columns	D	O	erosion evidence data
F_Count	All Columns	D	O	frequency count data
SoilLS	All Columns	D	O	soil slope data
BasalA	All Columns	D	O	basal area data

Column Use:

    C   Connector   Column values used to properly join information from multiple tables

    D   Data   Column values used as data in summary

    I   Identifier   Column values used to identify data elements

Base:

    I   Input column for summary

    O Output column for summary

Input and output files. The following lists describe each output file created by a data summary.

Output Files

LoadFile.txt   Tabular progress report

InPut Files

File of the form: II-M-D.P   where II is installation code, M is numeric month of measurement date, D is numeric day of measurement date, P is plot number. Only files

with this naming convention will be loaded with
the <Load All> option set. If drag and drop is
used to load files, any naming convention can be
used.

Methods. The <Upload Handheld Files> command loads handheld output files from
the handheld field computers into the LCTA database. Information relating to the
files loaded in the database are stored in a file. After all files are loaded, an entry is
added to the "Analysis Queue."

There are two options for loading handheld files. The loading option is set with
<Utilities><Options><Load All> menu selection. If load all is checked, the loading of
handheld files will proceed in the background, and all files will be loaded. If the "Load
All" option is not checked, an icon will appear but no files will be loaded until a load
file name is dragged from the Windows™ File Manager to the icon and released.

The "Load All" option will look only for handheld files in the HHFILES directory. The
drag and drop method will accept files from any directory. Backup copies of all
handheld files should be stored in another location than the HHFILES directory. This
will protect the data from any software, hardware, or personnel problems.

With the "Load All" option, all files are renamed after loading to prevent the files from
being reloaded at a later date. All "-" in the file name are converted to "_" in the new
file name. No other changes are made so file names still should be easy to understand.
With the "Drag and Drop" option, file names are not changed after the data is loaded
into the database. The program user must keep track of which files were loaded.

The same file can be repeatedly loaded into the database without problems. When a
new plot is loaded, all information currently in the database for the same plot and date
are removed before the new current data is added (with the exception of data collected
on two handheld computers). To reload a file that has been loaded and renamed
already, the file must be renamed to the original file name (convert all "_" in the name
to "-"). If the drag and drop method of loading handheld files was used, the handheld
files do not need to be renamed.

The <Upload Handheld Files> program will create an information file on the results
of all the files loaded into the database. To see this information select <Analysis>,
then select <Waiting To View>. Select "LoadFile" from the dialog box list ("LoadFile"
will not appear until the upload handheld files program has been completed). The
output file will list each handheld file loaded into the database. Additional
information detailing problems encountered loading the handheld files also may be

included. A message for each handheld file loaded will indicate if the handheld file was renamed.

Error messages specifying data observations not being added to a database table are common. The messages mean that the handheld file contains missing data that was not loaded into the table. Many database table columns will not accept missing or invalid column values. This database feature is referred to as referential integrity. See the database documentation for more information on these features of the database. To correct the problems, edit and reload the handheld file or edit the data already in the database table. Edit the handheld file by opening the file with the handheld field recording program. Edit the database directly by using the LCTA users interface data editing features, Quest®, or another third party data editing tools.

If the current date and the date the plot was measured are not in the same year, a dialog box will be displayed. The dialog box allows the plot measurement date to be changed. This feature checks for a common data recording error. Most data files are loaded into the database the same year the data was collected. Field recorders with battery problems frequently have reset computer clocks. The program assumes that, if the measurement year and current year are not the same, the measurement year is incorrect due to battery problems. The dialog box provides an easy mechanism to identify and correct the problem before data enters the database. If the measurement date is correct, simply accept the date and continue loading the data.

The Load Handheld Files program will load any valid file created by a handheld program created by the handheld compiler program. The program can handle a variety of data collection methods:

- The program will load data files created by the handheld program with any variety of options specified.
- The program will handle data collected on more than one handheld computer. The data can be collected in a variety of means on the handheld computers.
- The program will handle missing data that the database will not allow into a table.

When collecting field data in a nonstandard way, contact the LCTA assistance center for assistance on how installation-specific collection methods will affect the handheld computer and the load data program. After the first few field plots have been measured, load the handheld files into the database. This will identify any problems early in the field season.

Spp
Update

Update Species Lists

The update species table summary creates or updates the local LCTA database copy of the SCS Plants database. All vegetation and vertebrate information required for standard LCTA data analyses is added to the local LCTA database table.

Uses. The program automates creation of the local species tables. Local PlntList and VertList tables provide faster access to frequently used data. If disk space is limited (using the software on a portable or home computer), the complete species database does not need to be stored on the computer. The local species tables allows customization of vegetation and vertebrate information for installation-specific needs without compromising standard methods and analyses or the master species database.

For example, a plant species may have a life form more similar to a shrub than a tree because the installation is located at the northern edge of the plants habitat range. The local PlntList table can be modified and data summaries rerun. The affect of changing species life form on PCC summaries can be evaluated by comparing prechange results with postchange results. The local PlntList table can be repopulated with standard data by deleting all PlntList table entries and rerunning the <Update Species List> program.

If unknown plant species codes exist in the data tables, the local PlntList table allows data to be used in standard data summaries without knowing the correct species code. Enter the unknown code in the local PlntList table. Fill in all table fields where information is available (annual or perennial, deciduous or coniferous, grass or forb, or tree). The data analysis programs will use any unknown codes that have sufficient information required by the summary. The PlntList table can be updated when the final species determination is made.

The <Update Species Lists> program can be used to locate errors in the data before running analysis programs. The program will identify all unknown VegID's and VertID's. The program will identify missing information required for certain analyses.

Access. To update the local species list, select the <Utilities> menu option and the <Update Species Lists.> submenu. Entering <Alt-U,S> from the computer keyboard also will start the application.

Database inputs and outputs. The database diagram in Figure 70 lists all database tables used for the update species code data utility. See the Analysis Menu Options section earlier in this chapter for more detailed information about entity relationship diagrams.
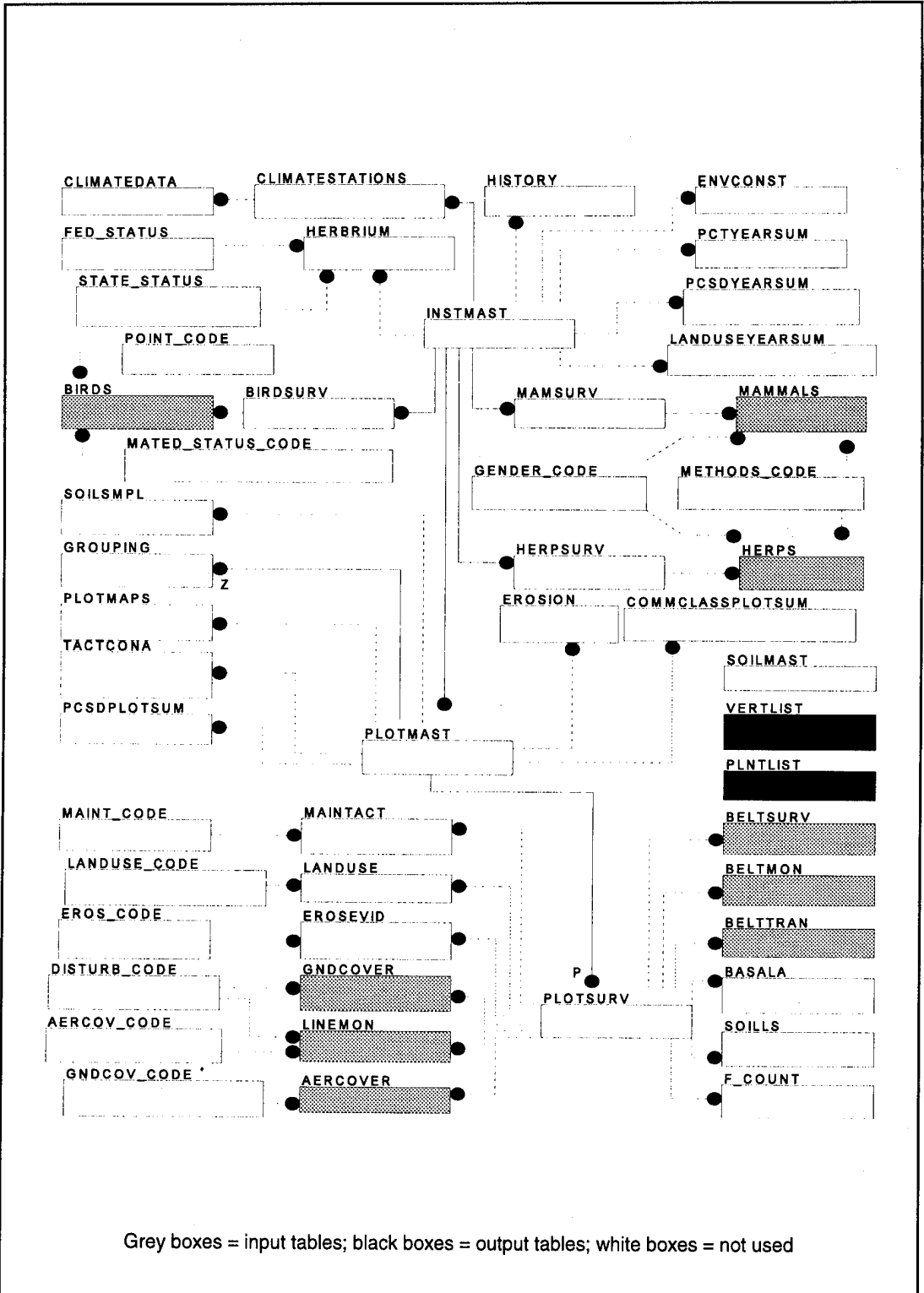
Grey boxes = input tables; black boxes = output tables; white boxes = not used

Figure 70. LCTA reduced entity relationship diagram and species utility input tables.

Table 14 lists all database tables and columns used for the update species code data utility.

Table 14. Update species code data utility database tables and columns table.

Table Name	Column Name	Column Use	Base	Contents
GndCover	VegID	D	I	vegetation code
AerCover	VegID	D	I	vegetation code
BeltMon	VegID	D	I	vegetation code
BeltTran	VegID	D	I	vegetation code
BeltSurv	VegID	D	I	vegetation code
LineMon	VegID	D	I	vegetation code
Birds	VertID	D	I	vertebrate code
Mammals	VertID	D	I	vertebrate code
Herps	VertID	D	I	vertebrate code
PlntList	VegID	C	O	vegetation code
	Family	D	O	scientific family name
	Genus	D	O	scientific genus name
	Spec	D	O	scientific species name
	SubSpec	D	O	scientific subspecies name
	Variety	D	O	scientific variety name
	Life	D	O	life form (annual, perennial)
	Origin	D	O	plant origin
	Form1	D	O	life form (tree, grass, forb, etc.)
	Form2	D	O	life form modifier (vine, etc.)
	TSType	D	O	tree shrub type (conifer, deciduous)
	Synon	D	O	synonym name
VertList	VertID	C	O	vertebrate code
	Class	D	O	scientific class name
	Order	D	O	scientific order name
	SubOrder	D	O	scientific suborder name
	Family	D	O	scientific family name
	SubFam	D	O	scientific subfamily name
	Genus	D	O	scientific genus name
	Spec	D	O	scientific species name
	Common	D	O	common name

Table Name	Column Name	Column Use	Base	Contents
	Authors	D	O	reference authors
	VertStat	D	O	endangered status
	VertNote	D	O	general note
Verts	VertID	C	I	vertebrate code
	Class	D	I	scientific class name
	Order	D	I	scientific order name
	SubOrder	D	I	scientific suborder name
	Family	D	I	scientific family name
	SubFam	D	I	scientific subfamily name
	Genus	D	I	scientific genus name
	Spec	D	I	scientific species name
	Common	D	I	common use name
	Authors	D	I	reference authors
	VertStat	D	I	endangered listing status
	VertNote	D	I	general use note
Plants	VegID	C	I	vegetation code
	Family	D	I	scientific family name
	Genus	D	I	scientific genus name
	Spec	D	I	scientific species name
	SubSpec	D	I	scientific subspecies name
	Variety	D	I	scientific variety name
	Life	D	I	life form (annual, perennial)
	Origin	D	I	plant origin
	Form1	D	I	form type (grass, forb, tree, etc.)
	Form2	D	I	form modifier (vine, etc.)
	TSType	D	I	tree shrub type (conifer, deciduous)
	Synon	D	I	synonym name
TSType	VegID	C	I	vegetation code
	TSType	D	I	tree shrub type (conifer, deciduous)

Column Use:

    C   Connector   Column values used to properly join information
                          from multiple tables
    D   Data   Column values used as data in summary
    I   Identifier   Column values used to identify data elements

Base:

    I   Input column for summary

    ·O   Output column for summary

Output files. The following lists describe each output file created by a data summary.

Output Files

       SppList.txt   Tabular data summaries

Methods. The <Update Species Tables> command searches the current LCTA database for all species IDs, obtains information about all new IDs from the species database, and adds the information to the current LCTA database. All measurement plots (core and special use) and all measurement years are used to construct the list.

Maps

The following menu options are displayed in the pull down menu after the <Maps> menu option in the utilities menu under the main menu has been selected. General, local, and miscellaneous maps are digital hand drawn maps used to document the location of LCTA plots. Photos are digital photographs documenting the location and vegetation of the LCTA plots. Installation maps are GIS maps stored in the database for displaying LCTA data.

When <General>, <Local>, <Misc.>, or <Photos> menu items are selected, a Year-Plot dialog box will prompt for the plot number and year of the map (Figure 71).

If the current window is a graphic window, a dialog box will appear (Figure 72). Specify if the current windows contents are to be stored as a map or to retrieve a stored map. If a map is to be stored, the year-plot dialog box will appear. Enter the year and plot number of the map being stored.

Figure 71. Year-plot selection dialog box.
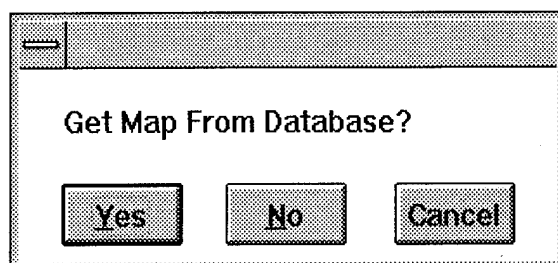
Figure 72. Insert, retrieve map dialog box.

General. General plot maps are small scale maps used to find the general location of a plot. The maps usually have major road and landmarks.

Local. Local plot maps are large scale maps used to locate the exact location of the plot. The map usually will show local features found near the plots.

Miscellaneous. Miscellaneous plot maps are user-defined maps and can be any additional map the field crew documented.

Photos. Plot photographs are used to locate the plot and to provide a general idea of the type of vegetation on the plot. The photo is a composite of a group of photographs taken when the plot was established.

Installation. Installation maps are GIS maps stored in the database. When <Installation> is selected, a dialog box listing each installation map stored in the database appears (Figure 73). Select the desired map.

When storing an installation map, a dialog box will prompt for the map name, lower left map coordinates, and upper right map coordinates (Figure 74).
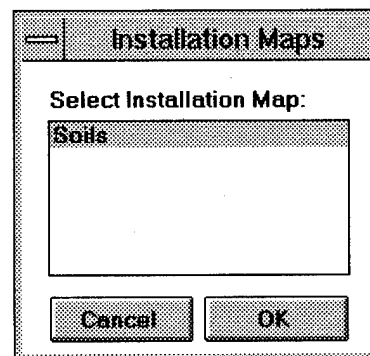
Figure 73. Map selection dialog box.

SQL Selection

The <SQL Selection> command executes the SQL query command in the current window and displays the results in a window titled "SQLFile". If text is highlighted, the SQL query is assumed to be the highlighted text. If no text is highlighted, the SQL query is assumed to be the whole line on which the cursor is located. All queries are to the active database listed in the LCTA
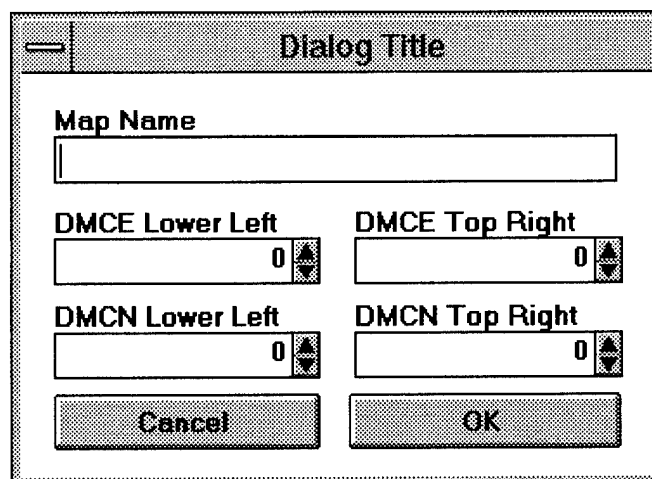
Figure 74. Map insertion dialog box.

Program Manager window title. Any valid "Select," "Update," "Delete," "Insert" command is allowed. See the SQLBase documentation for valid SQL syntax.

One option affects the behavior of the <SQL Selection> command. If the "SQL Overwrite" option is checked, all output from a query will be added to the current SQLFile window overwriting the last query's results. If not checked, the SQL query results will be written to a new SQLFile window.
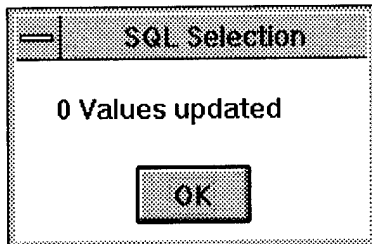
Select statements will produce an output spreadsheet. If no data was selected, the spreadsheet will contain no data rows. Update and delete statements produce no database output; however, a dialog box will display the number of rows affected (Figure 75).

Figure 75. Update, delete changes dialog box.

If the SQL statement is invalid, a dialog box will display error information (Figure 76). A short explanation of the problem will be listed. The error code is a number that can be looked up in the database documentation for more detailed information. The error location is the number of characters from the beginning of the SQL command where the error occurred.
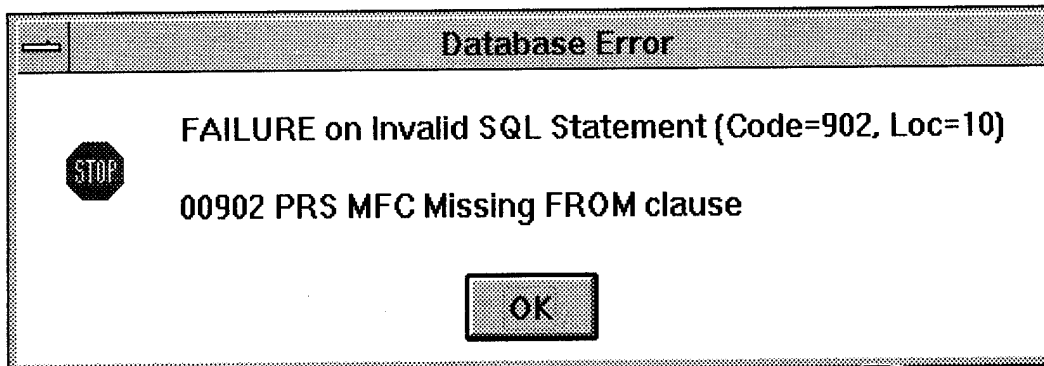
Figure 76. Database access error messages dialog box.

Table Size

The <Table Size> command opens a dialog box that lists the number of rows in any LCTA database table (Figure 77). Select a table from the drop down list box. The table size will be listed in the lower display box.
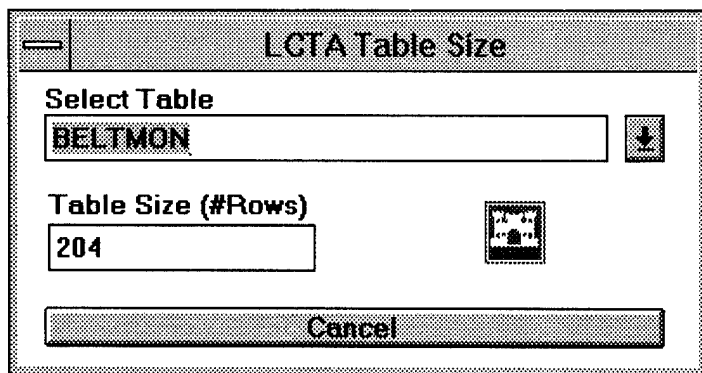
Figure 77. Database table size dialog box.

The table size dialog box is useful when loading data into the database or deleting data from the database. Check the size of a table before and after adding or deleting data to verify that the correct amount of data was added or deleted.

Set Options

The following menu options are displayed in the pull down menu after the <Set Options> menu option in the <Utilities> menu has been selected.

Save files. The <Save Files> option controls whether files created by analysis menu selections are written to a disk file or not. If the option is checked, all windows contents are stored in a disk file. If not checked, no files will exist on disk. A prompt to save a windows contents to a file will appear whenever a window is closed that does not have an associated disk file.

The purpose of this option is to allow or prevent output files from appearing on disk when preliminary analyses are run. Preliminary analyses with incomplete or uncorrected data may produce invalid summary results. Output files from incomplete data may accidentally be used in reports if the files reside on the disk.

Save work space. The <Save Work Space> command allows all opened windows in the LCTA Program Manager to be recorded when the program is terminated. The next time the LCTA Program Manager is started, these same windows will be reopened automatically.

Load all. There are two options for loading handheld files. If "Load All" is checked, the loading of handheld files will proceed in the background. All files with a valid LCTA handheld file name for the current database will be loaded from the default handheld directory. If the "Load All" option is not checked, an icon will appear but no files will be loaded until a load file name is dragged from the Windows™ File Manager

to the icon and released. See the section on loading handheld files earlier in this chapter for more detailed information.

Overwrite SQL. If the <Overwrite SQL> option is not checked, all output from a SQL query will be added to a new output window. Multiple queries will create multiple output windows. If <Overwrite SQL> is not checked, all output from SQL query commands will be displayed in one window. Multiple queries will never create more than one output window. Each new query will overwrite the results of the previous query.

To examine the output of several SQL commands at the same time, remove the checkmark from the <Overwrite SQL> menu item. If executing SQL commands one at a time to edit data, the <Overwrite SQL> options should be checked.

Tool bar. The tool bar provides an alternative means of selecting LCTA menu options (Figure 78). Frequently used LCTA Program Manager menu selections are contained in the tool bar. Checking the <Tool Bar> option displays the tool bar. Removing the checkmark from the <Tool Bar> hides the tool bar.
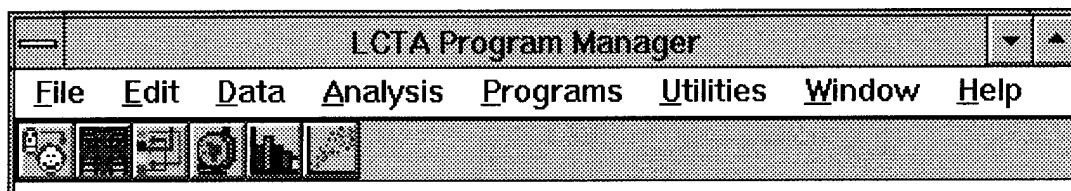

Figure 78. Program tool bar.

Tool bar buttons perform spreadsheet and graphics utilities. The utility of each tool bar button (left to right) is to change spreadsheet headers, change spreadsheet dimensions, sort spreadsheet columns, display spreadsheet data on an installation map, graph spreadsheet data in a bar chart, and plot spreadsheet data.

 To change spreadsheet column header names, select the change headers button. A dialog box will appear and prompt for column name changes (Figure 79). Select any column name from the column name list. Enter the new column name in the edit box. Select <Update> to change the column name. The column list will display the updated column names. After all column names are acceptable, select <Quit>. Use the change headers button to customize output reports.
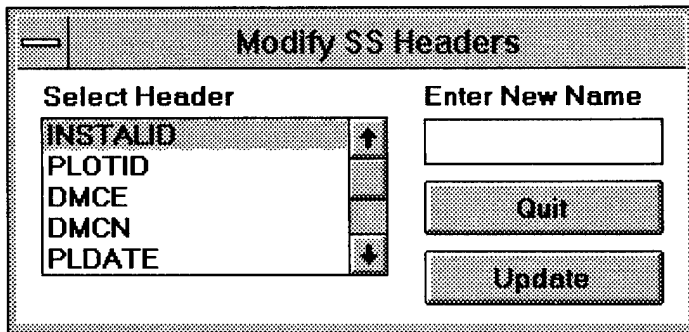
Figure 79. Change spreadsheet headers dialog box.

To change the spreadsheet dimensions, select the dimensions tool bar button. A dialog box will appear and prompt for the appropriate changes (Figure 80). Indicate whether columns or rows are to be changed. Select adding or deleting cells. Indicate whether the changes will be made before or after the currently active spreadsheet cell. If adding a column, specify whether the column should be text or number format. Select <OK> to commit the spreadsheet changes.
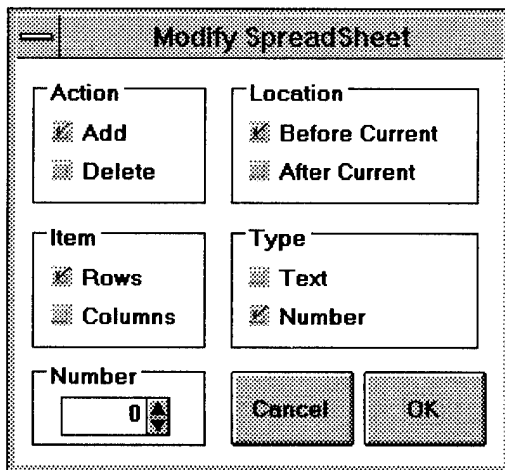

Figure 80. Modify spreadsheet dimensions dialog box.

To sort the rows in a spreadsheet, select the sort button from the tool bar. A dialog box will appear and display the sorting options (Figure 81). Up to three columns can be sorted in one operation. Select the column to control the sort order and whether the column should be sorted in ascending or descending order. Only the order of rows are sorted. The cells in a row will always remain together. Select <OK> to commit spreadsheet changes.
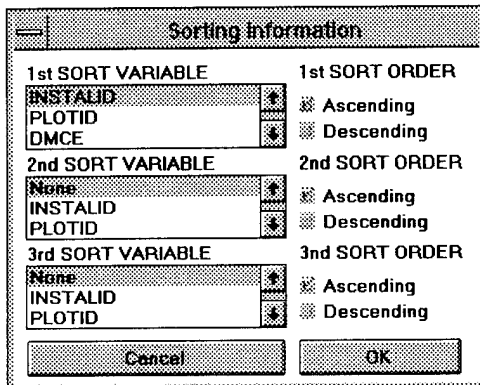
Figure 81. Sort spreadsheet dialog box.

Select the map button from the tool bar to display the current spreadsheet data on a map. The map button is used to browse through a spreadsheet's data based on the location of the data source. A spreadsheet must have a column for DMCE and DMCN because the database maps use these coordinates. A dialog box will prompt for the X axis column (DMCE), the Y axis column (DMCN), and the database installation map (Figure 82). Select the OK button to view the selected map. A point on the map will mark the location of each spreadsheet data row. To browse through the spreadsheet data, locate the mouse pointer over a location on the map window and press the right mouse button. The active spreadsheet cell will move to the data associated with the selected point.

To close the map hot graph, make the spreadsheet the active window and select the map button from the tool bar.
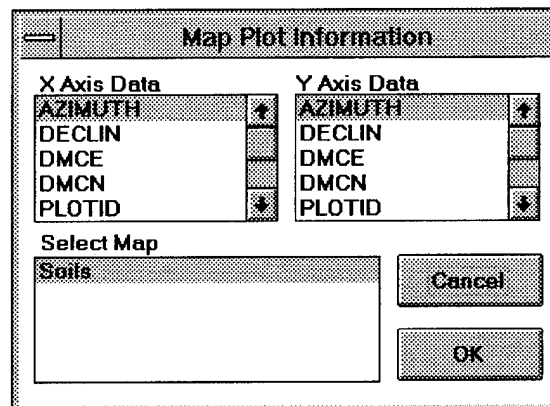

Figure 82. Map data plot options dialog box.

Select the bar chart button from the tool bar to display spreadsheet data in a bar chart. A dialog box will prompt for the X axis column, Y axis columns (one or more), and bar chart style (Figure 83). Select the OK button to view the selected bar chart. Move the mouse to any bar and press the right mouse button. The current spreadsheet cell will move to and highlight the selected data. To close the bar chart window, make the spreadsheet the active window and select the bar chart button from the tool bar.
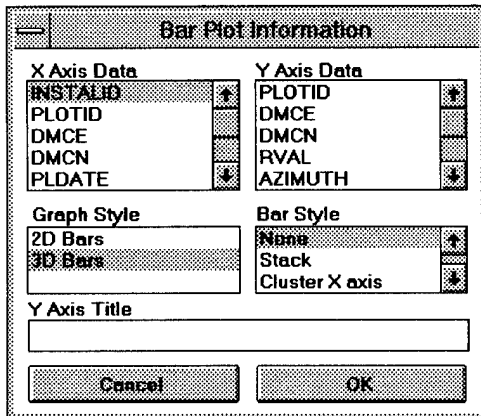
Figure 83. Bar chart options dialog box.

 Select the scatter plot button from the tool bar to display the spreadsheet's data in a bar chart. A dialog box will prompt for the X axis column, Y axis column, and line styles (Figure 84). Select the OK button to view the selected scatter plot option. Move the mouse to any data point and press the right mouse button. The current spreadsheet cell will move to the selected data. To close the scatter plot window, make the spreadsheet the active window and select the scatter plot button from the tool bar.
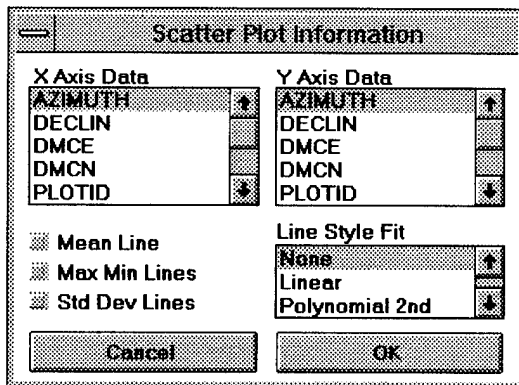

Figure 84. Scatter plot options dialog box.

Tool Box

The tool box provides an alternate means to start LCTA programs. The tool box is useful when running a number of analyses. Because most summaries require the same input values, the tool box only requires the input values to be specified on time.

When the <Tool Box> option is selected, a dialog box will be displayed (Figure 85). Select the desired options. These options will remain in effect until changed.
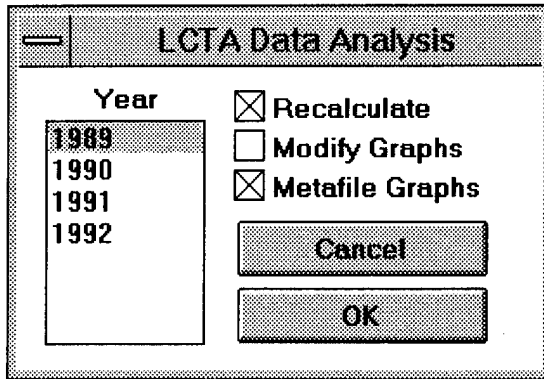
Figure 85. Data analysis options dialog box.

To change the options for the tool box, run the next analysis from the LCTA Program Manager menu system. The tool box will use the new options selected during the last analysis.

Select the <Tool Box> menu item to remove an existing tool box.

The buttons on the tool box match the pictures next to each analysis title in this documentation (Figure 86). The menu command associated with each button is as follows (left to right, top to bottom) :

Land Use

Plant Community Classification (PCC)

Belt Summaries

Plot Summary

SQL Selection

Data Dictionary

Plant Cover Surface Disturbance (PCSD)

Erosion

Enter/Edit/View

Update Species Lists

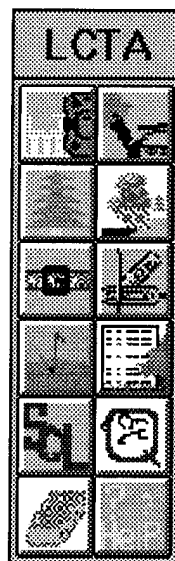View Analysis Queue

Help for Selection

Figure 86. Program tool box.

Programs Menu Options

The following menu options are displayed in the pull down menu after the programs menu option in the main menu has been selected.

TES

The <TES> command calls the Threatened and Endangered Species program. Additional information about the TES program is contained within the TES program.

Create HH PGM

The LCTA handheld compiler program is designed to produce custom source code for the LCTA data recording programs for inventory and monitoring data collection using the options specified by the user. After the source code has been written, the turbo pascal command line compiler is used to generate executable files that can be loaded on to the handheld computers.

Although a standard set of data must be collected for the LCTA program, many installations have a need to collect supplementary data for regional differences or installation-specific needs. The <create HH Prg> menu selection allows installation personnel to customize the handheld program to their needs by adding addition variables.

See the LCTA handheld Program Generator documentation (Anderson et al., July 1995) for more detailed information.

Windows Menu Options

The following menu options are displayed in the pull down menu after the Windows™ menu option in the main menu has been selected.

Tile

The <Tile> command arranges all open windows so no window is hidden by another window. The size and shape of windows will depend on the number of open windows and the size of the LCTA Program Manager window.

Windows™ Metafile (.WMF) windows often appear distorted if not maintained near their original shape. Tiling may distort .WMF files.

Cascade

The <Cascade> command arranges all open windows so the windows are all the same size and shape and overlapped. Cascading will allow some part of every window to be visible. This command will provide access to hidden windows.

Arrange Icons

The <Arrange Icons> command neatly arranges all icon windows at the bottom of the LCTA Program Manager window.

Close All

The <Close All> command closes all windows in the LCTA Program Manager window. This command is useful after opening a group of windows from the analysis queue and before opening the next group of windows from the analysis queue.

Open Window List

The "Open Window List" is a list of currently available windows inside LCTA Program Manager. Selecting a name from the list will bring that window to the front of the screen in its current shape and size. If many windows are open, this is a convenient way to browse through a collection of windows or to find a hidden window.

Help Menu Options

The following menu options are displayed in the pull down menu after the help menu option in the main menu has been selected.

Help Documents

The <Help Documents> command opens the help window at the beginning of the table of contents for a selected help topic. A dialog box will appear listing all available help sessions (Figure 87). Select the appropriate help session. A help session is a group of help topics that are all related to one general topic or program. Each help sessions is related to some aspect of LCTA; items in a session are generally distinct from other session topics.

Help For Selection

The <Help For Selection> command
opens the help window with informa-
tion about the highlighted text of the
currently active window. If an error
message appears in the help window,
no help was found for that key word.

Figure 87. Help documents dialog box.

In text documents, double clicking
the left mouse button will highlight
one word for help selections. Highlighted text for help is sensitive to extra spaces,
characters, punctuation, etc. when looking for help in the help file.

A dialog box will appear and prompt for the appropriate online help session (Figure
87). Select the appropriate help session. Generally the default help session is the
appropriate help session. However, related information may be found in other help
sessions.

Database Data Dictionary

The database data dictionary provides definitions of table and column names in the
active LCTA database (Figure 88). This data dictionary is self-updating. If
installation-specific tables or columns have been added to the database, the data
dictionary utility will automatically display these tables and columns. When updates
or modifications are made to table or column descriptions, these changes are updated
automatically in the data dictionary.

Select a database table from the table
drop down list. A definition of the table
and a list of the columns found in the
table will be displayed. Select a column
from the column drop down list to obtain
a description of the selected column.

When creating new tables or columns in
the database, be sure to add descriptive
information to the "Remarks" section.
The "Remarks" information is used by the
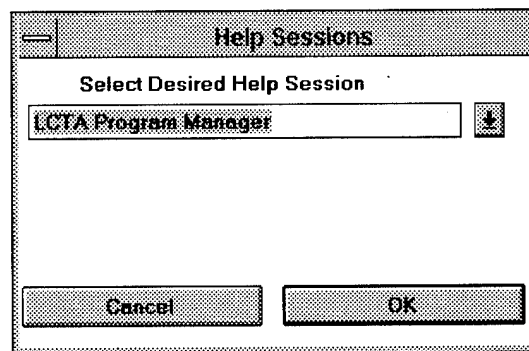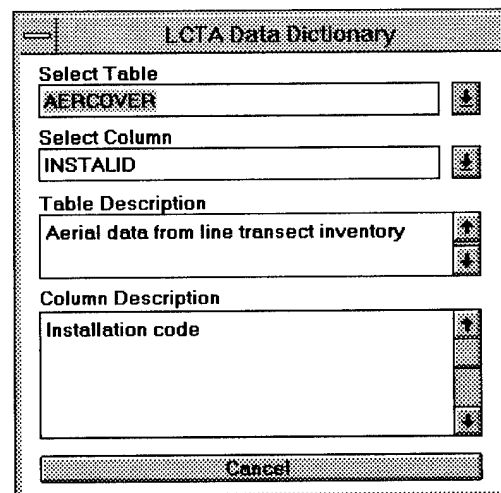database dictionary tool.

Figure 88. Data dictionary dialog box.

About LCTA

The <About LCTA> command displays the version number of the program. This information may be requested when calling for program technical support.

References

Anderson, A.B., W. Sprouse, D. Kowalski, and R. Brozka, *Land Condition Trend Analysis (LCTA) Data Collection Software Users Manual: Version 1.0,* ADP Report 95/13 (U.S. Army Construction Engineering Research Laboratory [USACERL], July 1995).

Sprouse, W.L., and A.B. Anderson, *Land Condition Trend Analysis (LCTA) Program DATA Dictionary,* ADP Report EN-95/03/ADA295608 (USACERL, April 1995).

Tazik, D.J., S.D. Warren, V.E. Diersing, R.B. Shaw, R.J. Brozka, C.F. Bagley, and W.R. Whitworth, *U.S. Army Land Condition-Trend Analysis (LCTA) Plot Inventory Field Methods,* Technical Report N-92/03/ADA247931 (USACERL, February 1992).

Wischmeier, W.H., and D.D. Smith, *Predicting Rainfall Erosion Losses: A Guide to Conservation Planning,* Agriculture Handbook No. 537 (Science and Education Administration, U.S. Department of Agriculture, Washington, D.C., 1978).

Appendix: Forms

Send a copy of the following problem, suggestion, and installation report forms to the USACERL ENL team.

PROBLEM REPORT FORM

User Name: _____ Date:__ /__ / __

Database: _____

Type of Problem: Major Error: []   Minor Error: []
                    Request for Improvement: []

What error occurred or what would you like improved?

_____

_____

_____

_____

_____

Did any error messages appear on the screen? Yes [ ] No [ ]

If yes, please list the error message:

_____

_____

_____

_____

Under which menu item did the error occur or is an improvement requested?

_____

SUGGESTION REPORT FORM

User Name: _____   Date:__ /__ / __

Database: _____

Type of Request: Modify existing analysis: []   Add new analysis: []

                       Modify existing output: []   Modify existing help doc   []

POC for additional information:

Name_____

Address_____

_____

Phone _____

Are you including additional documentation ?   [] Yes [] No

     Algorithm   []   Sample report   []

     Journal reference   []   Other _____

Please describe requested modification or addition:

_____

_____

_____

_____

How will modification/new analysis help you ?

_____

_____

_____

_____

What other installations/personnel could use this ?

_____

_____

INSTALLATION INFORMATION FORM

User Name: _____

Installation Name: _____

Address: _____

_____

_____

_____

Phone: _____

FAX: _____

Date of Installation: _____

Programs Installed:

LCTA Windows Front End   __   Version Number _____

LCTA Handheld Compiler   __   Version Number _____

(Version numbers can be found by starting the programs and clicking on the "About" menu item)

MS-DOS® Version Number: _____

Windows™ Version Number: _____

Computer Brand: _____

Computer Model: _____

	YES	NO		Version
Do you have Turbo Pascal for MS-DOS® installed?	[]	[]		_____
Do you have SQLBase® installed?	[]	[]		_____
Do you have Quest® for SQLBase® installed?	[]	[]		_____

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ATTN: AFZD-DEM
Fort Drum 13602-5097
ATTN: AFZS-EH-E
Fort Irwin 92310-5000
ATTN: AFZJ-EHE-EN
Fort Hood 76544-5057
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Fort Hunter Liggett 93928
ATTN: AFZW-HE-DE
Yakima Tng Center 98901-5000
ATTN: AFZH-Y-ENR
Fort Dix 08640-5500
ATTN: ATZD-EHZ

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ATTN: ATBO-FE
ATTN: ATBO-HE
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ATTN: ATZM-E-PE
Fort Jackson 29207-5660
ATTN: ATZJ-PWN
Fort Gordon 30905-5040
ATTN: ATZH-DIE
Fort Benning 31905-5122
ATTN: ATZB-PWN
Fort Rucker 36362-5135
ATTN: ATZQ-DPW-EN
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