Welcome to FFI

The FFI ecological monitoring utilities, version 1.02.10, are an integration of FEAT and FIREMON, two respected, science-based programs used for fire effects monitoring on public lands. Developed jointly by the National Park Service and the Bureau of Reclamation, FFI is designed as a comprehensive, database-driven framework that organizes sampling protocols, stores field data, and provides analysis tools for vegetation sampling and monitoring programs. FFI is designed for people with vegetation sampling experience who need a way to organize their sampling data so that it can be readily accessed.

The goal of FFI is to act as a robust monitoring tool that can be used across public agencies, as well as private entities, to consistently describe ecological systems. It incorporates components necessary to conduct a successful monitoring program, including an integral database, analysis and reporting tools, a modular spatial component, and a protocol manager that enables users to develop their own sampling methods when needed.

Key concepts

FFI was designed and developed with several key concepts in mind, and it is these concepts that distinguish FFI from other contemporary monitoring tools. Understanding these concepts will help you to make the best use of FFI's capabilities.

- FFI is based on the monitoring protocols and methods used in FEAT and FIREMON and adds several new protocols. (For descriptions of each, see About the FFI protocols in the Additional information section.) Collected monitoring data is maintained independently of the methods and protocols.
- Your methods and data will be permanent and portable. FFI is designed to support your monitoring and data management routines while ensuring that your methods and data remain separate from the tool itself. The tool is database-driven, rather than method-driven. This means that your assembled methods and collected data will always be available to you, whether or not you use them within the framework of FFI.
- Monitoring data is auditable data. FFI can help to ensure that organizations can collect, validate, track, and store auditable environmental monitoring data over the long term, and that the data will continue to be accessible.
- FFI is hierarchical. The tool is based on a hierarchy of geography, time, and method. This hierarchy is imposed and preserved by the database structure. The geographic hierarchy is represented by the administrative unit (whole study area), project unit (sample population), macro plot, and sample. The temporal component is represented by scheduled sample events.

About FFI

FFI incorporates data analysis tools from FEAT and FIREMON for fire effects monitoring. To support other ecological monitoring software tools, FFI provides easy export of data in standard formats.

- FFI uses a Database Administration module to create and store protocol databases.
- FFI provides automated metadata support.
- FFI employs a client-server architecture that is scalable from desktop to server installation, supporting simultaneous multiple user access. Data migration software is available to convert FEAT and FIREMON data for use in FFI.

FFI Modules

FFI is the basic software for desktop computers. The FFI installation package includes additional software modules. Two of these must be installed with FFI, and others can be installed as desired.

- FFI Data Access module. This integral module, installed during the FFI installation, acts as the bridge between the tool and the database.
- FFI Database Administration module. FFI's integral SQL component, the Database Administration module links directly to the server to manage user accounts and user roles as well as handle database management tasks.
- FFI Protocol Manager. An optional component, the Protocol Manager supports development and management of sampling protocols and methods that can be imported into FFI.
- FFI PDA module. The optional PDA module supports use of PDAs (personal digital assistants) for data collection in the field.
- FFI GIS module. An optional component,FFI GIS contains GIS tools that support project unit development, sample design, macro plot location, and spatial data query, allowing you to see your plots in the 'real world'.

Definitions

FFI uses a unique set of definitions derived from FEAT and FIREMON terminology. To understand specific differences between terms used in FFI and terminology used in FEAT and FIREMON, see the Nomenclature table.

Some basic definitions include:

- Program– a collection of projects that use a consistent set of protocols to collect monitoring data for specific sites within multiple geographic locations in response to a research question, or to meet an agency mission or mandate.
- Project unit – a collection of monitoring sites within a specific geographic region, such as a watershed or subbasin, for which monitoring data is collected based on established, approved protocols.
- Protocol – a set of one or more closely related methods, compiled by a researcher, monitoring agency, or other entity, that are used to collect, analyze, and report field monitoring data in a consistent way over time. Protocols are a means of organizing methods in terms of common or related characteristics, so that they can be efficiently filtered and located. A protocol can contain one or more methods, and methods may occur in one or more protocols.

- Method – a systematic procedure for collecting, analyzing, or reporting monitoring data consistently over time. Methods have these characteristics: they can be replicated by others and are described in documentation. In Protocol Manager, it is assumed that methods are contained within protocols, but this is not required. Methods can be created and maintained without protocols. Also, a method may occur in more than one protocol.
- Attribute – a quantitative field measurement or summary value, or a qualitative descriptor, that represents conditions observed in the field.

Links

- On-line FFI information at FRAMES
- On-line users community at Google Groups

There are three separate User's Guides available at FRAMES and on-line:

- FFI (main application)
- Protocol Manager
- GIS Module

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Getting additional help

If you need help beyond the information provided in this *User's Guide*, visit the on-line FFI information page at frames.nbii.gov/ffi. This FRAMES page provides:

- A link to the FFI Google Discussion Group.
- Contact information for email and phone support.
- Links to FFI documentation and training information.
- General information about the FFI ecological monitoring utilities.
- Links to other FRAMES pages.

About the User's Guide

The *FFI User's Guide* covers the following topics:

- Installing FFI.
- Using FFI.
- Getting help.

There are three separate User's Guides :

- FFI (main application)
- Protocol Manager
- GIS Module

Main application

Each *User's Guide* is available in three formats: on-line, as desktop help, and in PDF format. It will be updated as FFI is revised, and updates will be announced to the user community via the on-line FFI information page at frames.nbii.gov/ffi.

See also:

Nomenclature

Text conventions

Text conventions in the *User's Guide*

The table below shows the text conventions used in this manual.

CONVENTION	DESCRIPTION	EXAMPLE
Bold	Something to be selected or clicked; name of module, window, tab, or menu.	The **Database Select** window opens. Click the **New Program** icon. Select **Import** in the **Database** pull-down menu.
Italic	Value; option in a menu or listing	Select the *Tree Data* protocol in the displayed listing.
`courier font`	Text to be entered using the keyboard	Enter `string of text` using the keyboard.
NOTE	Note	Notes provide additional information pertinent to a topic.
CAUTION	Caution	Cautions provide warnings.
Blue underlined italics	Internal links; Web links	See *Using FFI* for more information.

Viewing or printing the *User's Guide*

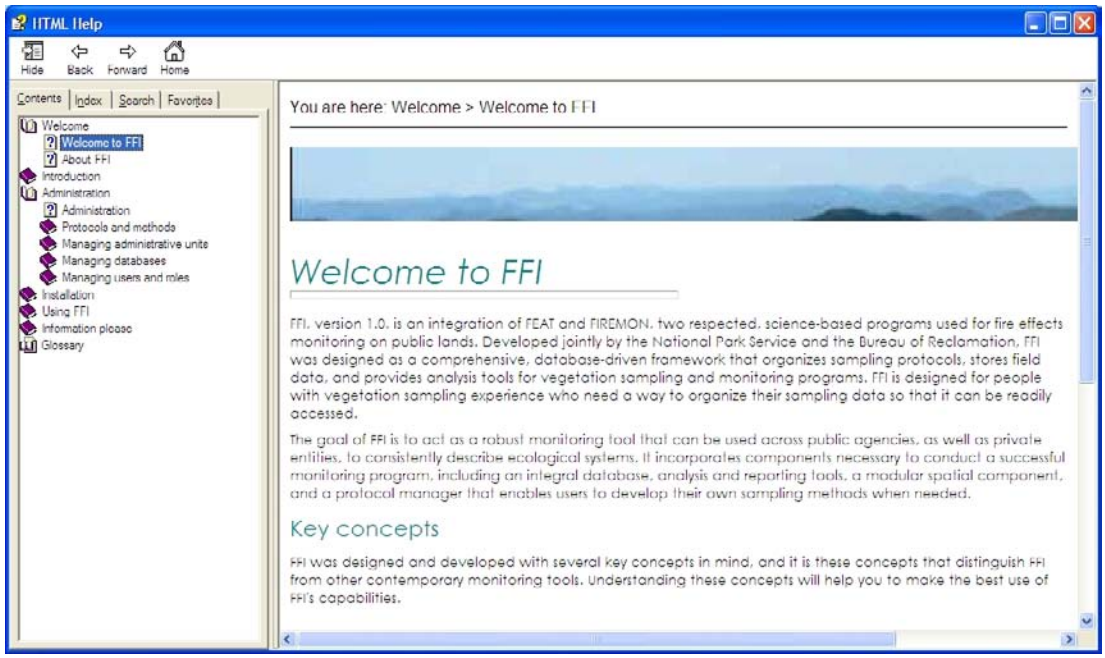
The *User's Guide* is available in three formats, described below.

On-line *User's Guide*

You can reach the on-line help through the link at the top of the FFI window or the FFI FRAMES Web site.

HTML desktop *User's Guide*

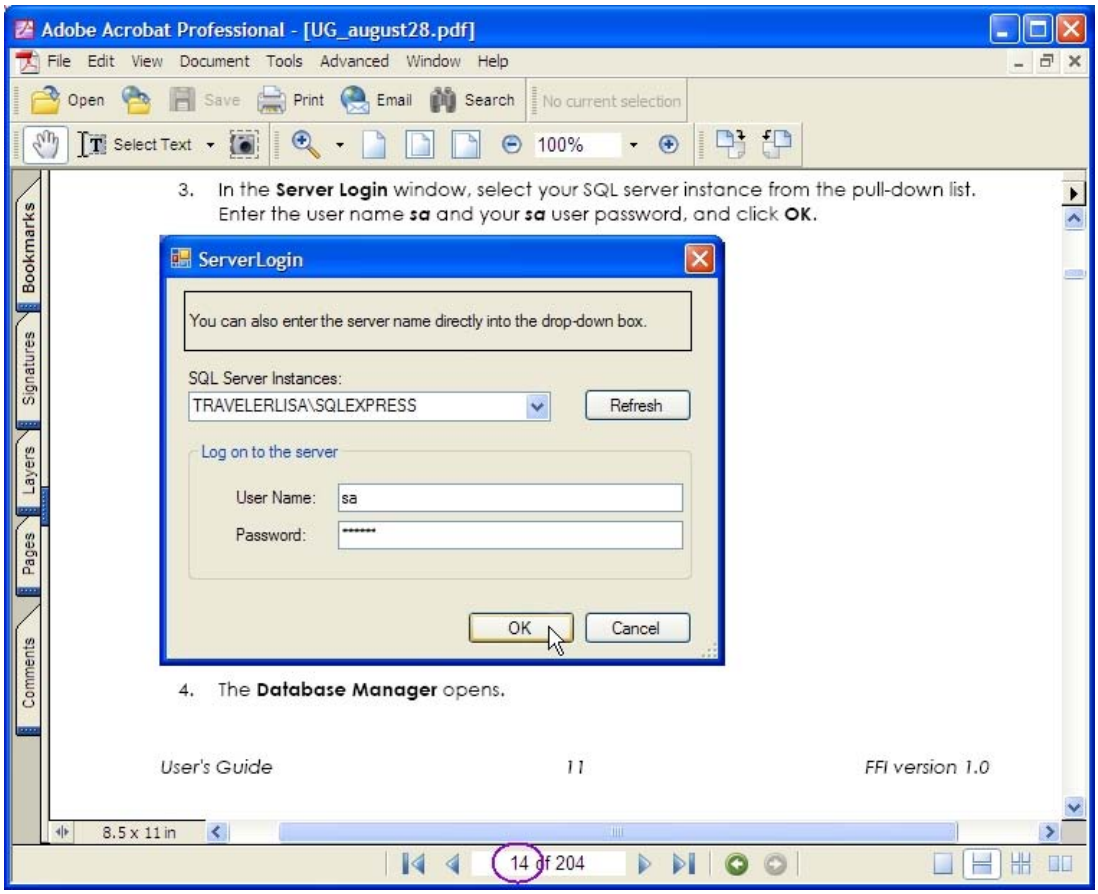
The HTML help (*.chm*) file is available on the FFI FRAMES Web site. If you wish to use the HTML help then copy the *.chm* file to your desktop. The file will display correctly only if it is placed on the desktop.



Adobe PDF *User's Guide*

The Acrobat PDF file can be printed for reference. In Acrobat, click the **Bookmarks** tab to navigate to a topic, or click on a topic in the table of contents. To print, select **File -> Print** and choose a print range of **All**, **Current Page**, or a **Pages From** range.

> *NOTE: When you enter a page range to print, ignore the page numbers on the document and enter the page numbers from the navigation controls at the bottom of the Acrobat window (page 14 in this example).*



Nomenclature

FFI uses specific terminology, some of which is adapted from FEAT and FIREMON, its predecessors. Please familiarize yourself with the terms used in FFI.

FIREMON Term	FEAT Term	FFI Term	Description
Registration ID	Land unit	Administrative unit	The study area, or the entire geographic area covered by a sampling effort.
Project ID	Monitoring unit	Project unit	A subset of the administrative unit; a sample population. A project unit, or project, consists of macro plots, sample events, and status.
	Sample site	Candidate site	A geographic point within a project that has been identified as a potential macro plot.
Plot location	Macro plot	Macro plot	A regularly shaped plot within the project unit that contains the target population to be monitored. A macro plot has a specific azimuth around which method data are collected.
Sample event	Monitoring event	Sample event	The date on which sampling or

FIREMON Term	FEAT Term	FFI Term	Description
			treatment is scheduled.
Sample events	Status	Status	A context for a monitoring event in relation to treatments or disturbances.
		Protocol	A collection of related methods.
Method	Protocol	Method	A set of specifications, procedures, and requirements for collecting data during a sampling event, and an associated set of attributes.
Field	Attribute	Sample attribute	Sample attributes describe the conditions associated with a particular sampling event, such as date and time, plot and sample size, weather, names of sampling team members. These attributes are generally collected once per sampling event.
		Method attribute	Method attributes describe the data being collected and analyzed, such as species count, tree size, tree density, fuels, and diversity. These attributes are generally collected more than once per sampling event.

See also:

About FFI

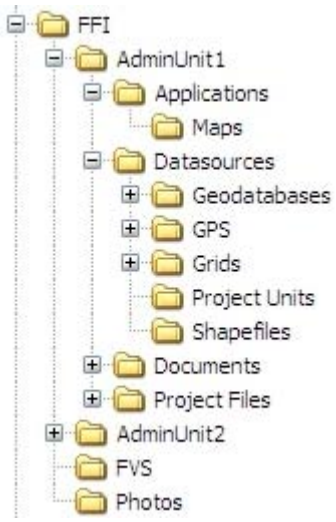
Suggested file structure

A suggested organization for your FFI directories is shown below. This folder structure should be created under C:.

In general, FFI will allow you to file documents wherever you wish. However, there are some instances in which FFI will place, or search for, files in specific locations:

- Photos should be stored in C:\FFI\Photos.
- Files exported by the Project Files function in Reports and Analysis will be placed in C:\FFI\AdminUnit\Project Files.
- Forest Vegetation Simulator (FVS) export files will be placed in C:\FFI\FVS.

NOTE: If you are not using the FFI GIS module, you may not need all of the folders shown.



References

The FFI development team acknowledges the contributions of the following references:

- Brown, J.K., 1974. Handbook for Inventorying Downed Woody Material. U.S Forest Service.
- Lutes, Duncan C.; Keane, Robert E.; Caratti, John F.; Key, Carl H.; Benson, Nathan C.; Sutherland, Steve; Gangi, Larry J. 2006. FIREMON: The Fire Effects Monitoring and Inventory System. Gen. Tech. Rep. RMRS-GTR-164-CD. Fort Collins, CO. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 1 CD.
- National Park Service, 2003. Fire Monitoring Handbook.
- USDA, NRCS, 2007. The PLANTS Database (http://plants.usda.gov, 21 August 2007). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

Installation

This section of the *User's Guide* addresses:

- Installation requirements.
- Installing FFI.

Installation requirements

FFI, version 1.02.10, is based on Microsoft® SQL Server 2005. FFI users have two choices of SQL Server to choose from: 1) SQL Server Express 2005 Edition is a free program that can be used with databases up to 4 GB in size; 2) the full version of SQL Server 2005. The full version does not have a maximum database size limitation but must be purchased.

Most users will use the free version so we have a posted a copy on the FFI FRAMES Web site. If you wish to use the full version of SQL Server contact your IT representative.

NOTE: If you are moving to FFI from FEAT or FIREMON, you must convert your databases before beginning work in FFI. Please contact your FFI administrator or request help on the FFI Google Group.

Hardware and software requirements

General requirements:

- Minimum screen resolution of 1024 X 768 (XGA).
- Windows 2000, Windows XP and Vista operating systems.
- Microsoft .NET 2.0 Framework.
- Microsoft SQL Server 2005 Express Edition.

Stand-alone or database master computer:

Minimum requirements

NOTE: The minimum requirements are adequate for small (less than 50 MB) FFI databases.

- Free disk space: 600 MB before installing SQL Server Express, plus sufficient space for database storage.
- Memory: 512 MB or more of RAM.
- Processor: 1 GHz or higher.

Recommended requirements

For larger databases, we recommend:

- Free disk space: 600 MB before installing SQL Server Express, plus sufficient space for databases, which can range in size from 600 MB to 4 GB each.
- Memory: 1 GB of RAM.
- Processor: 2 GHz or higher.

NOTE: We have noted that there is a significant improvement in performance between 512 MB and 1 GB of RAM. Additional RAM above 1 GB will yield limited improvement.

Database client computer:

- Free disk space: 600 MB.
- Memory: 512 MB or more of RAM for databases smaller than 50 MB; 1 GB for larger databases.

GIS-capable stand-alone or database client computer:

- ArcGIS 9.2 and ArcGIS 9.3.
- Recommended system requirements as stated above.

Database server:

- Free disk space: sufficient space for databases, which will range in size from 600 MB to 4 GB each.

NOTE: FFI does not have to be installed on the database server.

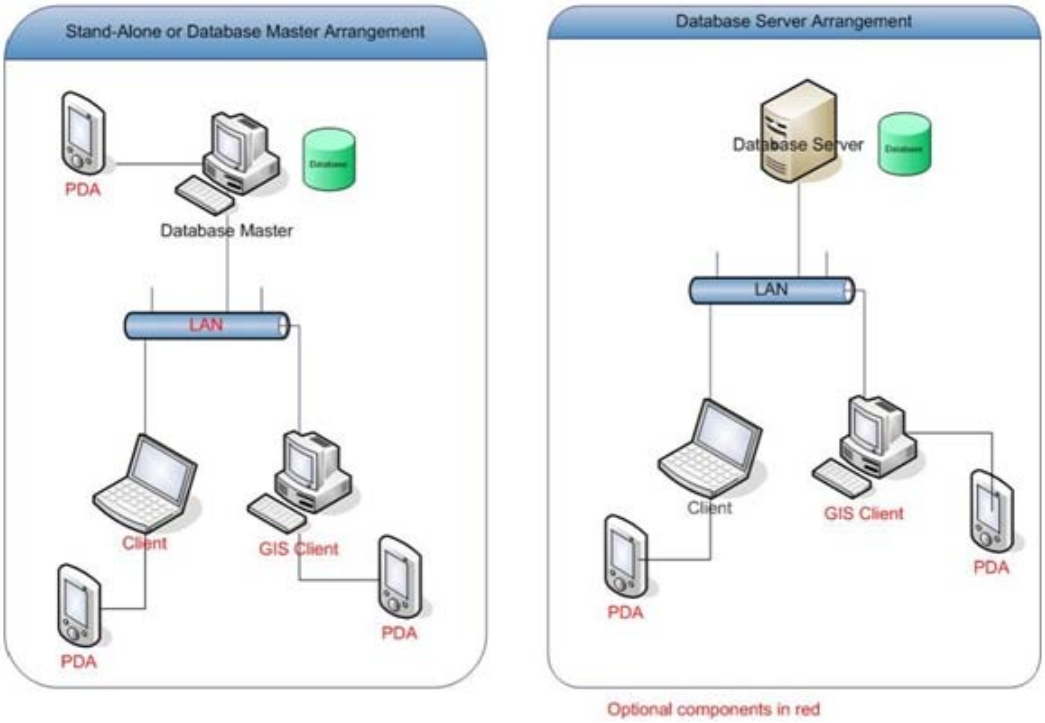
Personal digital assistant (PDA):

- Windows Mobile 5.
- 256 K RAM memory (minimum)
- 520 Mhz (minimum)

See recommended computer configurations.

Computer configurations

As depicted below, FFI can be installed as a stand-alone system with GIS or PDA options, or as a networked system, also with options for GIS and PDA.



Stand-alone or database master computer:

- The stand-alone computer has no other computers attached to it that share its internal databases. The database master computer has client computers that attach to it and use its central database.

Client computer:

- Connected to the local area network (LAN) and uses data stored on the database master or database server. This can be a field computer.

GIS-capable stand-alone or database client computer:

- Configured like the stand-alone or client computer, but equipped with GIS software.

Database server:

- A dedicated computer running a database engine that can be accessed either directly from a server or client computer with password protection, or via an intranet connection.

Personal Digital Assistant (PDA)

- A PDA is a portable device that stores data collected in the field for later transfer to the client or stand-alone computer.

See Hardware and software requirements for more information.

FFI installation process

To complete the FFI installation you will need to download the install files from the FFI FRAMES Web site (http://frames.nbii.gov/ffi).

Before you begin downloading, create a temporary directory on your C: drive where you will store the installation files (e.g., c:\FFITemp).

Download these files from the FFI Software and Manuals page on the FFI FRAMES Web site and save the them in the temporary directory you created above:

1) *FFI Install Package for Windows 2000, XP and Vista*

2) *Microsoft SQL Server Express 2005 Version*

You may also want to download these optional files:

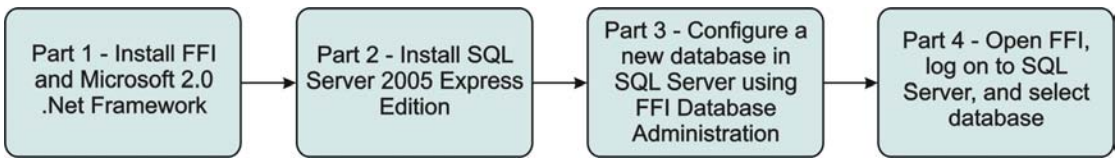
3) If you plan on installing the GIS Tool then download the *FFI GIS Install and User Guide*

4) If you want to use our test dataset to practice with then download the *FFI Training Dataset*

NOTE: You will need a .zip extraction utility such as WinZip to unzip the FFI Installation package, GIS files and Training dataset.

The flowchart below shows the four key processes involved in installing FFI and creating a database. Each process is described in a separate part.

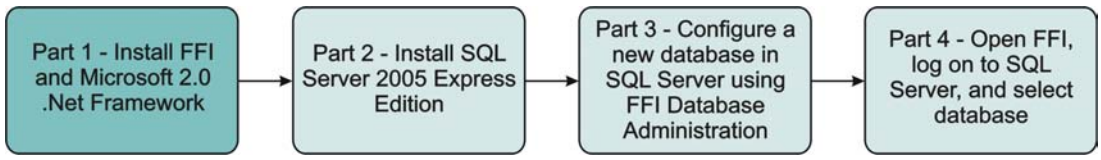
NOTE: You must have Windows administrator privileges to install FFI on your computer. A standard Windows user can use FFI after a Windows administrator has installed it.



NOTE: The full installation process requires approximately one hour to complete.

1. Part 1 - Installing FFI and .NET.
2. Part 2 - Installing SQL Server 2005 Express.
3. Part 3 - Creating a database using the FFI Database Administration module.
4. Part 4 - Opening FFI, logging on, and selecting database.

Part 1 – Installing FFI and Microsoft .NET



NOTE: The FFI installer requires Microsoft® .NET Framework 2.0. Most computers will already have .NET Framework 2.0 installed. You can check to see if it is on your computer by opening Windows ***Control Panel > Add/Remove Programs*** *and look for* ***Microsoft .Net Framework 2.0*** *in the list of installed applications. If it is not installed, download .NET framework from the Microsoft Web site and install it on your computer before continuing with the FFI installation process.*

To install FFI follow these steps:

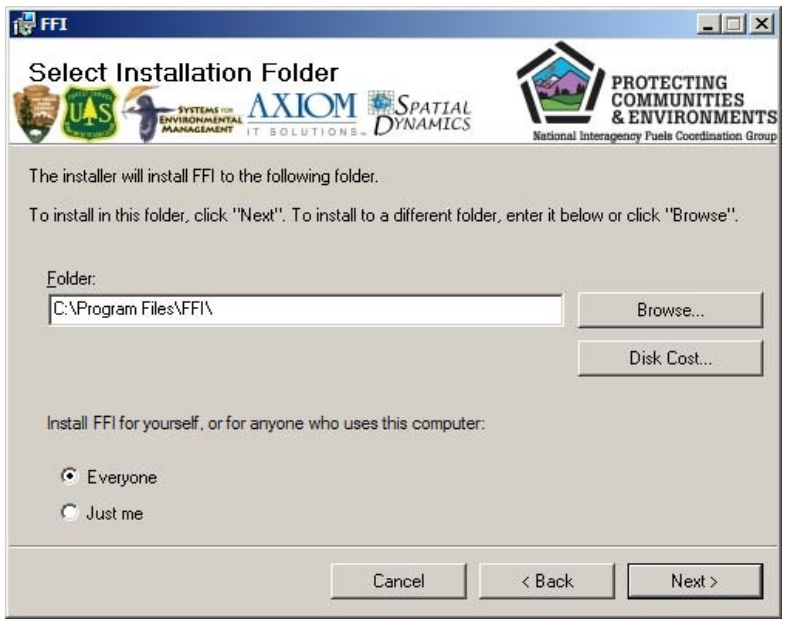
1. Uninstall any earlier versions of FFI using the Windows **Add/Remove Programs** function. (Do not uninstall SQL Server.)

2. In Windows Explorer or My Computer, navigate to the temporary directory where you stored the FFI files you downloaded from FRAMES.

3. Double-click the on the FFI installation file (it will have a .msi extension)

4. The FFI Setup Wizard page will open. Click **Next**.

5. Select the installation folder and click **Next**.



7. Click **Next** on the Confirm Installation screen.

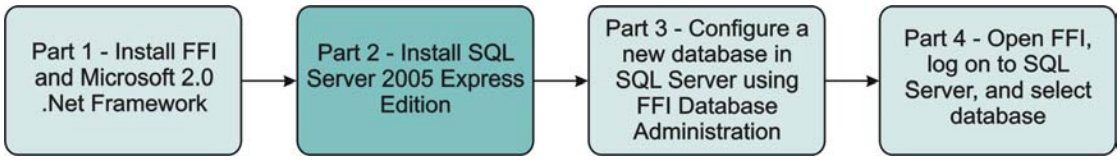
8. When FFI finishes installing click **Next**.

9. Click **Close** when the installation is complete.

Three FFI icons will now be on your desktop: 1) Protocol Manager, 2) FFI Database Administration , 3) FFI.

10. Proceed to Part 2, Installing SQL Server 2005 Express Edition.

Part 2 – Installing SQL Server 2005 Express Edition



Follow these instructions carefully!

Important Remember the password you select in Step 14 or you will not be able to use FFI.

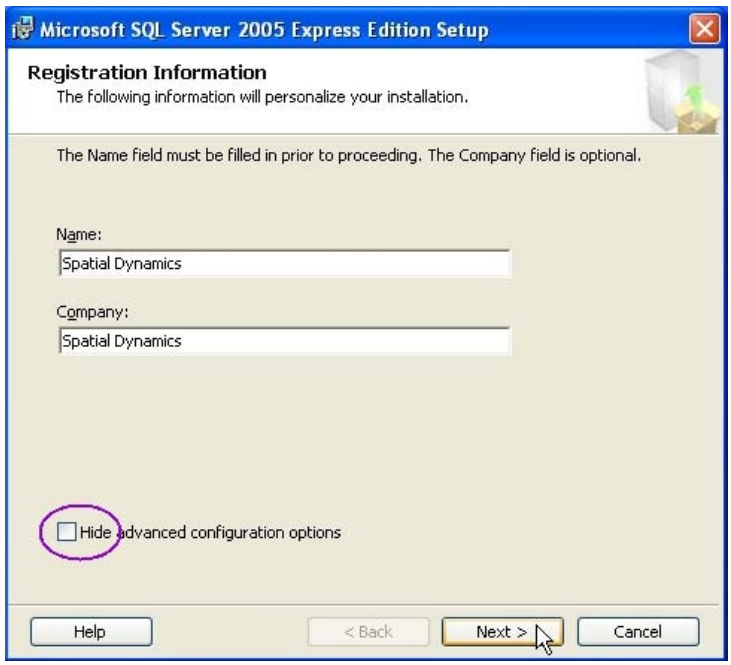
To install SQL Server 2005 Express Edition on your computer:

1. Navigate to the temporary folder where you saved **SQLEXPR32.EXE**.
2. Double click on **SQLEXPR32.EXE**.
3. If you see a security warning window, click **Run**. The installer will extract files needed for installation. This can take a few minutes.

4. Accept the licensing conditions and click **Next**.
5. In the **Installing Prerequisites** window, click **Install**. Installation takes a few moments.
6. Click **Next** after the required components are successfully installed.
7. In the **System Configuration Check** window, click **Next**.
8. The **Microsoft SQL Server Installation Wizard** opens. Click **Next**.
9. Another **System Configuration Check** window opens. Click **Next**.

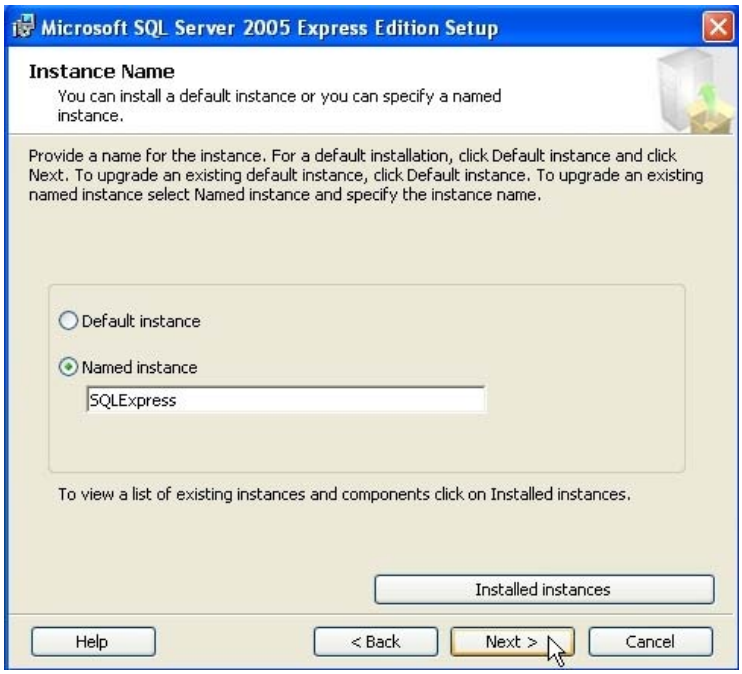
NOTE: If the System Configuration fails, contact your IT support staff.

10. In the **Registration Information** window, complete the **Name** and **Company** fields. *Uncheck* the *Hide advanced configuration options* box, and click **Next**.



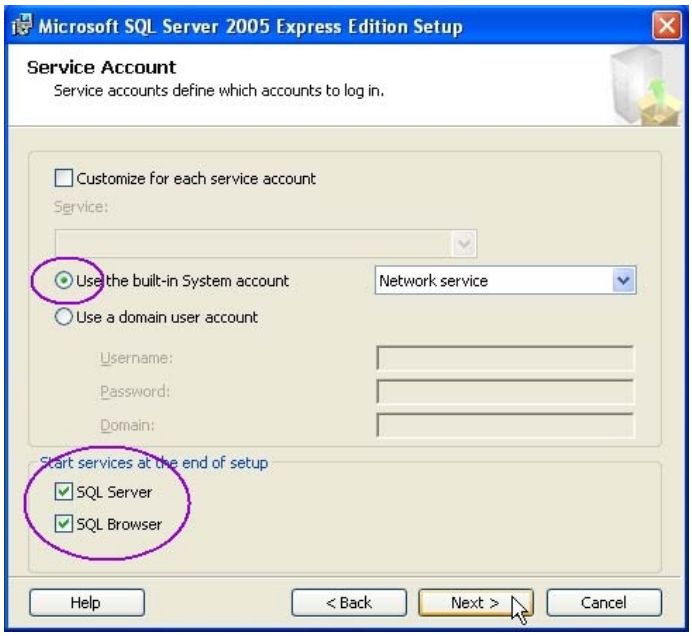
11. In the **Feature Selection** window, click **Next**. Do not change any options.

12. In the **Instance Name** window, click **Next** to create your SQL Server instance. Do not change any options.



*NOTE: Click the **Installed Instances** button to see a listing of any instances that are already installed. If you already have SQL instances installed on your computer, you will need to enter a unique name for this new instance of SQL. Remember the new name; you will need it later in the installation. Otherwise, keep the default name as **SQLExpress**.*

13. In the **Service Account** window, leave the *Use the built-in System account* option checked, as shown. Select *SQL Server* and *SQL Browser*, and click **Next.**



14. In the **Authentication Mode** window, select the **Mixed Mode** option. Enter and confirm a new SQL password, and then click **Next**.

*NOTE: Select a password that you can easily remember, since it cannot be retrieved if it is forgotten. See Password guidelines for help in selecting a password. This is your **sa** user (SQL) password, and you will use it each time you log on to FFI. Be sure to write your **sa** user password down in a safe place. Your **sa** user (SQL) password is different than your Windows password.*

15. In the **Collation Settings** window, click **Next**. Do not change any options.

16. In the **Configuration Options** window, click **Next**. Do not change any options.

17. In the **Error and Usage Report Settings** window, do not enter anything, and click **Next**.

18. In the **Ready to Install** window, click **Install**. Installation and setup can take several minutes.

19. In the **Setup Progress** window, click **Next**.

20. In the **Completing Setup** window, click **Finish**.

Proceed to SQL Server Settings.

SQL Server Settings - optional

NOTE: If you are using FFI only as a desktop application - no remote connections - then you do not need to read this section. Go to Part 3.

Many users experience problems connecting to an FFI database remotely (connecting to a SQL Sever instance on another computer on the local area network). This may be due to the configuration of SQL Sever and/or to the Windows Firewall. The steps recommended here come from a Microsoft article.

If your situation is not addressed by these steps you may want to read the article found here.

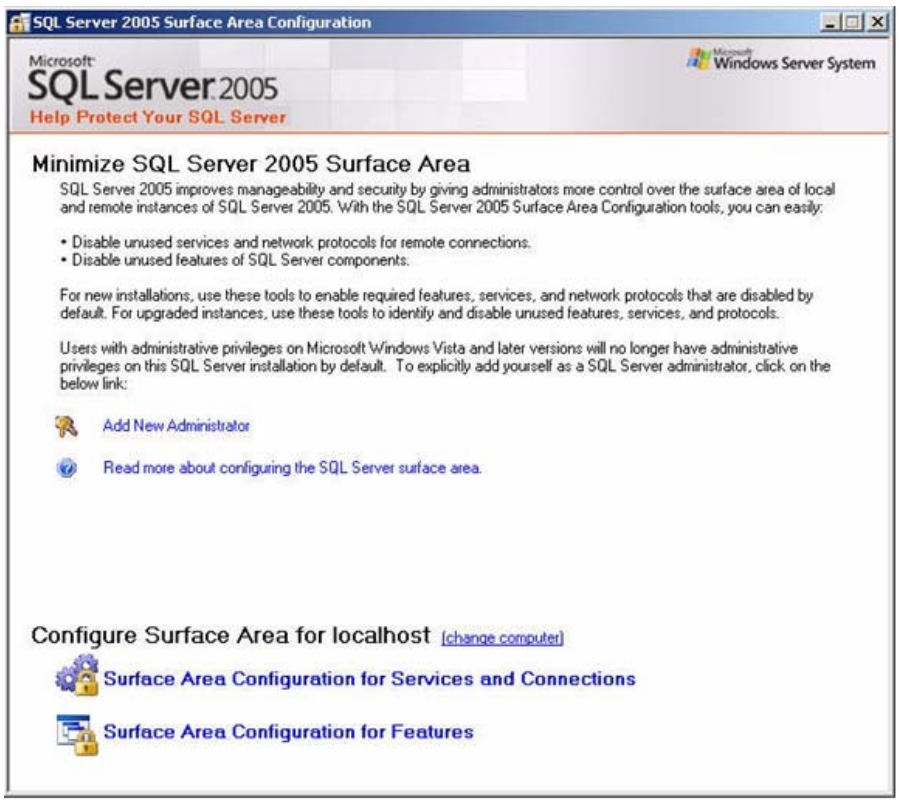
For more SQL Sever connectivity troubleshooting help, see this article.

Addition information may be available on the FFI Google Discussion Group.

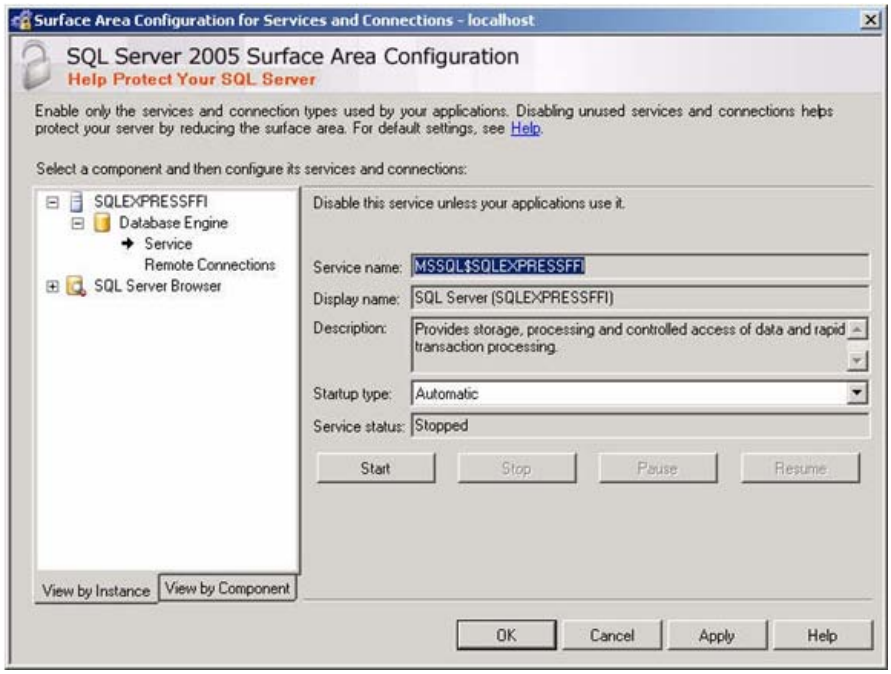
Enable remote connections for SQL Server 2005 Express or SQL Server 2005 Developer Edition

Carry out these steps on the SERVER computer – that is, the computer that is hosting your FFI databases.

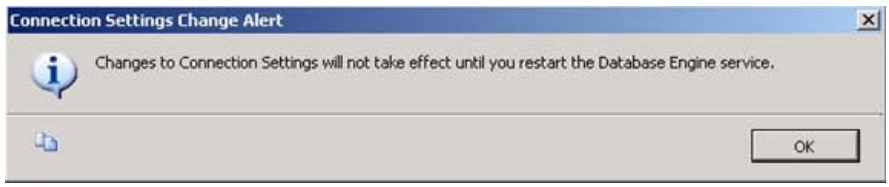
1. Click **Start**, point to Programs, point to **Microsoft SQL Server 2005**, point to **Configuration Tools**, and then click **SQL Server Surface Area Configuration**.



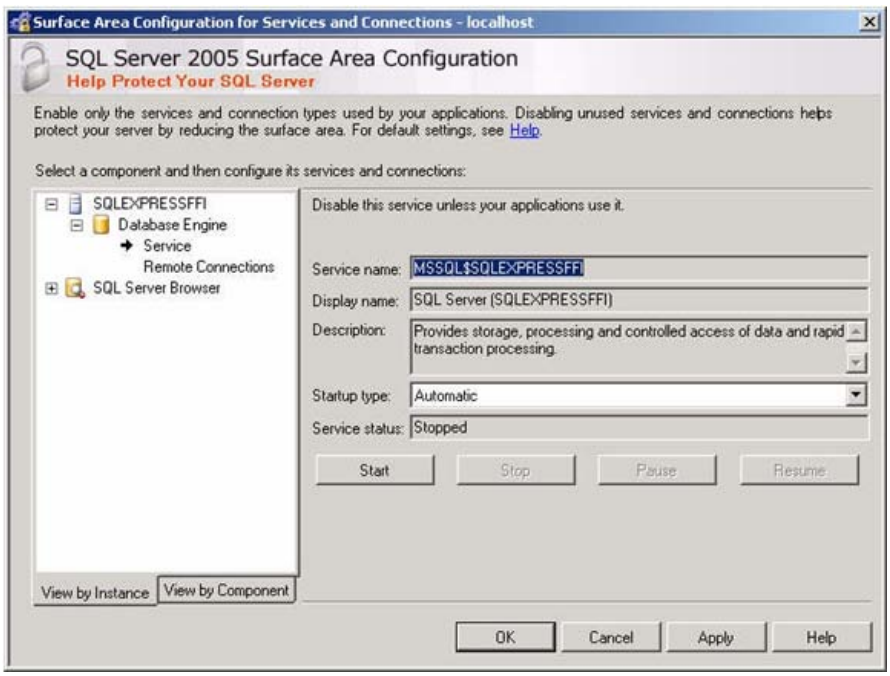
2. On the **SQL Server 2005 Surface Area Configuration** page, click **Surface Area Configuration for Services and Connections**.
3. On the **Surface Area Configuration for Services and Connections** page, expand **Database Engine**, click **Remote Connections**, click **Local and remote connections**, click **Using TCP/IP only**, and then click **Apply**.



4. Click **OK** when you receive the following message:



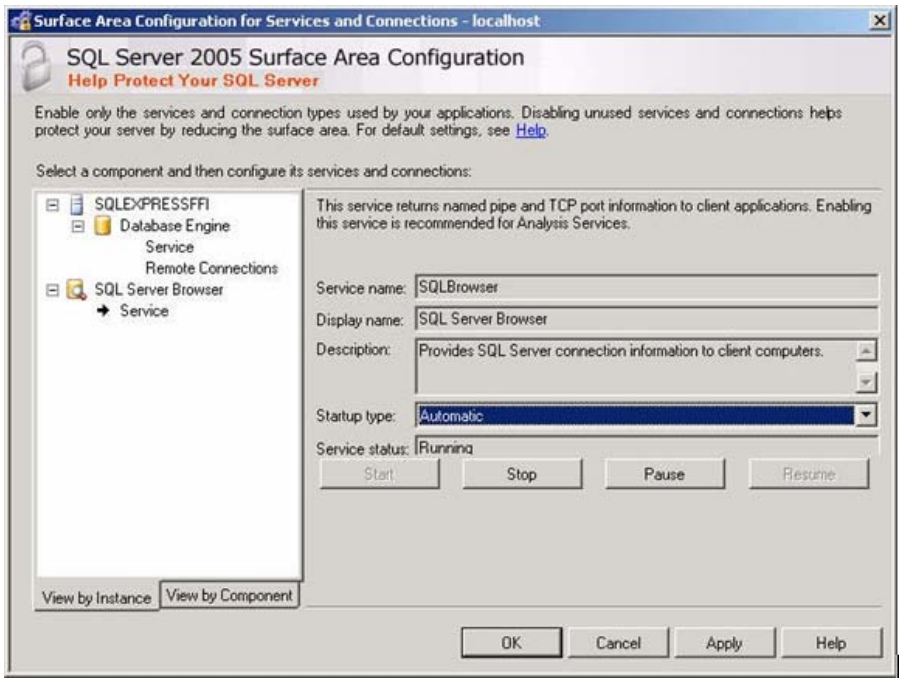
5. On the **Surface Area Configuration for Services and Connections** page, expand **Database Engine**, click **Service**, click **Stop**, wait until the SSQLSERVER service stops, and then click **Start** to restart the MSSQLSERVER service.



Enable the SQL Server Browser service

Carry out these steps on the SERVER computer – that is, the computer that is hosting your FFI databases.

1. On the **Surface Area Configuration for Services and Connections** page, click **SQL Server Browser**, click **Automatic** for **Startup type**, and then click **Apply**.
2. Click **Start**, and then click **OK**.

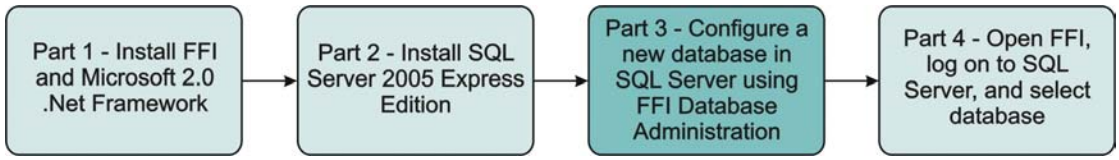


Create Exceptions in the Windows Firewall

Determine if you are using Windows Firewall (or any other firewall) on any of the computers involved. Configuring a firewall is more involved and likely to vary form site to site. More info on firewalls is available in the articles linked at the beginning of this document.

Proceed to Part 3, Configuring a database in SQL Server 2005.

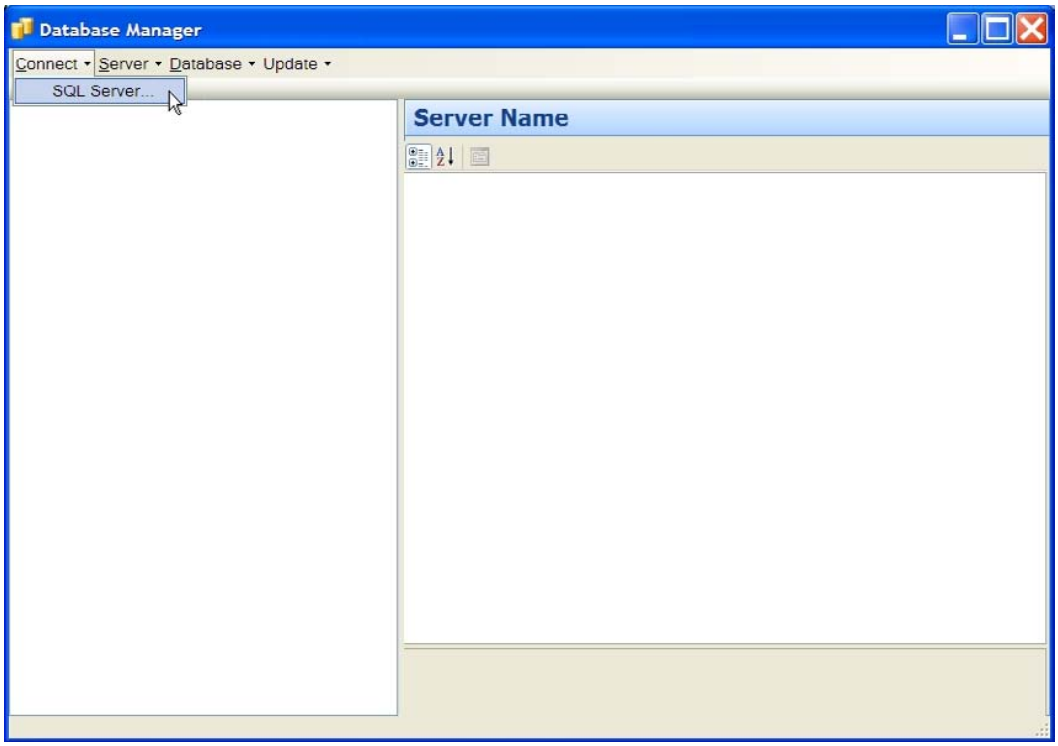
Part 3 – Configuring a database in SQL Server 2005



FFI uses a SQL Server 2005 database to store protocols and methods. If a database is not already available for your project, you must create one before you can begin to work with FFI. Use the FFI Database Manager module to create a new database.

1. Double-click the **FFI Database Administration** icon on your desktop. The **Database Manager** window opens.

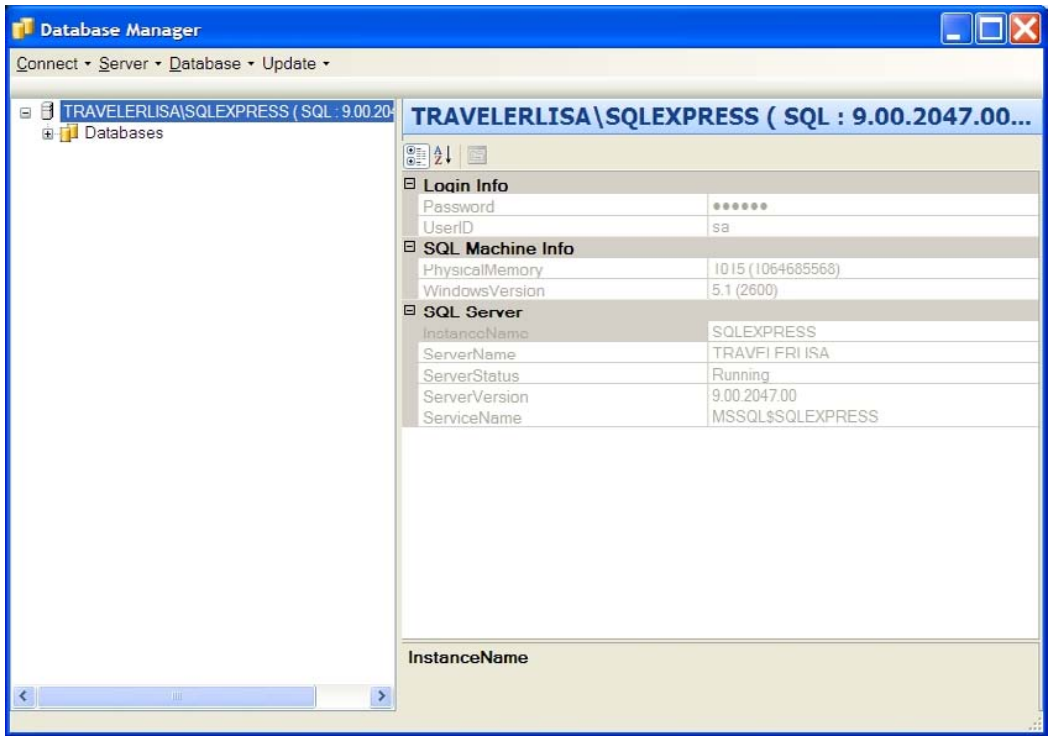
2. In the **Connect** pull-down menu, select **SQL Server**.



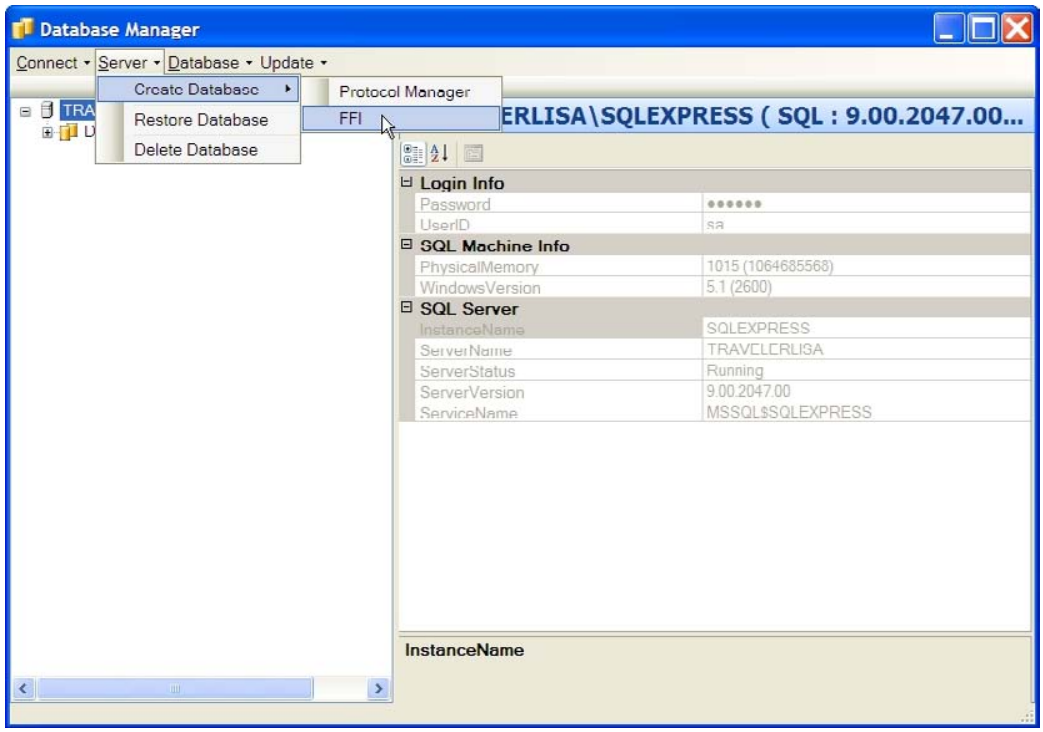
3. In the pull-down menu in the **Server Login** window, select the SQL server instance that you created in Part 2, step 12. Enter the username ***sa*** and the password that you created in Part 2 (your SQL password). Click **OK**.

NOTE: Unless you selected another name for the server in Part 2, step 12, the server instance is called SQLEXPRESS.

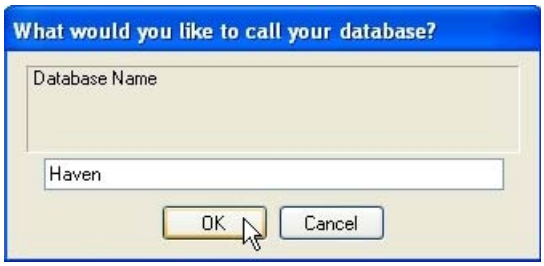
4. In the tree view of the **Database Manager** window, highlight the name of the SQL server instance.



5. In the **Server** pull-down menu, select **Create Database**. Select **FFI**.

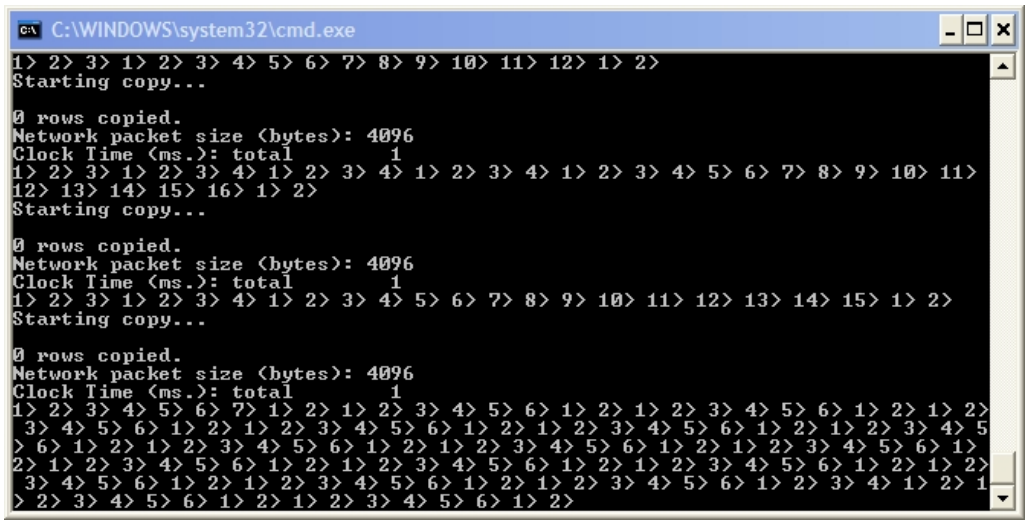


6. Enter a unique name, such as a park or forest name, for the new database and click **OK**.

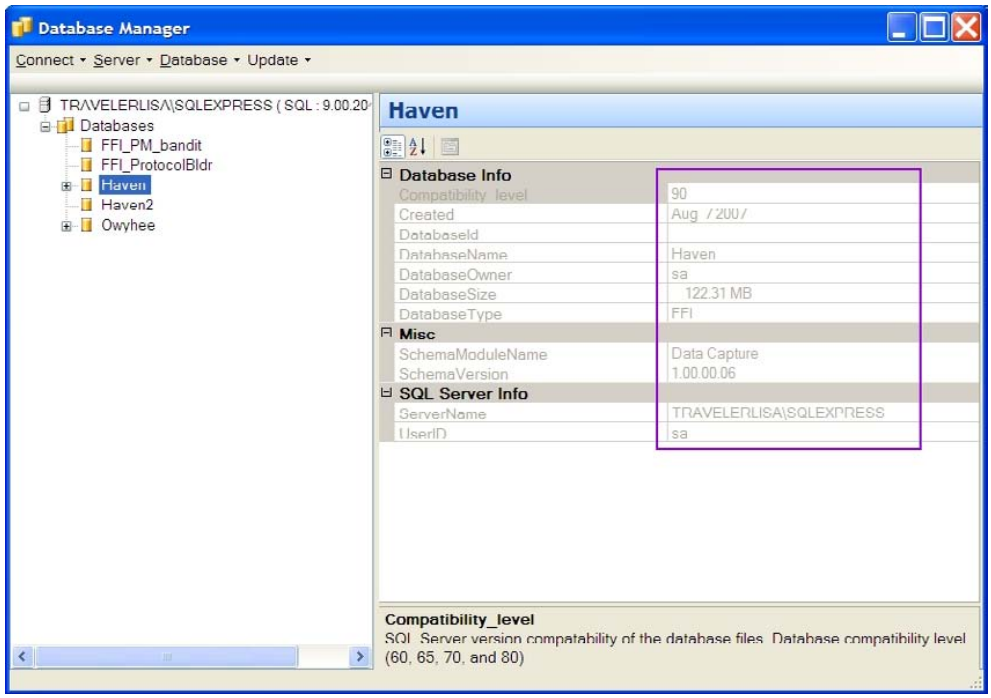


NOTE: If a database with the name that you selected already exists, FFI will prompt you to enter a different name or to overwrite the existing database. Database names cannot contain spaces and must begin with an alphabetic character.

7. A DOS window and a progress bar open, as shown below. Wait while the database is created, which could take up to 15 minutes, depending on your computer.

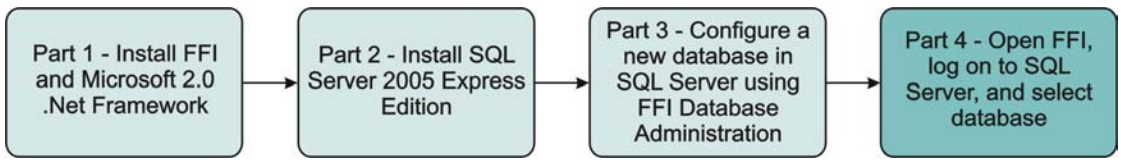


8. In the tree view of the **Database Manager** window, open the **Databases** folder. The new database will be listed.



9. Close the **Database Manager** window.
10. Proceed to Part 4, Opening FFI and logging on.

Part 4 – Opening FFI and logging on



1. Double-click the **FFI** icon on your desktop, or launch FFI from your **Start** menu (Start/Programs/FFI/FFI). The **Database Select** window opens.

NOTE: The FFI splash screen may be visible for a few moments while the program loads.

2. In the **Database Select** window, select your SQL server instance using the pull-down menu. Enter the username ***sa*** and SQL password that you established in Part 2.

*NOTE: The server name is in the format **machinename\SQLEXPRESS**.*

3. In the **Connect to a database** pull-down list, select the database that you created, and click **OK**.

*NOTE: If the **Connect to a database** menu is grayed out and you cannot select a database, you have entered an incorrect SQL password. Log on to the server again with the correct password. If necessary, repeat the Configuring a database procedure (Part 3).*

4. FFI will open and the new database will be connected.

For procedures on using FFI features and functions, see Using FFI.

Administration

In FFI, administrative functions, including SQL Server and database management, are managed by the FFI **Database Administration** (**Admin**) module, which connects directly to the database server.

When you first install FFI, you create an SQL Server system administration (***sa***) account. This account enables you to access the server and build user databases and administrative units.

Administration tasks

The **Admin** module lets you manage:

1. Databases:
    - Create a database.
    - Restore a database from backup.
    - Delete a database.
    - Back up a database.
    - Patch a database to function under the current version of FFI.
    - Import protocols.
2. Users and roles:
    - Adding and deleting users.
    - Assigning and deleting user roles.

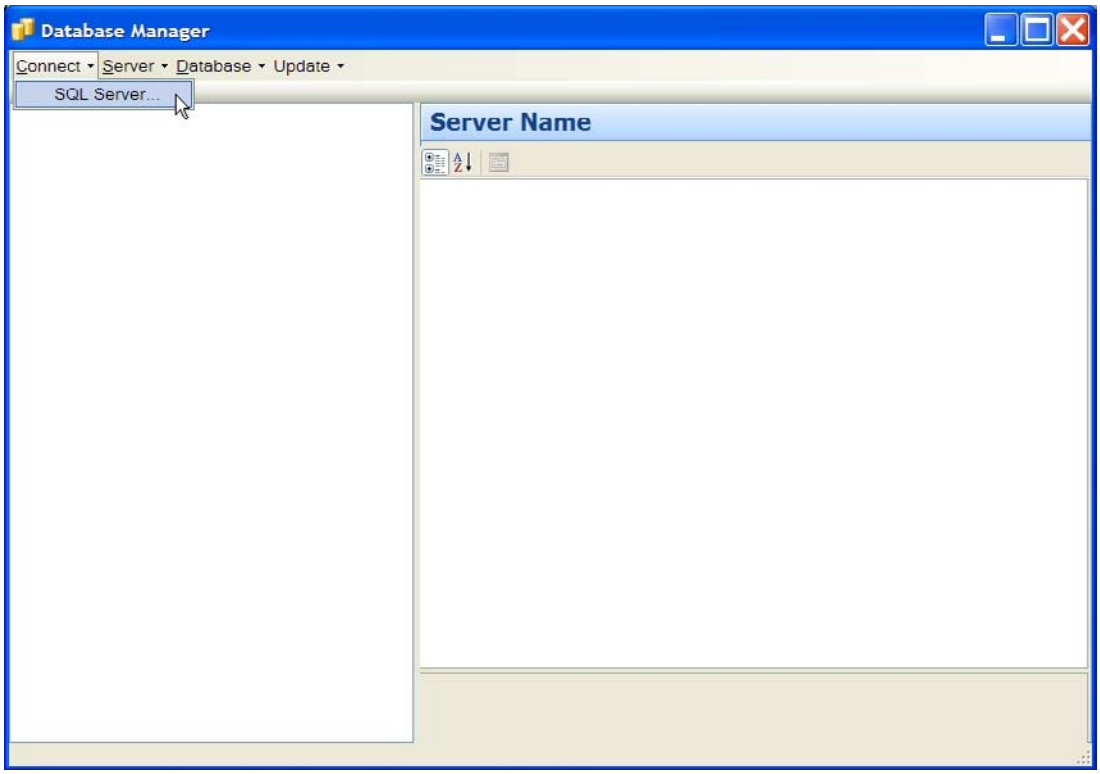
NOTE: For information about user roles, see User roles and permissions.

3. Administrative units:
    - Creating new administrative units.

Logging in to the Administration module

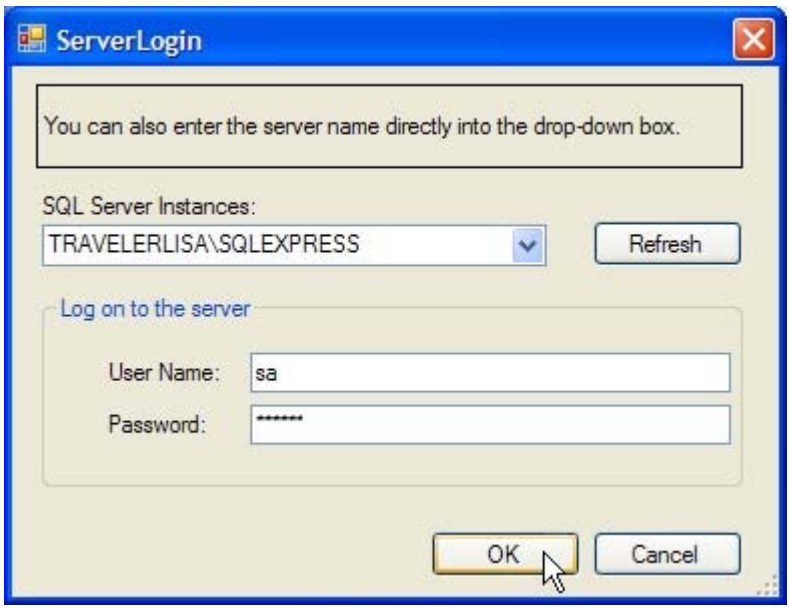
To open the **Admin** module and work in SQL Server:

1. Double-click the **FFI Database Administration** icon on your desktop or launch the module from the **Start** menu. The **Database Manager** window opens.
2. In the **Connect** pull-down menu, select **SQL Server**.

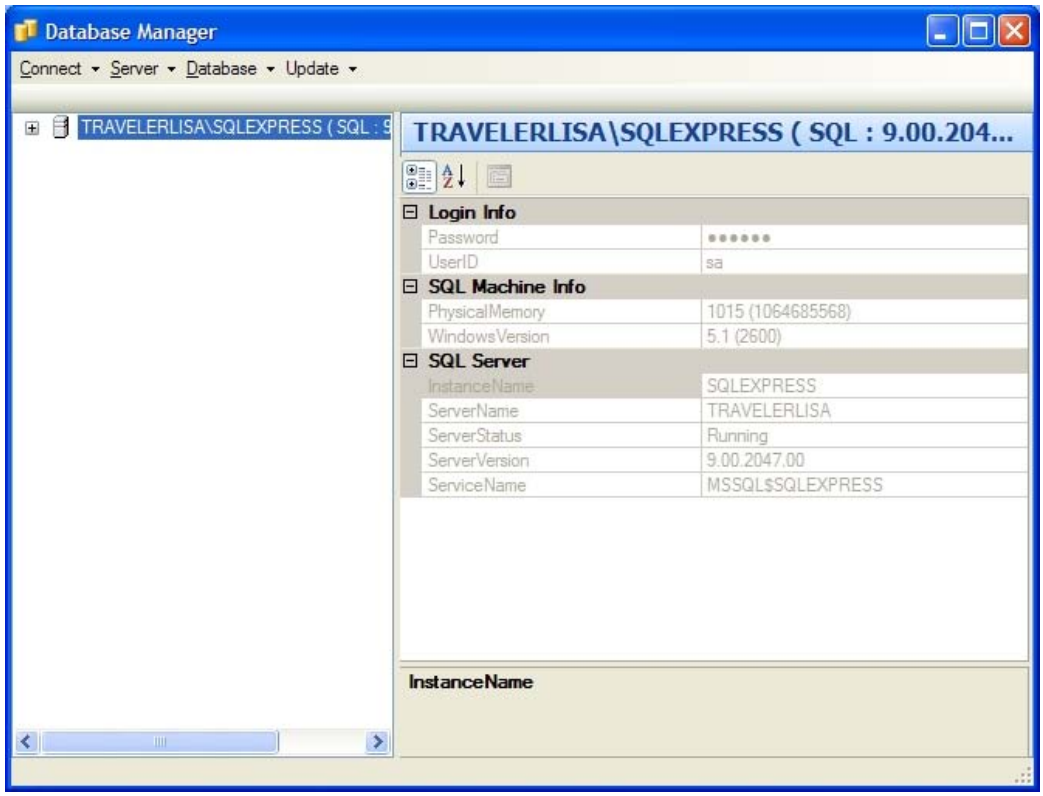


*NOTE: The **Update** function (at the far right in the toolbar) is used by Protocol Manager. It is not used in FFI.*

3. In the **Server Login** window, select your SQL server instance from the pull-down list. Enter the user name ***sa*** and your ***sa*** user password, and click **OK**.



4. The **Database Manager** opens.



Next: Creating administrative units

Protocols and methods

FFI protocols and methods

FFI incorporates the field sampling methods used in FEAT and FIREMON as its standard methods and protocols. In addition, FFI adds several new protocols. The table below lists the standard protocols that are available. For descriptions of each, see About the FFI protocols in the Additional information section.

NOTE: FEAT and FIREMON users - see Comparison of sampling protocols in the Additional information section for a crosswalk between the FFI, FEAT, FIREMON, and FMH protocols and methods.

Each of the standard protocols has its own forms, data summary reports, and data analyses. When you use the **Data Entry and Edit** function to enter monitoring data for a completed sample event, you will use familiar data entry forms that specifically correspond to each protocol that is assigned to the sample event.

STANDARD PROTOCOL	STANDARD PROTOCOL
Biomass - Fuels	Biomass - Plants
CBI	Cover - Line Intercept
Cover - Points	Cover - Points by Transect
Cover - Species Composition	Cover/Frequency
Density - Belts	Density - Quadrats
Disturbance History	FCCS
Fire Behavior	Pilot Sampling
Plot Description	Post Burn Severity
Rare Plant Species	Surface Fuels
Surface Fuels - Alaska Duff/Litter	Surface Fuels - Piles
Surface Fuels - Vegetation	Trees
Trees - Individuals	Trees - Saplings (diameter class)
Trees - Seedlings (diameter class)	

Adding additional protocols and methods

To add other protocols and methods to support your monitoring program, install and run the Protocol Manager module, which is included in the FFI installation package. See Importing protocols for more information.

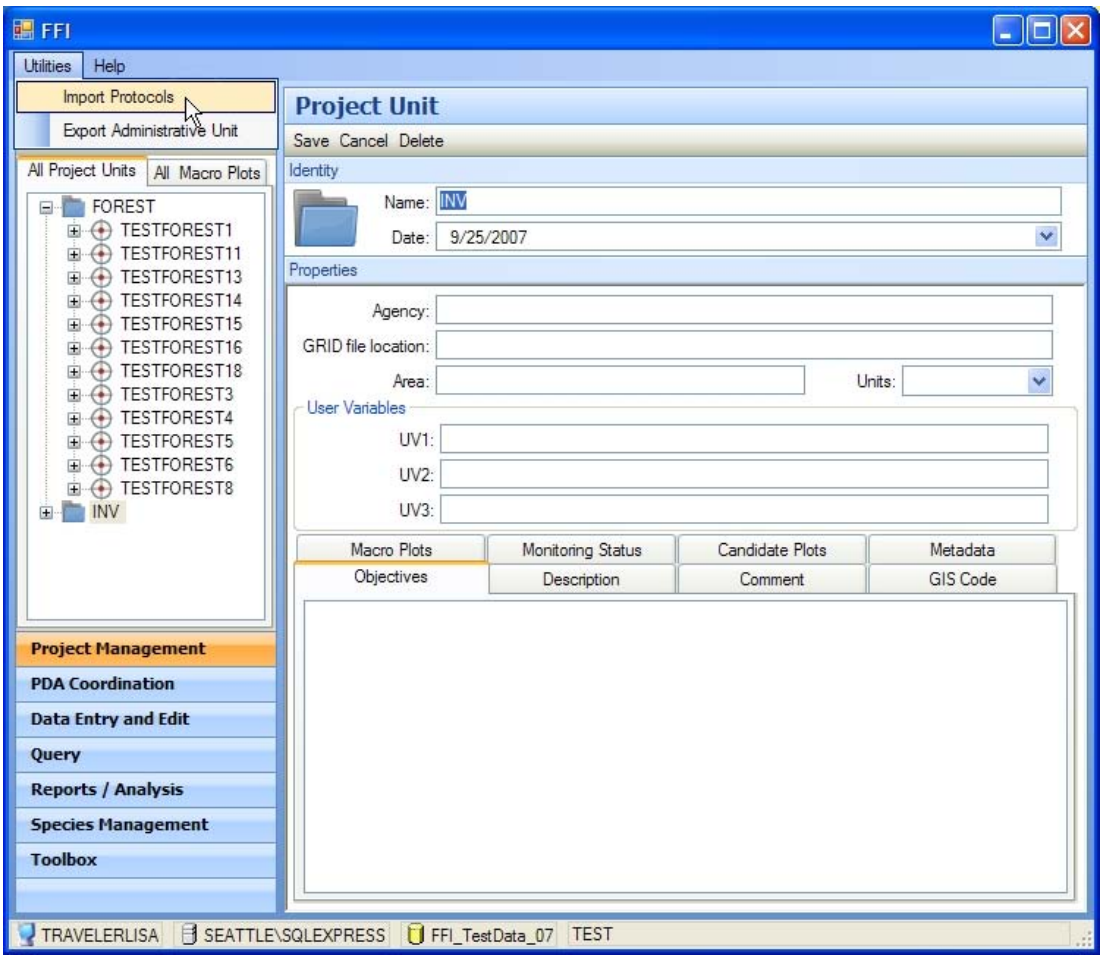
Importing protocols

FFI users with administrator or manager permissions can create new monitoring protocols in Protocol Manager and import them into FFI. After protocols are imported, they can be assigned to sample events (see Scheduling a sample event for information on assigning protocols). Importable files have a .pmd extension.

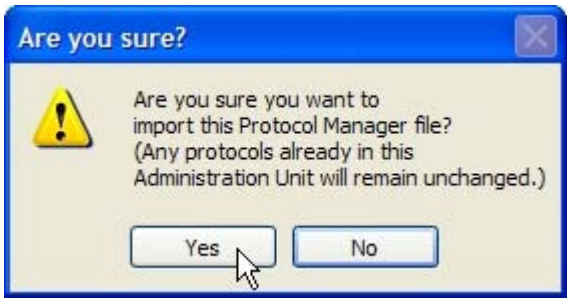
To import protocols:

1. In the **Utilities** pull-down menu in the window header, click **Import Protocols**.

*NOTE: If you do not have the correct permissions, the **Utilities** menu will not appear in your FFI window.*



2. Navigate to the protocol file you wish to import and click **Open**. (The .pmd files are included in the installation file you downloaded from FRAMES and will be found in the temporary folder you created in the installation process.)
3. A query window opens. Review the message. To continue, click **Yes**. If you select **No**, your database will not be touched.



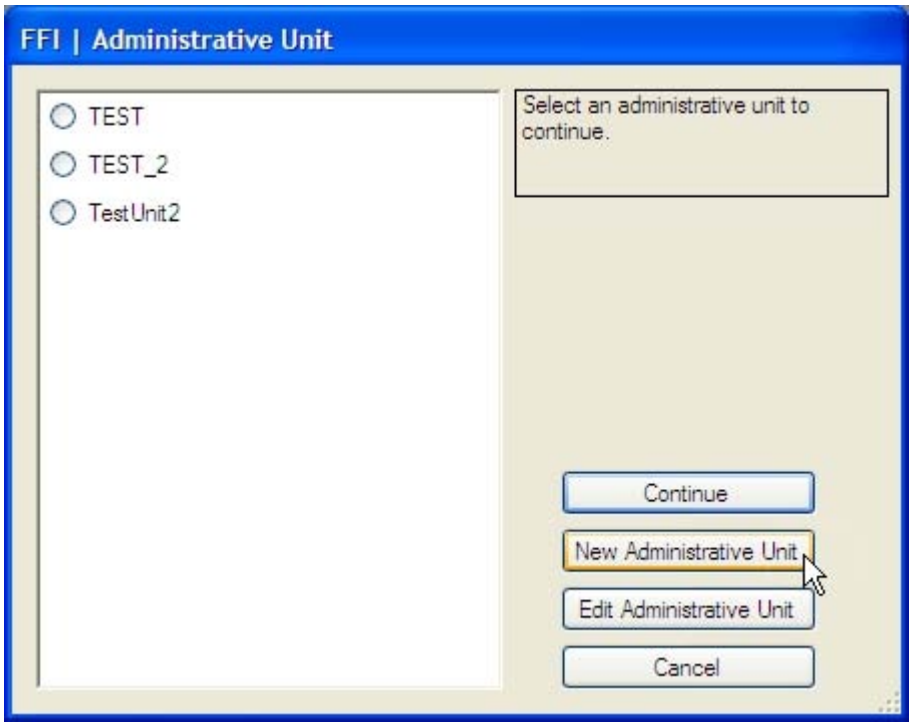
Creating a new administrative unit

*In FFI, an administrative unit is the study area, or the entire geographic area covered by a sampling effort. The term **administrative unit** replaces the FIREMON term **registration ID** and the FEAT term **land unit**.*

NOTE: Only administrators and managers can create administrative units. Administrative units cannot be deleted.

To create a new administrative unit:

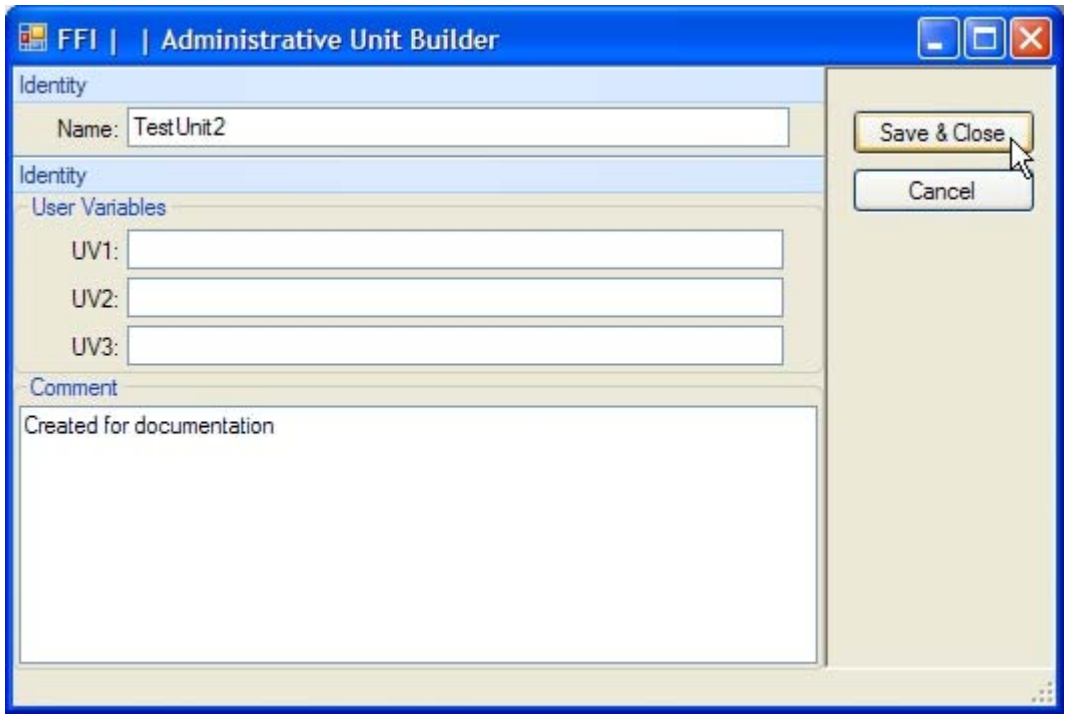
1. Open FFI and log on to your database.
2. The **Administrative Unit** window opens. This window lists any administrative units that currently reside in the database. Click **New Administrative Unit**.



3. The **Administrative Unit Builder** opens. Name the new administrative unit and add any descriptive comments. If you wish, you can use the user variable fields to

further describe the administrative unit. Click **Save & Close** when finished.

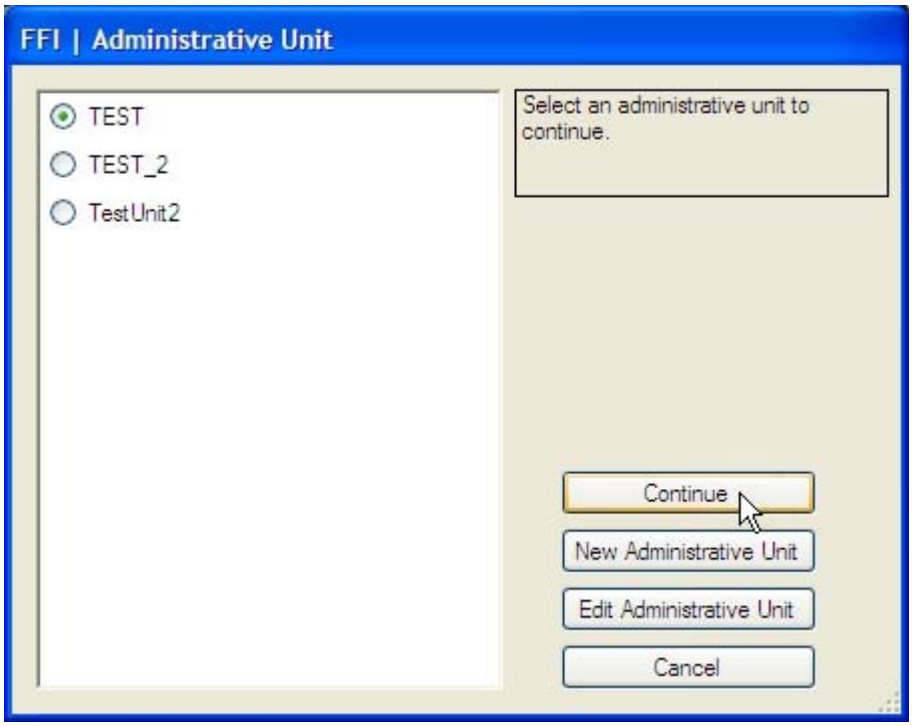
NOTE: You can also edit information for an existing administrative unit in this window.



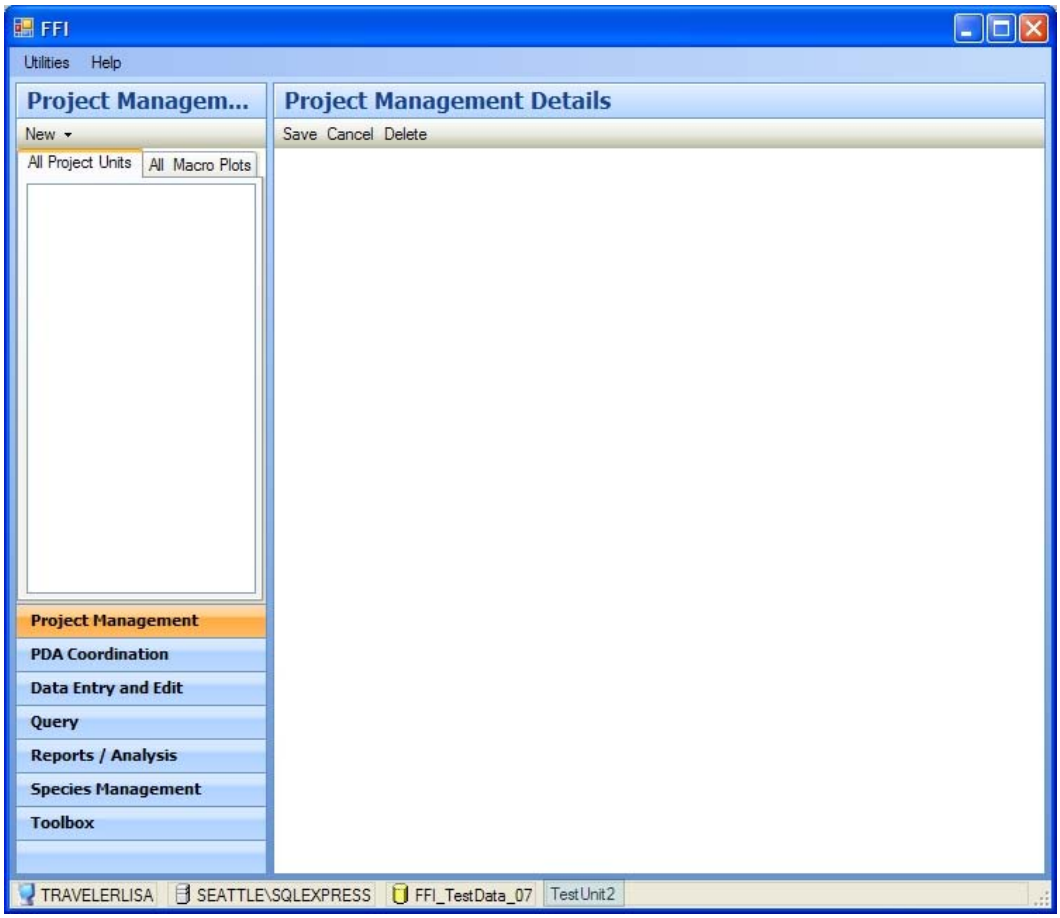
continued

Creating a new administrative unit (continued)

4. The new administrative unit will be listed in the left pane of the **Administrative Unit** window. Select its radio button and click **Continue**.



5. The **Project Management** window opens. Note that the name of the new administrative unit appears in the footer of the window.



NOTE: If you wish, you can use the FFI GIS module to spatially define the new unit. For more information, see the FFI GIS User's Guide, available in your FFI installation package or at http://frames.nbii.gov/ffi.

See also:

- Working with databases
- Project management
- Using FFI

Working with databases

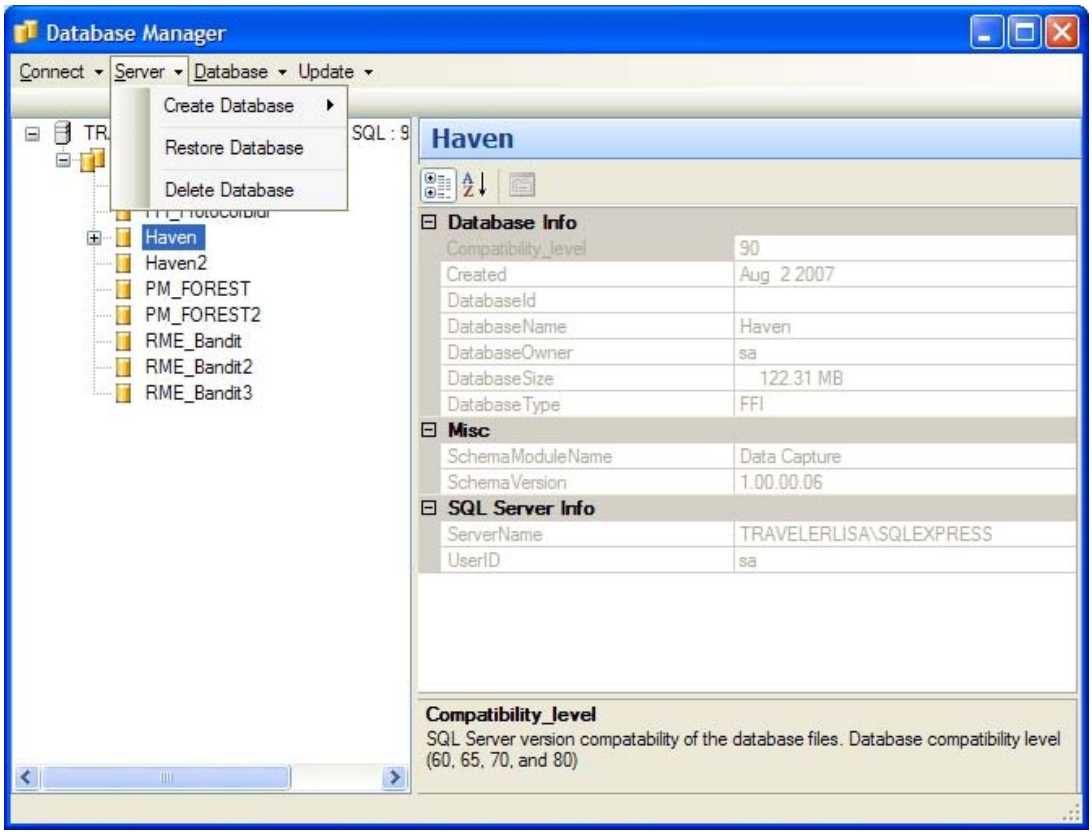
This section covers:

- Managing databases.
- Creating databases.
- Backing up databases.
- Patching databases.
- Restoring databases.
- Deleting databases.

Managing databases

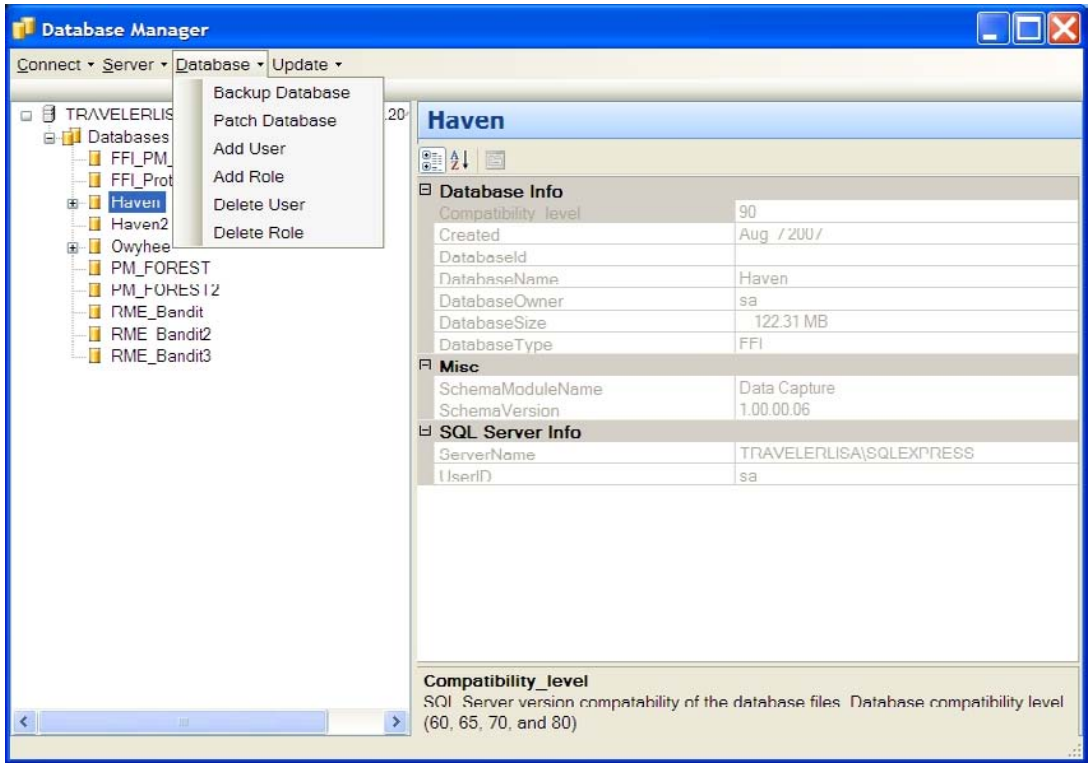
Both the **Server** and **Database** pull-down menus in the **Database Manager** provide access to database management functions.

Server menu



- Create Database – create new FFI or Protocol Manager databases.
- Restore Database – restore a deleted or damaged database from a backup database file.
- Delete Database – delete a database.

Database menu

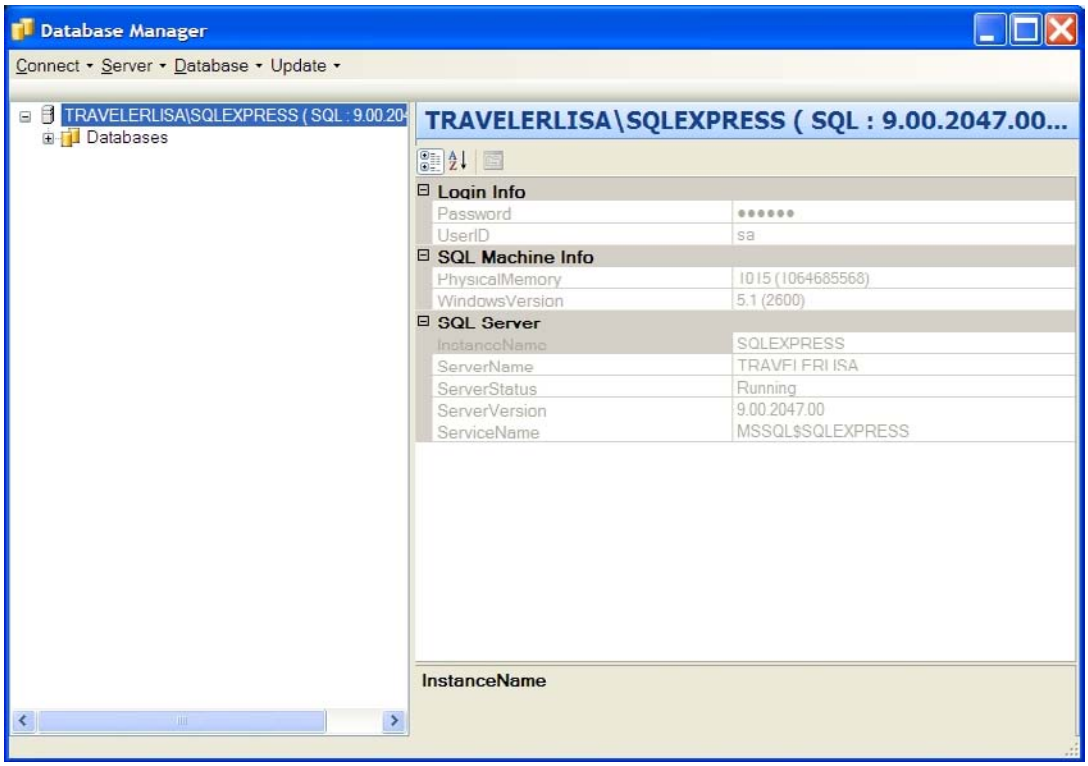


- Backup Database – create a backup copy of the selected database.
- Patch Database – update an existing database so that it works correctly with a new version of FFI.

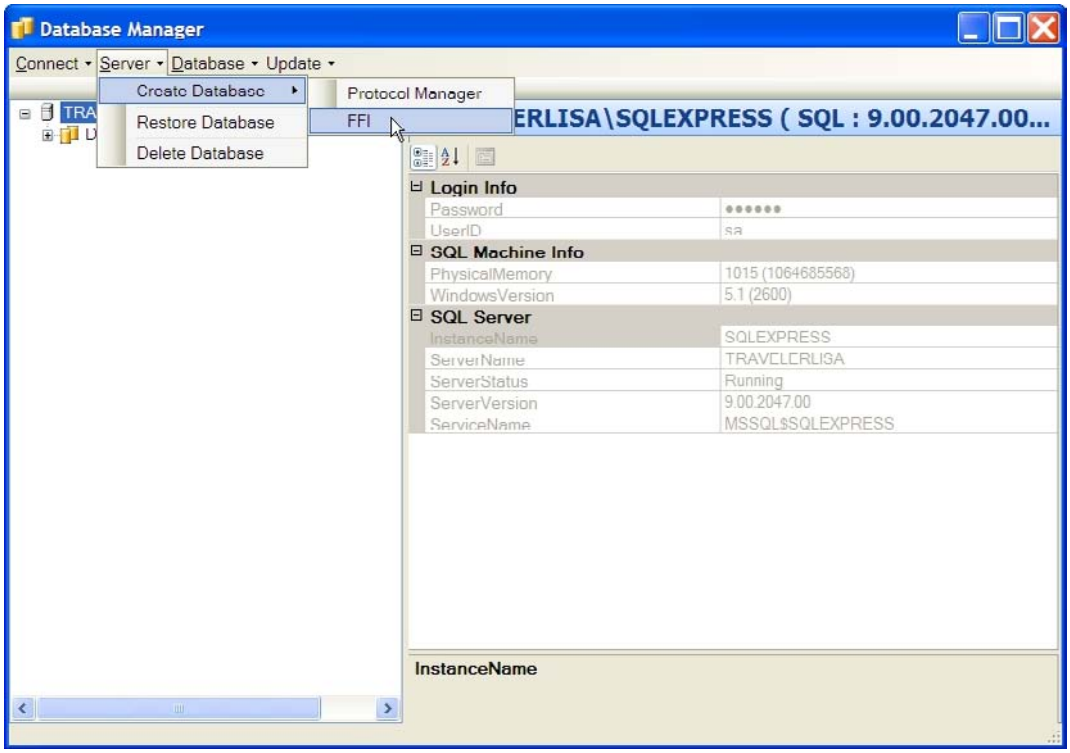
Creating a database

To create a new SQL Server database:

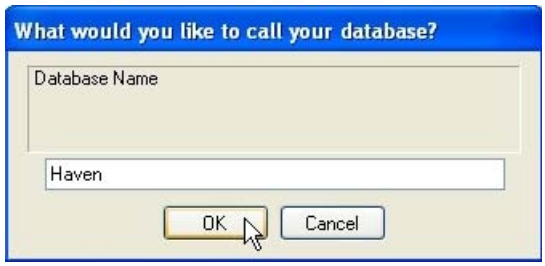
1. In the tree view of the **Database Manager** window, highlight the name of the SQL server instance.



2. In the **Server** pull-down menu, select **Create Database**. Select **FFI**.



3. Enter a unique name, such as a park or forest name, for the new database and click **OK**.

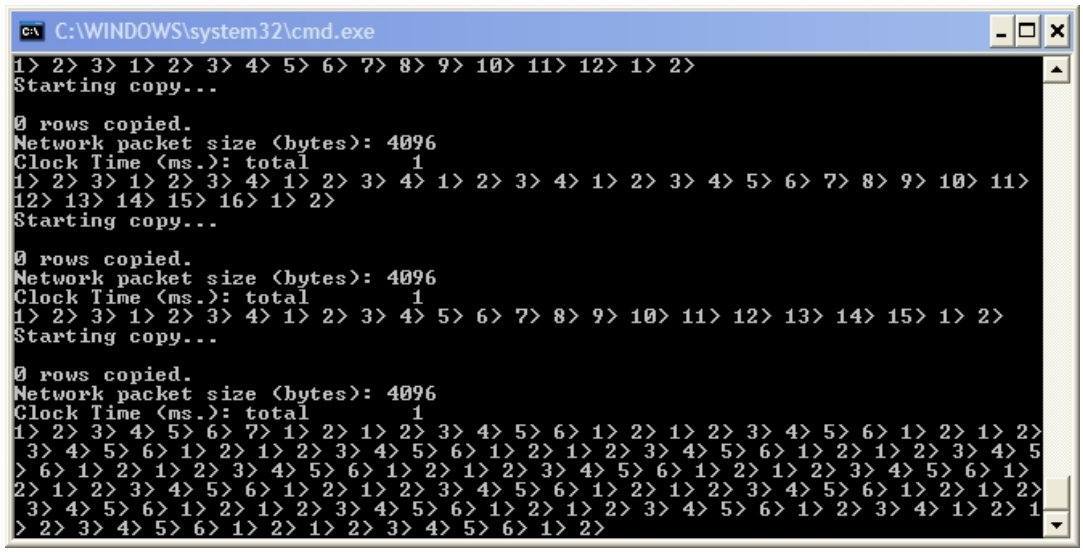


NOTE: If a database with the name that you selected already exists, FFI will prompt you to enter a different name or to overwrite the existing database. Database names cannot contain spaces and must begin with an alphabetic character.

continued

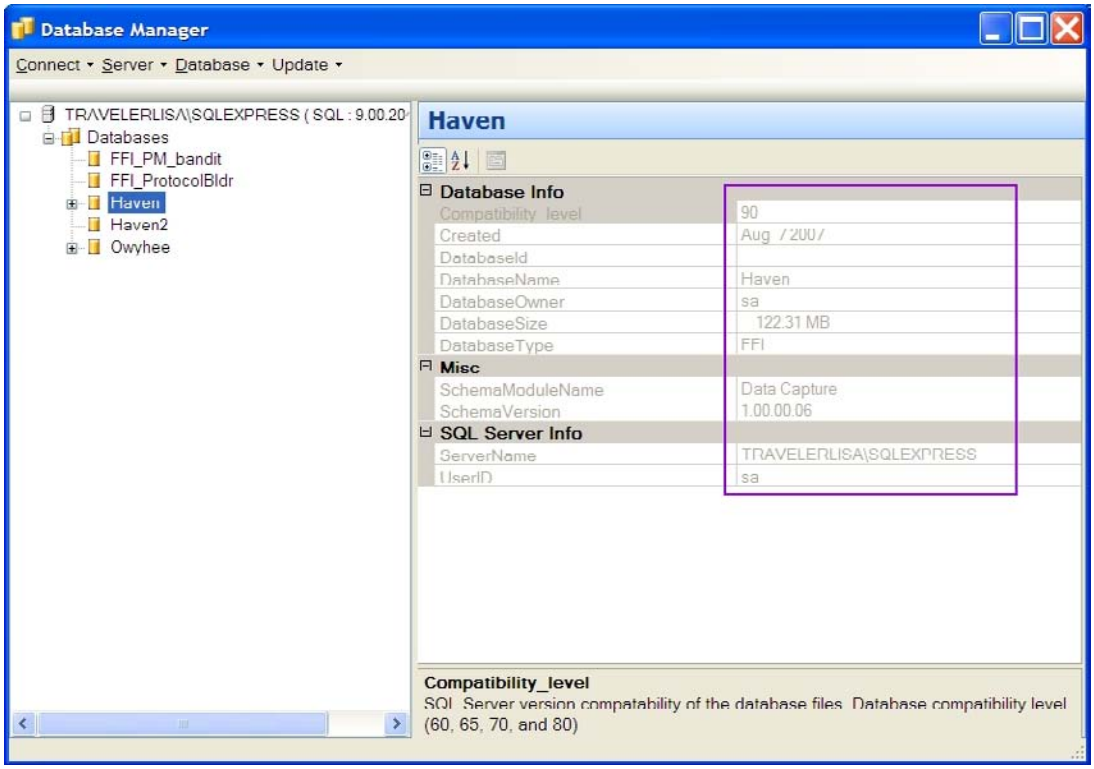
Creating a database (continued)

4. A DOS window and a progress bar open, as shown below. Wait while the database is created, which could take up to 15 minutes, depending on your computer.



NOTE: Under some circumstances, you might receive an error message reading "Database Creation Failed - The database you have created does not appear to have a valid schema". This generally occurs when using a slow processor. Simply try creating the database a second time.

5. In the tree view of the **Database Manager** window, open the **Databases** folder. The new database is listed in the tree view. Note the information about the new database that is shown in the right-hand pane:
    - Creation date, name, owner, and size.
    - Database type - FFI.
    - Schema module name and version.
    - SQL server name and user ID.



6. Close the **Database Manager** window.

Backing up a database

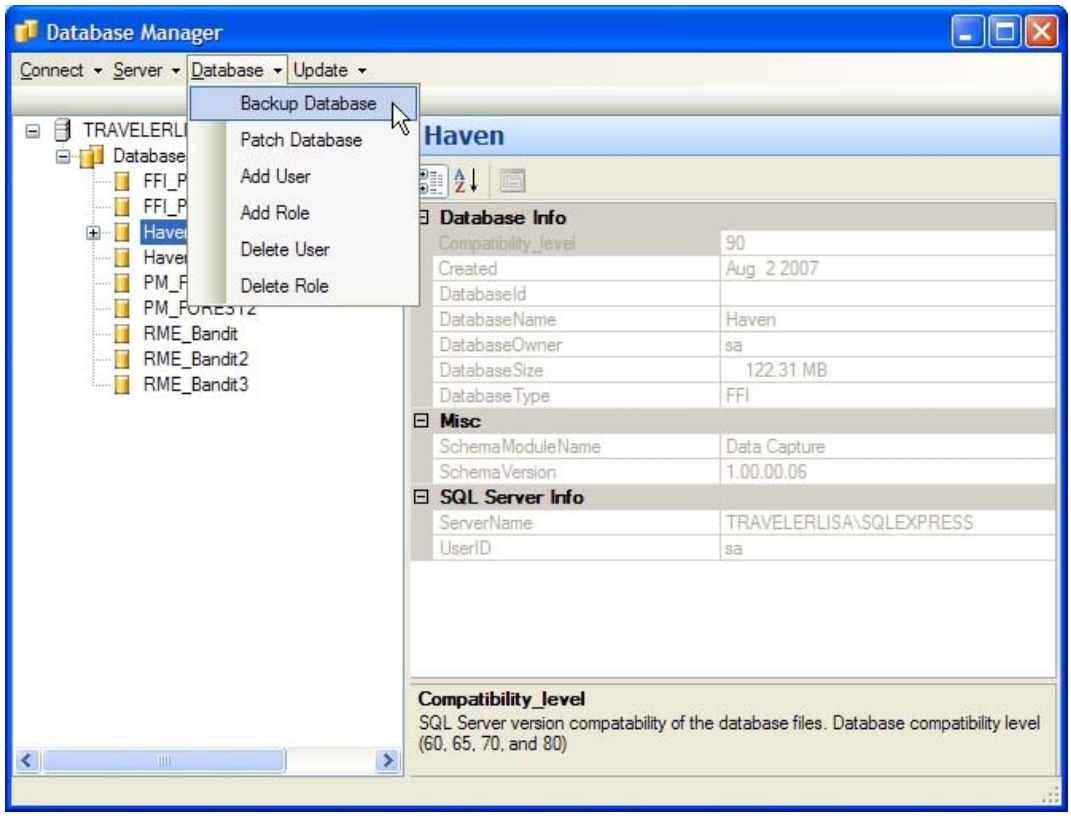
The **Backup Database** command creates a backup copy of the selected database and files it on your computer.

*NOTE: At this time, database backup must be done by an FFI administrator or manager, and can only be done within the **Admin** module.*

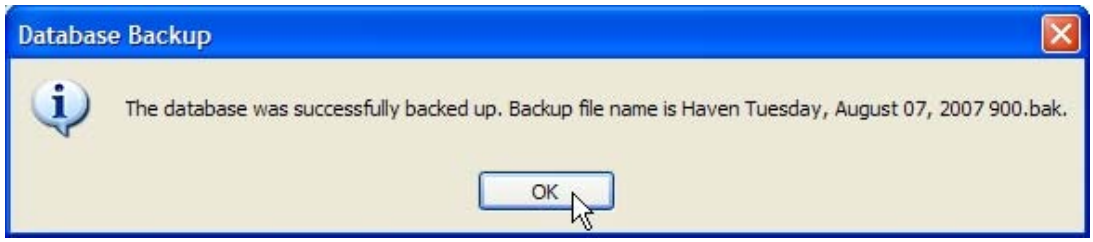
NOTE: Back up your databases often! A deleted database cannot be recovered, but you can restore a database from a backup file.

To back up a database:

1. In the **Database Manager** tree view, highlight the name of the database.
2. Click **Backup Database** in the **Database** pull-down menu.



3. After a moment or two, a confirmation box opens. Note the name of the backup file and click **OK**.



NOTE: The default location for backup files is C:\Program Files\Microsoft SQL Server\MSSQL.1\MSSQL\Backup. This is the recommended file location.

See also:

- Restoring a database

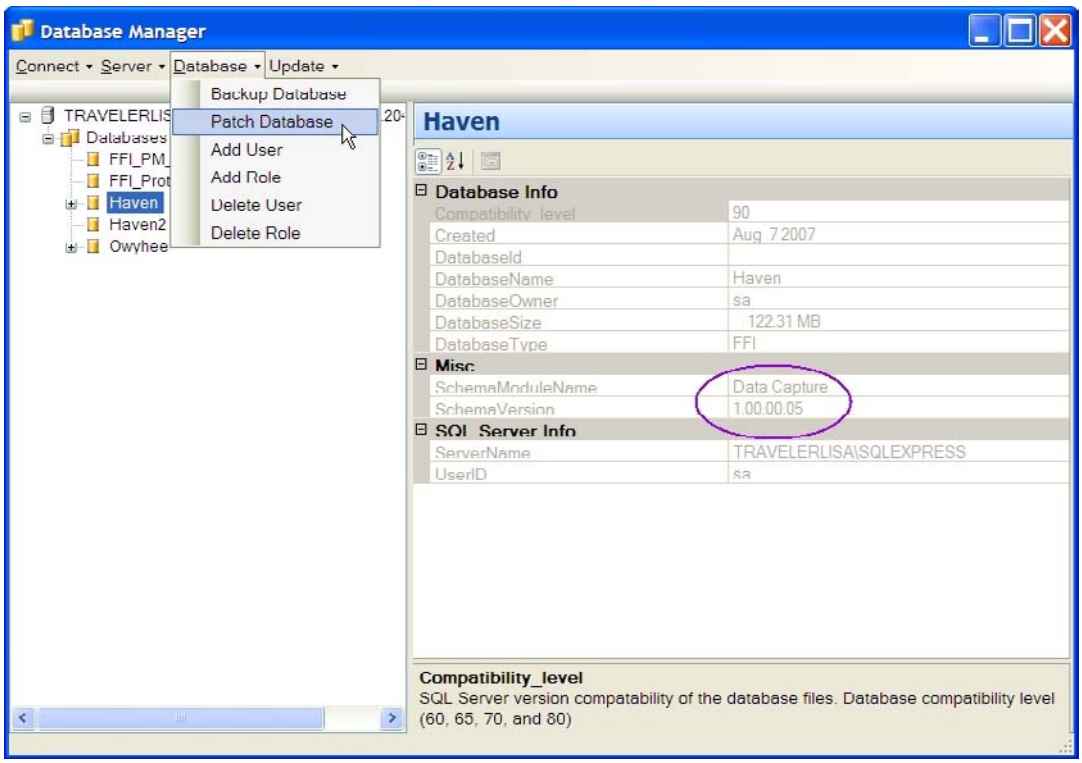
Patching a database

The **Patch Database** command lets you update an existing database so that it works correctly with a new version of FFI.

In this example, the schema version of the **Haven** database is 1.00.00.05, but the current version of FFI is 1.00.00.06. Apply the **Patch Database** command to upgrade the database to the current schema version.

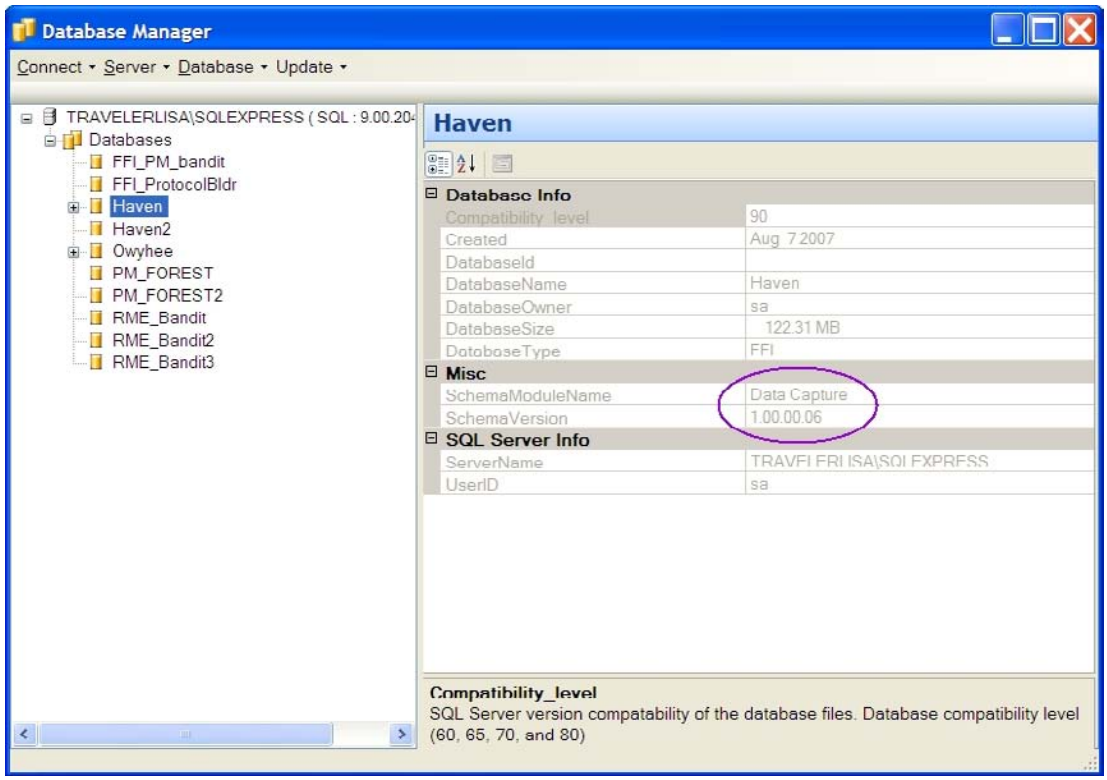
To patch a database:

1. In the tree view of the **Database Manager** window, highlight the name of the database to be patched.
2. In the **Database** pull-down menu, select **Patch Database**.



3. Click **OK** in the **Utilities** window to confirm.

4. A DOS window opens very briefly. Next thing you know, the database has been updated.



5. Back up the patched database using the **Backup Database** command in the **Database** pull-down menu.

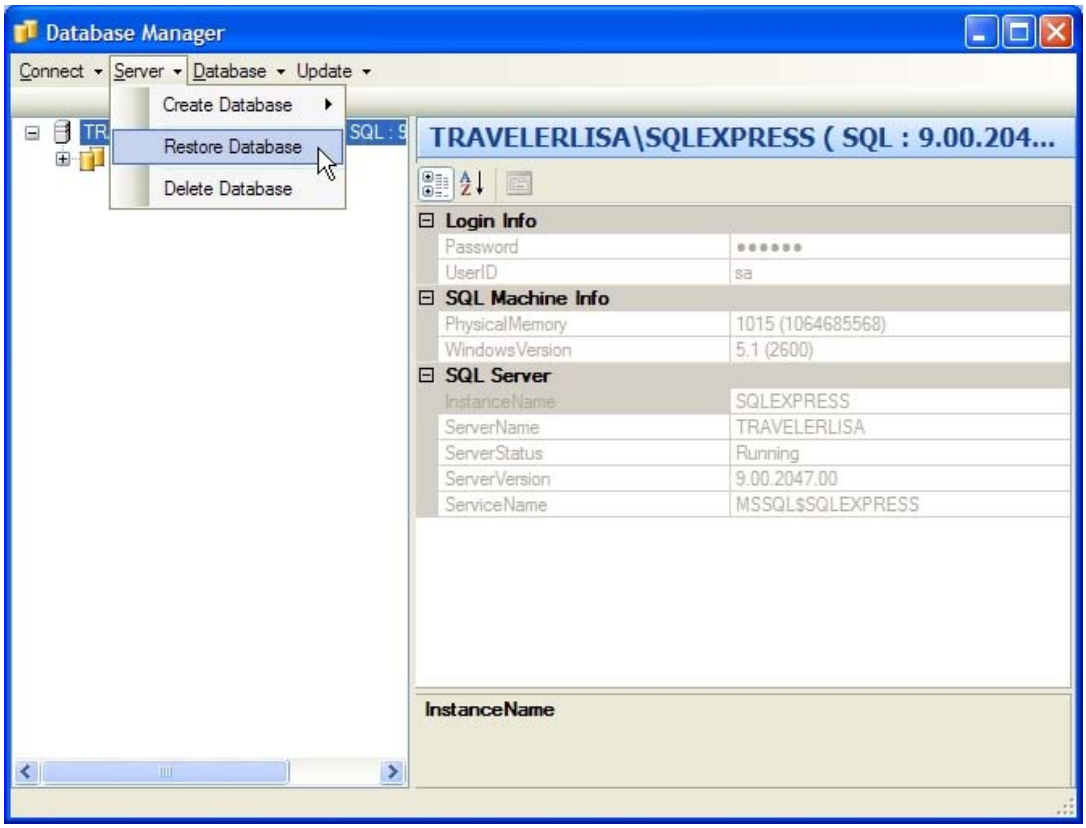
Restoring a database

A backed-up database can be restored if it is inadvertently deleted or damaged. You must hold an administrative role to restore a database.

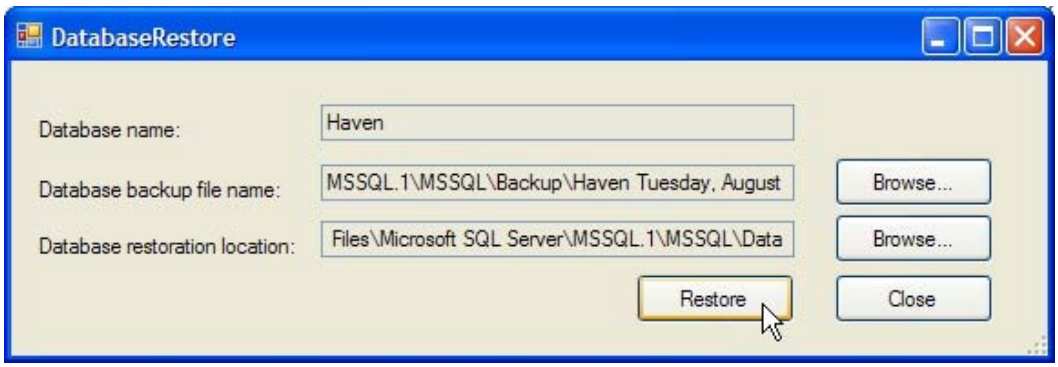
NOTE: Back up your databases often! A deleted database cannot be recovered, but you can restore a database from a backup file.

To restore a database:

1. Highlight the name of the SQL server instance in the tree view and select **Restore Database** in the **Server** pull-down menu.



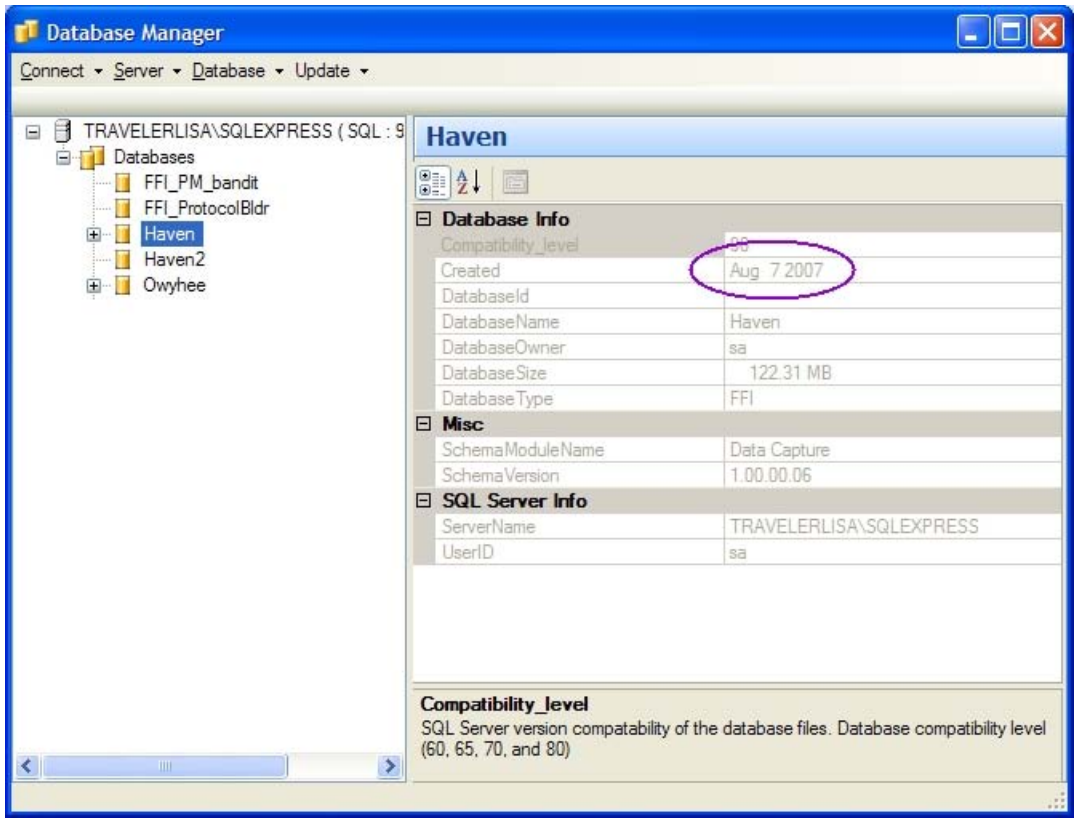
2. The **Database Restore** window opens. Browse to the both backup file and the restoration location, as indicated in the screenshot below, and click **Restore**.



NOTE: The default backup file location is C:\Program Files\Microsoft SQL Server\MSSQL.1\MSSQL\Backup. The default restoration location is C:\Program Files\Microsoft SQL Server\MSSQL.1\MSSQL\Data. We recommend using these defaults.

3. Click **OK** to close the message window.

4. The **Haven** database is again listed in the **Database Manager** tree view. Its new creation date is the date of the backup file used in the restoration.



NOTE: The Restore Database function can also be used to "import" a database to another computer in a remote location for analysis purposes. Keep in mind that any changes made to the copy on the remote computer cannot be recombined or "synchronized" with the source database.

See also:

- Backing up a database

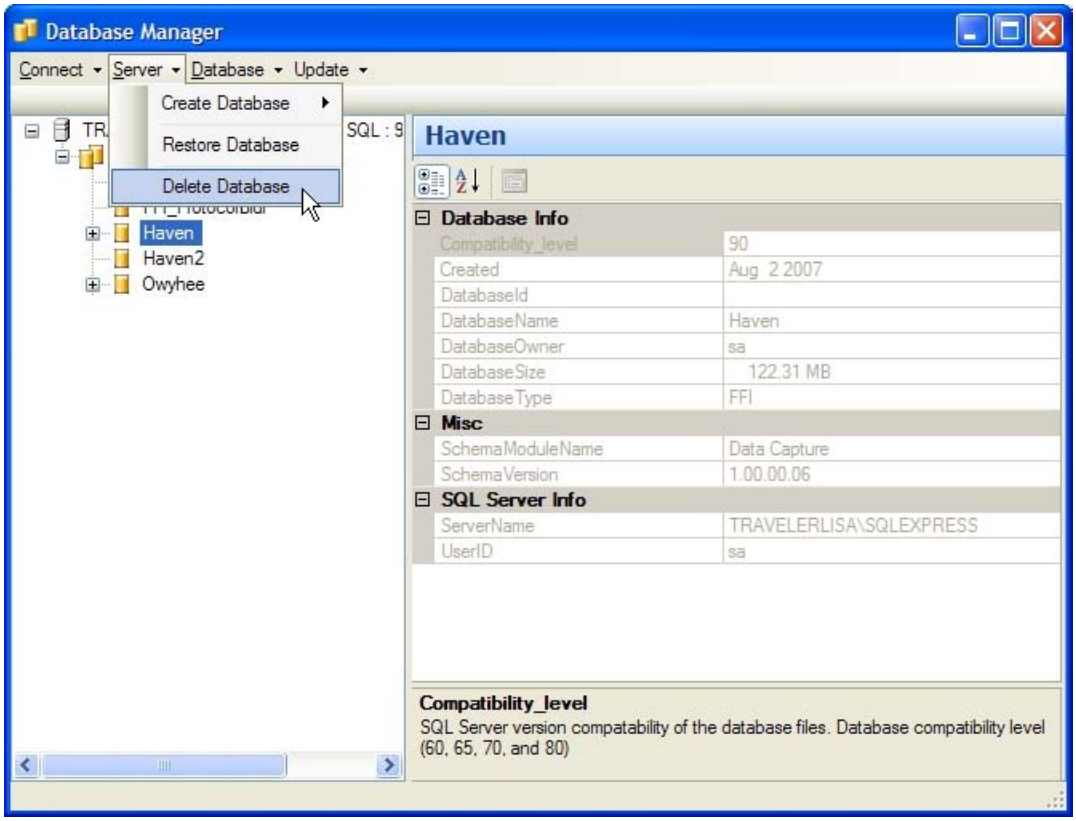
Deleting a database

FFI administrators and managers can delete databases that are no longer required.

NOTE: Back up your databases often! A deleted database cannot be recovered, but you can restore a database from a backup file.

To delete an FFI database:

1. Highlight the name of the database to be deleted.
2. Click **Delete Database** in the **Server** pull-down menu.



3. If you are sure that you wish to delete the database, click **OK** in the confirmation window.

4. The database is deleted.

See also:

- Restoring a database

Managing users and user roles

This section covers:

- Adding and deleting users
- Assigning and deleting user roles
- User roles and permissions
- Password guidelines

User roles and permissions

Four user roles are available in FFI. The range of tasks that you can perform is dictated by your role, which is assigned by your FFI administrator or manager. These roles are defined below.

Administrator

- Performs any activity in FFI and in SQL Server.

Manager

- Manages log-ins, adds and removes user IDs, and changes passwords.
- Assigns user roles.
- Creates, alters, and deletes databases; reads error logs.
- Creates and edits administrative units, project units, and macro plots.
- Imports new protocols and methods from the Protocol Manager module.
- Cannot restore databases.
- Cannot make changes in SQL Server instances.

Data entry

- Creates macro plots and sample events.
- Enters protocol data.
- Runs reports and analyses.
- Cannot access the Database Administration module.
- Cannot create administrative units or project units.

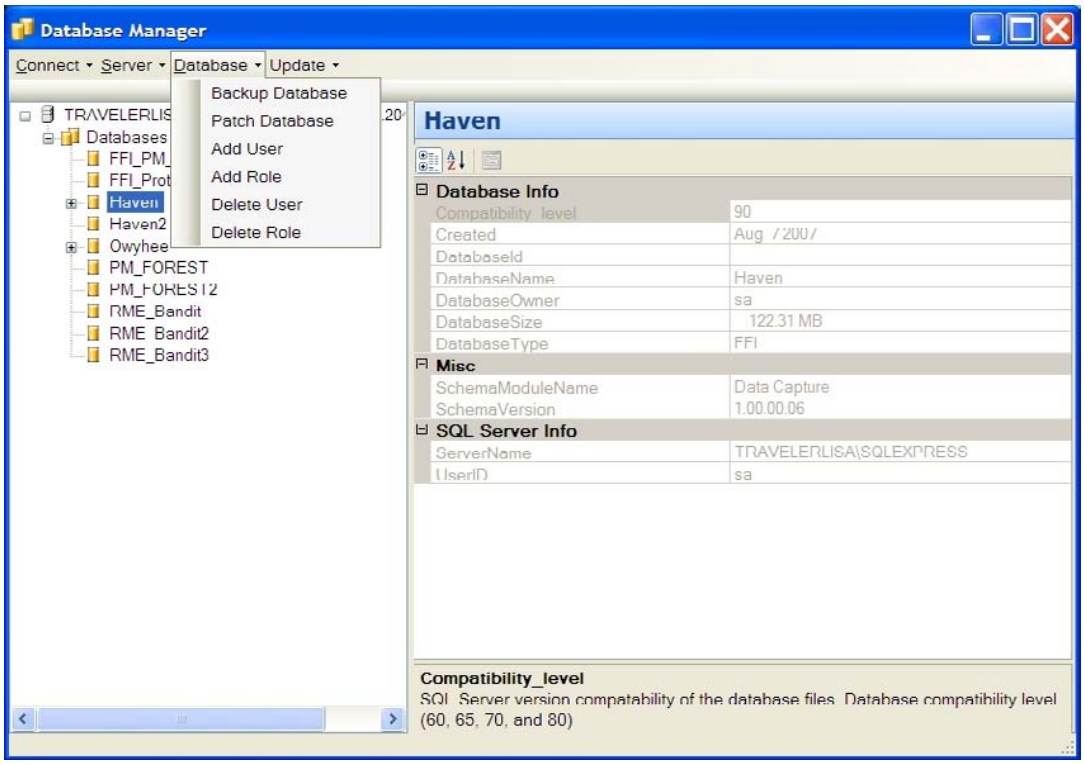
Reader

- Reads data.
- Runs reports and analyses.
- Exports queries and reports.
- Cannot access the Database Administration module.
- Cannot create administrative units, project units, macro plots, or sample events.

See Adding and deleting user roles

Adding and deleting users

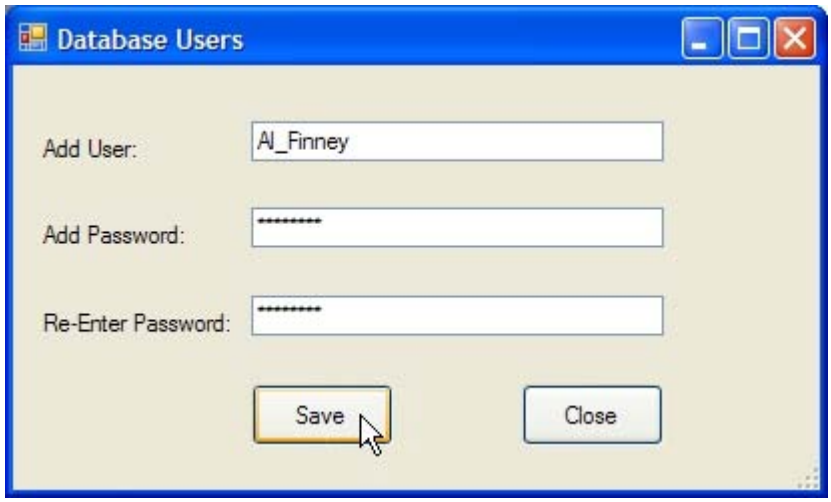
FFI administrators and managers can create and delete user accounts for a database. Use the **Database** pull-down menu in the **Database Manager** to add and delete users.



Adding a new user

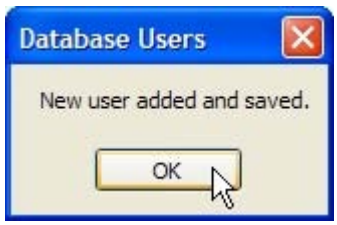
To add a new user:

1. Select the database name in the tree view of the **Database Manager**. In the example, above, a new user is to be added to the **Haven** database.
2. Click **Add User** in the **Database** pull-down menu.
3. Enter a name and password for the new user, and click **Save**.



*NOTE: Select a password that you can easily remember, since it cannot be retrieved if it is forgotten. See Password guidelines for help in selecting a password. This is your **sa** user (SQL) password, and you will use it each time you log on to FFI. Be sure to write your **sa** user password down in a safe place. Your **sa** user (SQL) password is different than your Windows password.*

4. Addition of the new user is confirmed. Click **OK** to close the confirmation window.

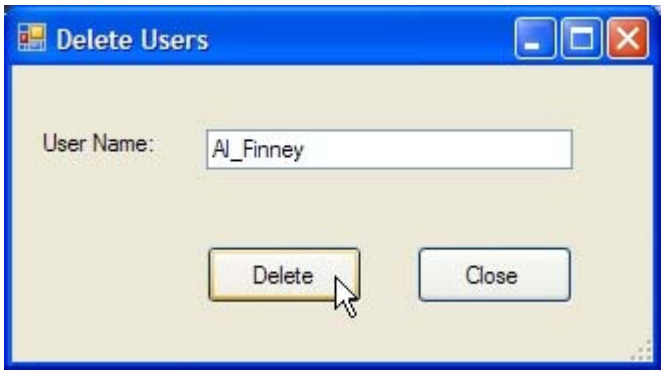


Deleting a user

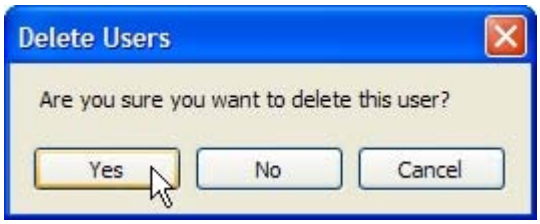
NOTE: No data is lost when a user or user role is deleted.

To delete a user:

1. Select the database name in the tree view of the **Database Manager**. In the example, above, a user is to be removed from the **Haven** database.
2. Click **Delete User** in the **Database** pull-down menu.
3. Enter the name of the user to be deleted and click **Delete**.

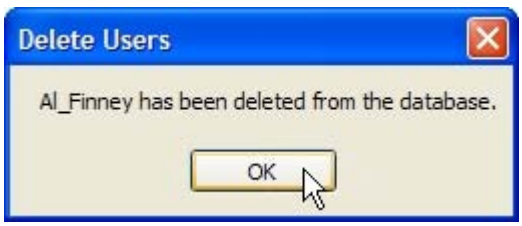


4. Click **Yes** to confirm that you really want to delete the user.



5. Click **Yes** to respond to the warning.

6. Deletion of the user is confirmed. Click **OK** to close the confirmation window.



See also:

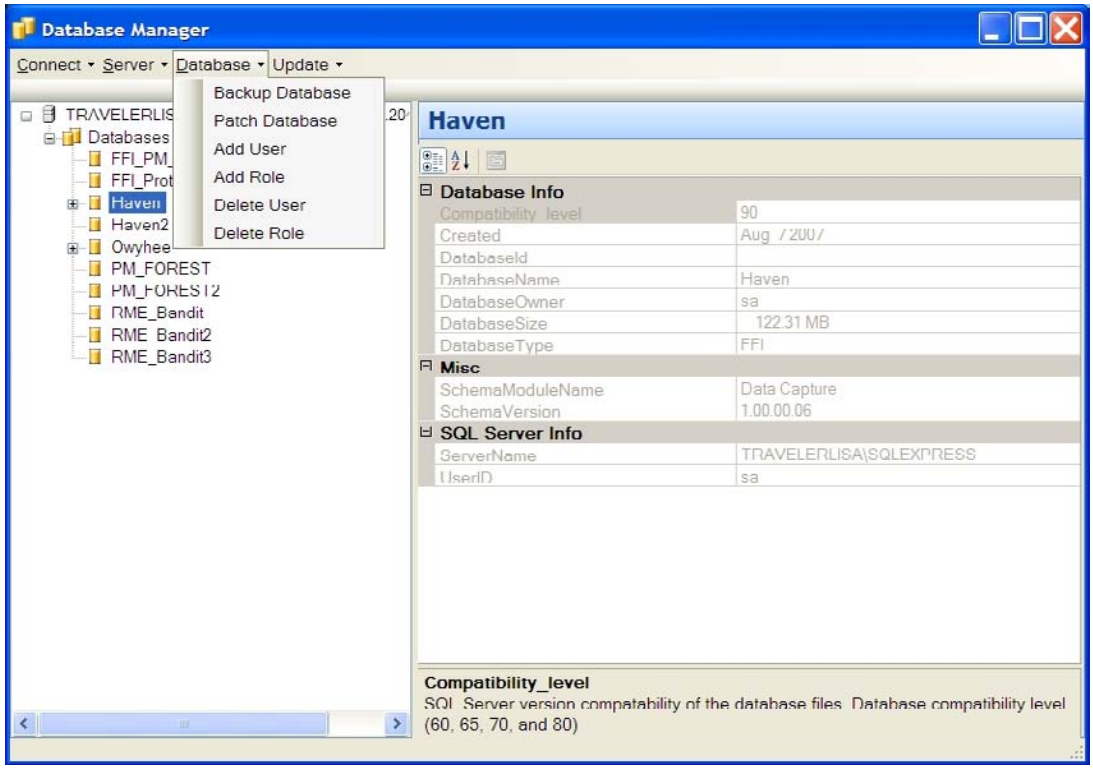
- Assigning and deleting user roles

Assigning and deleting user roles

FFI administrators and managers can assign and modify or delete user roles for a database. Managing user roles helps to ensure the integrity of the database by allowing

Database pull-down menu in the **Database Manager** to handle user roles.

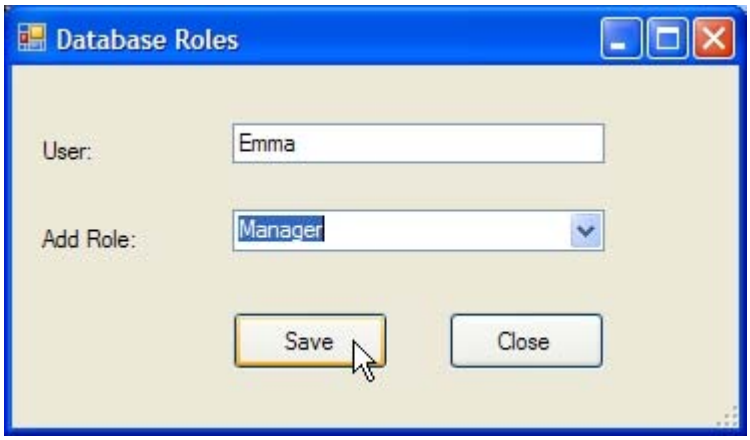
Note: The available user roles are Administrator, Manager, Data Entry, and Reader. See User roles and permissions for descriptions.



Assigning a role to a user

To assign a new role to a user:

1. Select the database name in the tree view of the **Database Manager**. In the example, a role is to be assigned to a user of the **Haven** database.
2. Click **Add Role** in the **Database** pull-down menu.
3. Enter the name of the user and select the desired role in the pull-down listing. Click **Save**.



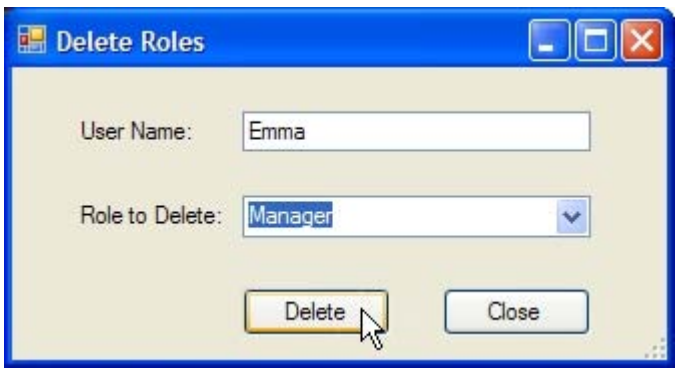
4. Addition of the user's new role is confirmed. Click **OK** to close the confirmation window.

Deleting a user role

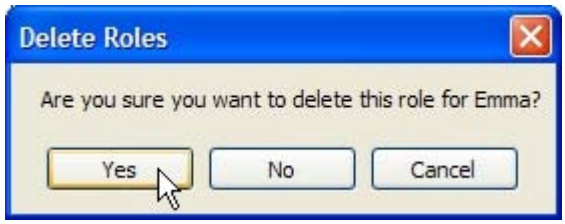
NOTE: No data is lost when a user or user role is deleted.

To delete a user role:

1. Select the database name in the tree view of the **Database Manager**. In the example, a role is to be deleted for a user of the **Haven** database.
2. Click **Delete Role** in the **Database** pull-down menu.
3. Enter the name of the appropriate user and select the role to be deleted in the pull-down listing. Click **Delete**.



4. Click **Yes** to confirm that you really want to delete the user role.



5. Deletion of the user's role is confirmed. Click **OK** to close the confirmation window.

See Adding and deleting users

Password guidelines

To ensure security, new FFI passwords should meet the following guidelines:

- The password does not contain all or part of the username.
- The password is at least eight characters long.
- The password contains characters from three of the following four categories:
  - Uppercase letters A through Z.
  - Lowercase letters A through Z.
  - Numerals 0 through 9.
  - Non-alphanumeric characters such as !, $, #, or %.

Using FFI

This section of the *User's Guide* contains detailed procedures for:

- Starting FFI
- Project management
- PDA coordination
- Data entry and edit
- Query
- Reports and analysis
- Species management
- Toolbox utilities

Also, see Data entry guidelines for general tips on entering data in FFI.

Starting FFI

To start FFI:

1. Double-click the FFI icon on your desktop or launch FFI from the **Start** menu.
2. In the **Database Select** window, select your SQL Server instance. Enter your user name and your SQL password to log on to the server.

3. After the server validates your password, select your database from the pull-down listing. Click **OK** to continue.

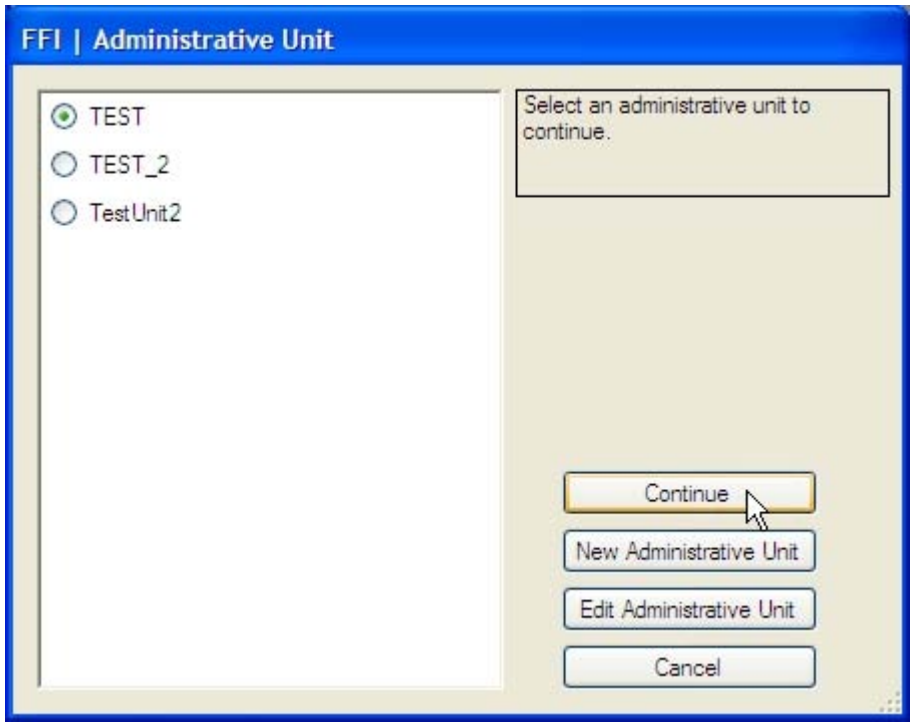
*NOTE: If the **Connect to a database** menu is grayed out and you cannot select a database, you have entered an incorrect SQL password. Confirm your password and log on to the server again. If necessary, repeat the Configuring a database procedure.*

continued

Starting FFI (continued)

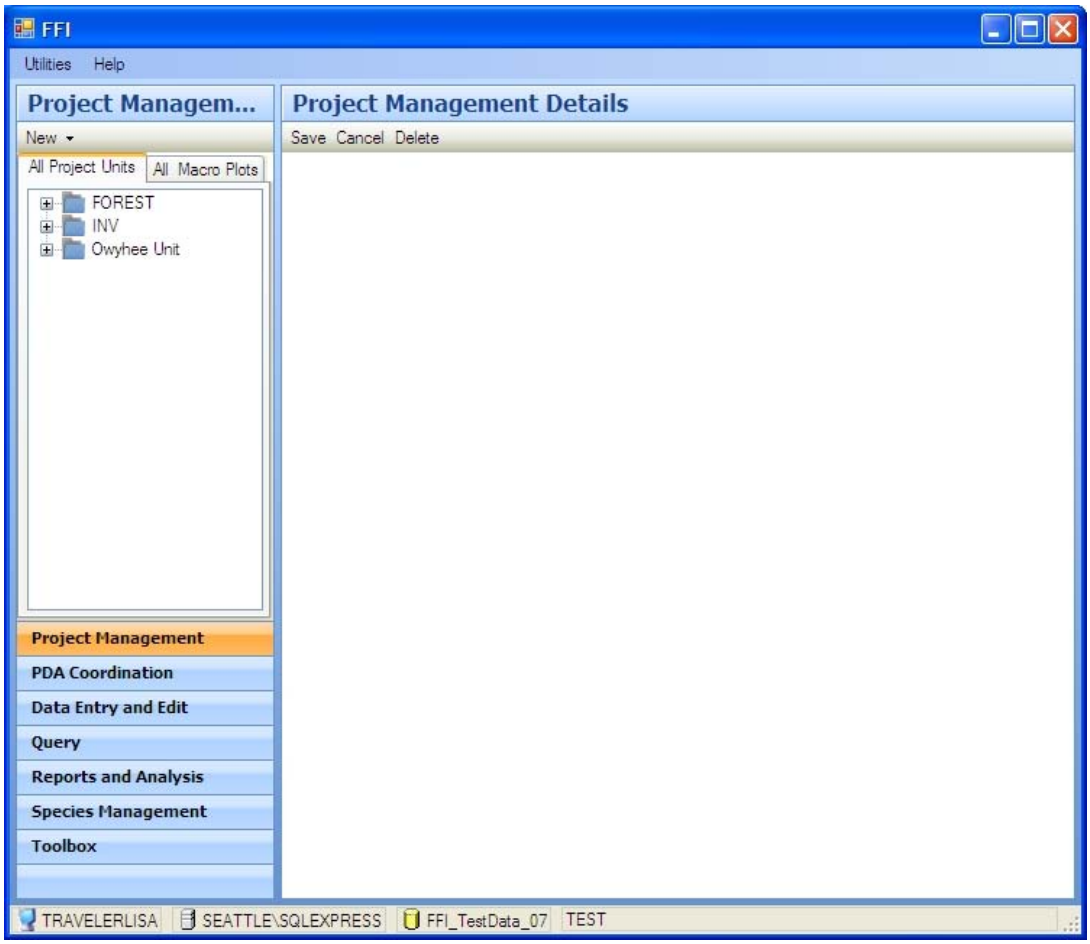
4. Pick the administrative unit you wish to work with and click **Continue**.

NOTE: If the administrative unit is not listed, it may reside in another database.



NOTE: You can use this window to edit information about an existing administrative unit. Click the name of the unit and click ***Edit Administrative Unit****. Make any necessary changes and click* ***Save****.*

5. The main FFI window opens. Note that your SQL Server database instance and administrative unit are identified in the footer of the window. Click the FFI module you wish to use and proceed.



The Attention icon

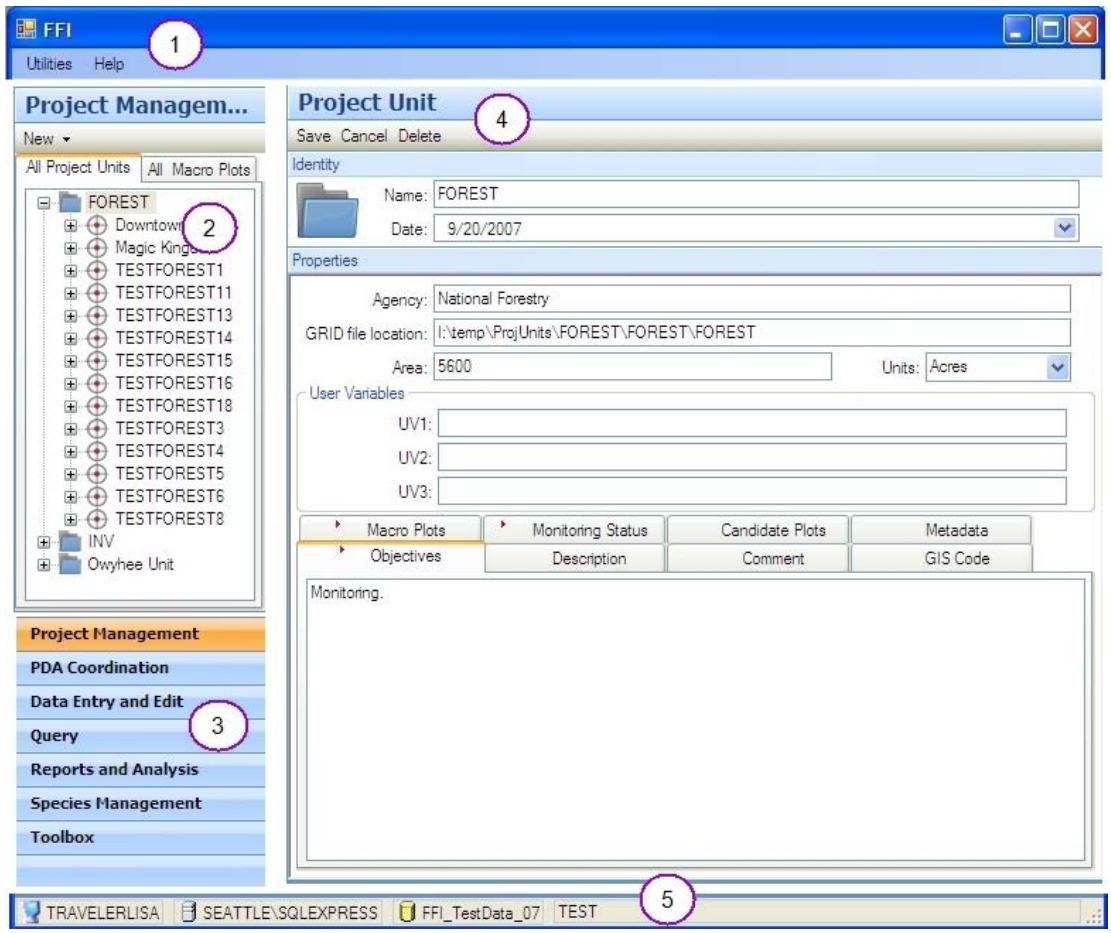
On many forms and input screens, you will see the **Attention** icon: . This icon indicates required or incorrect input. Mouse over the icon for messages about the required data. Once you resolve the errors and click **Save**, the **Attention** icon will disappear.

See also:

- FFI user interface
- Protocols and methods
- Project management
- Using FFI

The FFI user interface

The figure below shows the main FFI window. All user activities take place within this window, or within dialog boxes that are opened from this window. Each numbered component is described on the next page.



continued

The FFI user interface (continued)

Header (1)

The FFI window header (component 1) displays the program name. The appearance of the window header varies depending on your user status. If you have administrator or manager status, the **Utilities** menu, which allows you to import new protocols into FFI, will be visible. The **Help** menu provides information about FFI with a link to the FRAMES FFI Web page, and links you to the on-line **Help**.

Tree view(2)

This pane (component 2) shows a tree view listing your project units, macro plots, and scheduled sample events. You can choose to list **All Project Units** or **All Macro Plots** in your tree view. The toolbar of the tree view changes to reflect the function that you

select. Depending on which function is active, pull-down menus, toggle bars, or other controls will appear in the tree viewtoolbar.

Navigation button bar (3)

The navigation button bar (component 3) lets you switch between the seven FFI functions. The current function is always highlighted.

Work pane (4)

All data entry, viewing, editing, analysis, and querying take place in the work pane (component 4) or in dialog boxes that are called up from this pane. The work pane and its menus change to reflect the functions that you select.

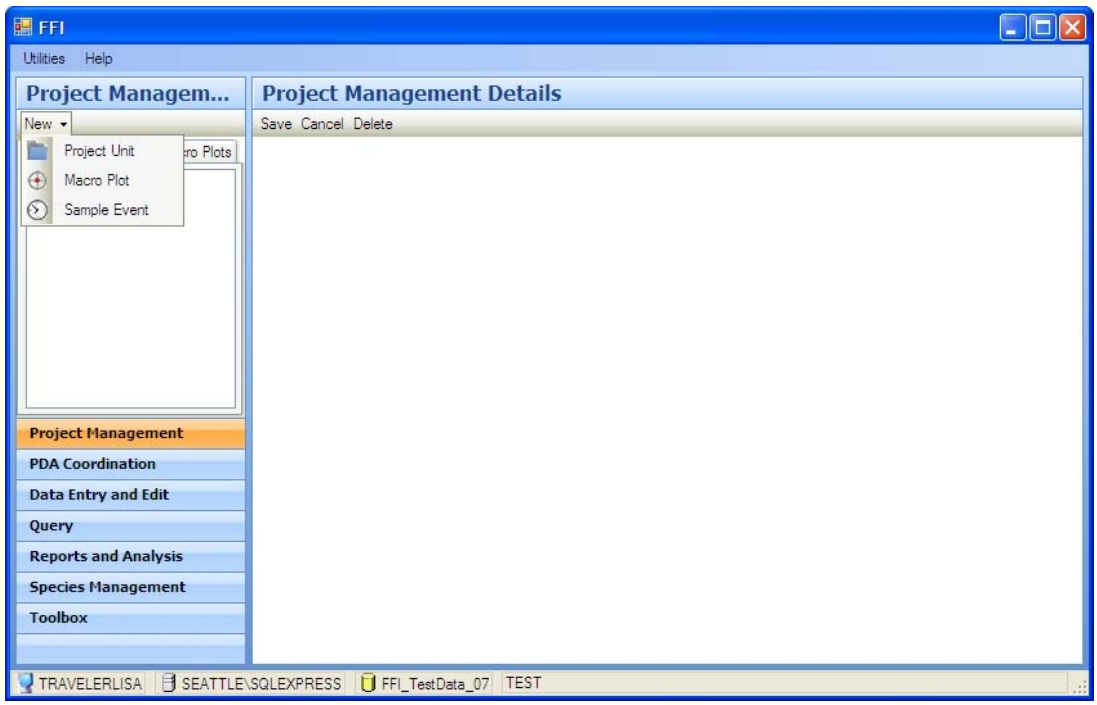
Footer (5)

The footer (component 5) remains the same while FFI is open. It identifies the current user, database server, database, and administrative unit.

Project management

The **Project Management** functions in FFI include:

- Creating and defining new project units and macro plots.
- Assigning macro plots to project units.
- Assigning monitoring status.
- Scheduling sample events.
- Assigning monitoring protocols to scheduled sample events.



NOTE: Your assigned role and permissions determine which functions you can perform in FFI. See User roles and permissions for more information, or consult your FFI administrator.

Return to Using FFI main page.

Working with project units

This section covers:

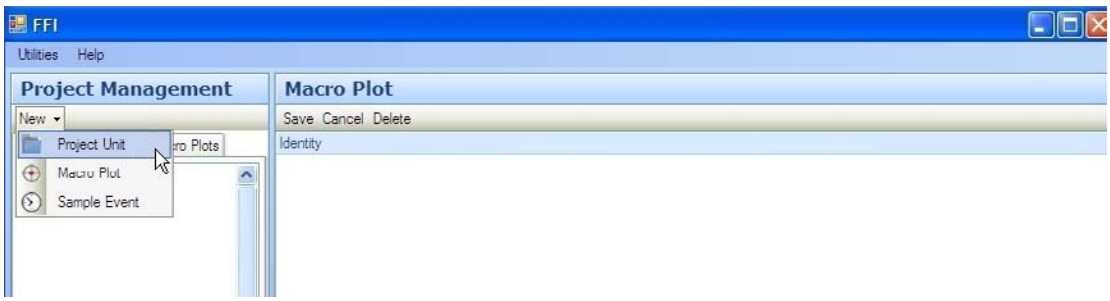
- Creating project units.
- Editing project units.
- Deleting project units.

Creating a new project unit

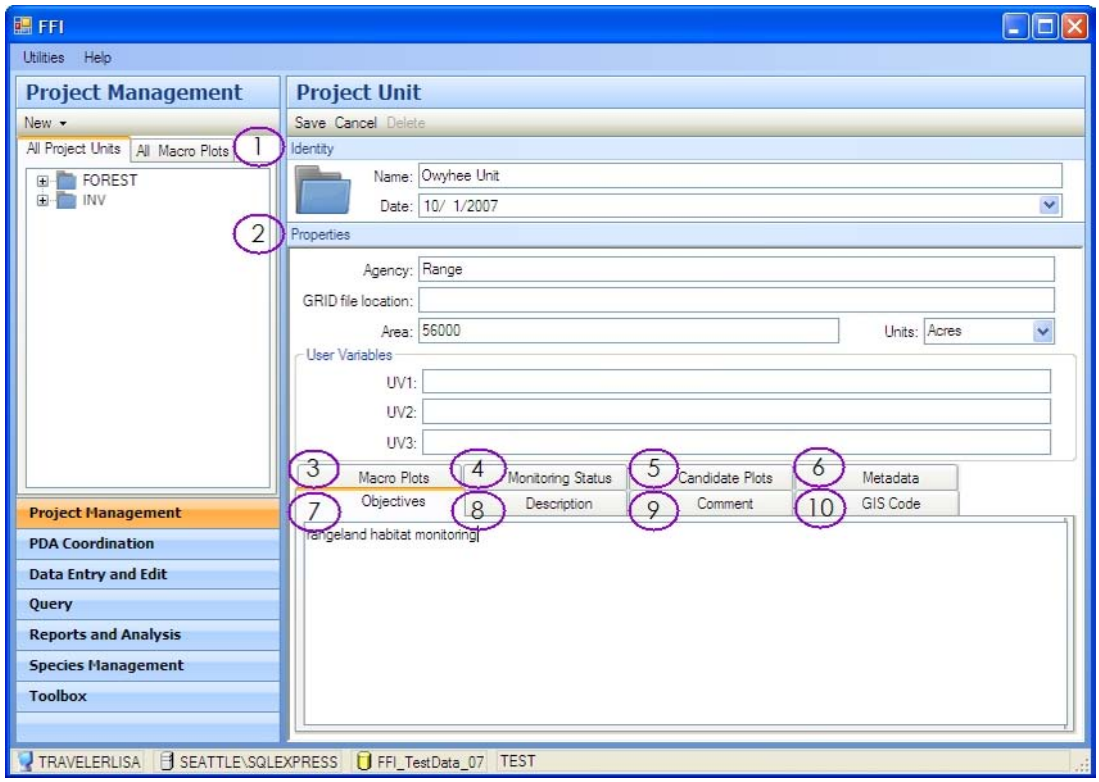
*In FFI, a **project unit** is defined as a division of the entire sample population of the administrative unit. This term corresponds to the term **project ID** used in FIREMON, and the FEAT term **monitoring unit**.*

Project units are usually defined so that they represent an area on the ground. For example, a project unit could consist of "all areas in the Ponderosa vegetation type between 1500 and 2000 meters above sea level, more than 500 meters from the nearest road, and more than 1000 meters from the nearest stream." Project units provide a means to functionally group macro plots for management and analysis. They can be defined so that they overlap spatially, and you can associate macro plots with multiple project units. You can spatially define project units using the FFI GIS module.

To create a new project unit, select **Project Unit** in the **New** pull-down menu. The **Project Unit** window opens.



The **Project Unit** window contains data entry fields and forms, accessed through a series of tabs, with which you can fully describe the new project unit. The numbered paragraphs in this section correspond to the numbered functions in the window, as called out below.



continued

Creating a project unit (continued)

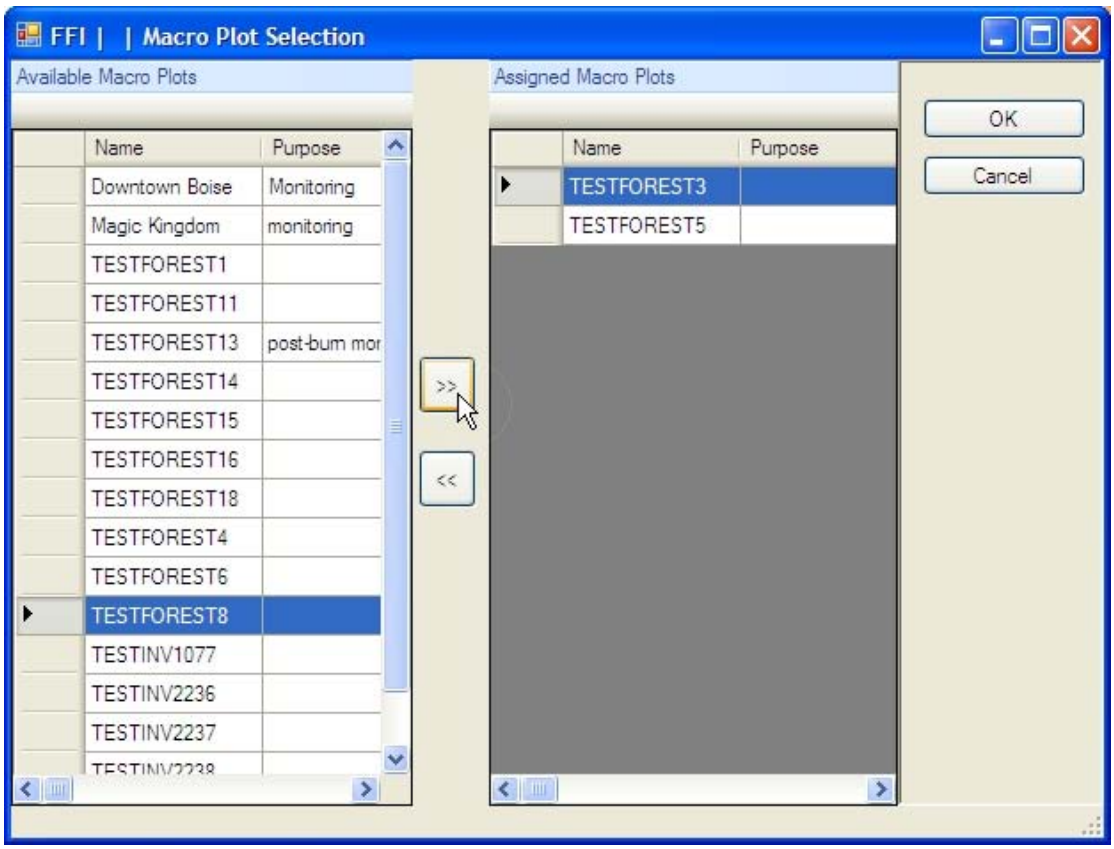
1. Add **Identity** information for the new project unit.
   - **Name**. Enter a meaningful name for the unit.
   - **Date**. The default is the date that you create the project unit. Use the pull-down calendar or enter text to select a different date.
2. Add **Properties** information about the new project unit.
   - **Agency**. Enter the agency name.
   - **GRID file location**. This is the file location of the GIS layer, if used. This field will auto-fill if the project unit is spatially defined.
   - **Area**. Enter the number of acres or hectares contained in the project unit.
   - **Units**. Use the pull-down to select *acres* or *hectares*.

   *Important: If you begin to enter numeric data into a field, such as the **Area** field, and then change your mind about including it, do not simply delete the entry. If you do this, you effectively lock the form, and you cannot enter any data. Instead, click **Cancel** to clear the entry. If you do find yourself locked in, enter a dummy value and then click **Cancel**.*

3. **Macro plots** tab. In this tab, click **Assign Macro Plots** to open the **Macro Plot Selection** form, which lets you assign macro plots to a project unit. Select the

desired macro plots from the left-hand pane and assign them to the project unit by clicking the **>>** arrow. Click **OK** when finished. The assigned macro plots will be listed in the **Macro plots** window after you save your work.

*NOTE: Use the **<<** and **>>** arrows to add or remove macro plots from the **Assigned Macro Plots** pane.*



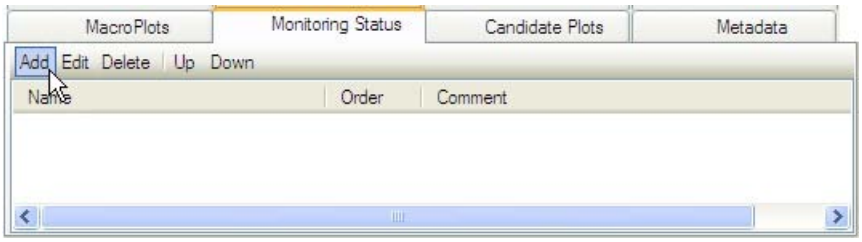
*NOTE: After you complete data entry in a form field, click **Save** at the top of the **Project Unit** pane. Notice that a small red triangle appears next to the tab's label after data has been entered.*

continued

Creating a project unit (continued)

4. **Monitoring status** tab. This tab contains the **Monitoring Status Builder**, which lets you add, edit, delete, and order monitoring status for a project unit. Monitoring status identifies the project unit's status in time in relationship to a treatment or disturbance.

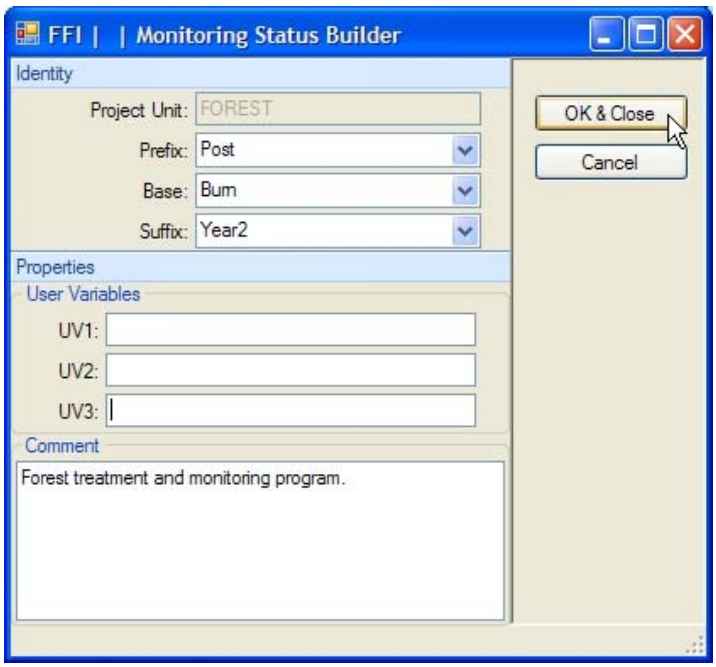
*NOTE: You can assign monitoring status for a sample event in the **Reports and Analysis** tab. For information on using monitoring status in analysis, see Analysis setup.*

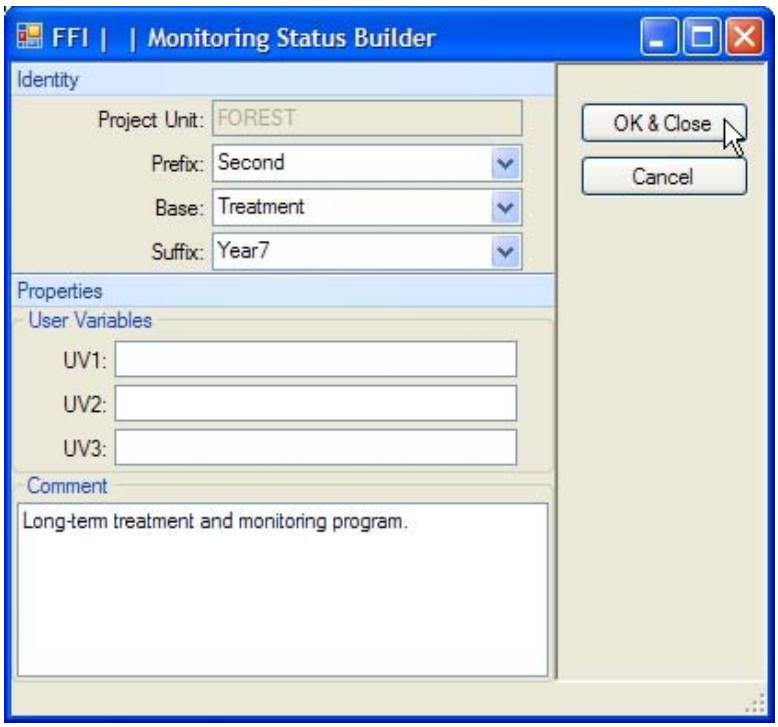


Click **Add** to open the **Monitoring Status Builder**. After you have assigned monitoring statuses to each project unit, the status list can be edited or deleted, and rearranged in any order. You can either assign the standard criteria listed below, or build your own.

- **Prefix**: Pre, Post, Re.
- **Base**: Burn, Disturbance, Measure, Treatment.
- **Suffix**: Years 1 - 5.

In the first example, the monitoring status uses the standard criteria and is Post-burn Year 2. In the second example, the status descriptors have been customized to meet a specific program need.



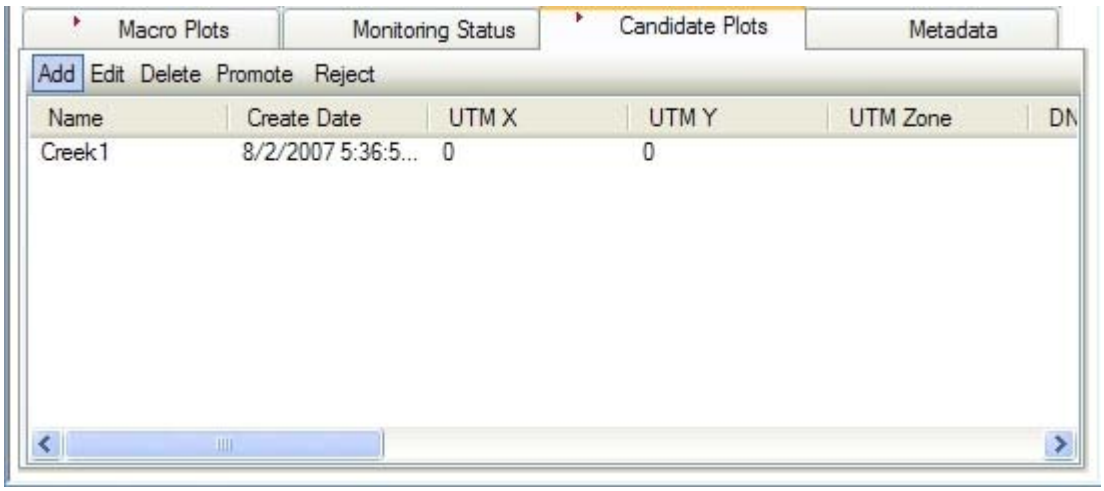


When you are finished assigning monitoring status, click **OK & Close**.

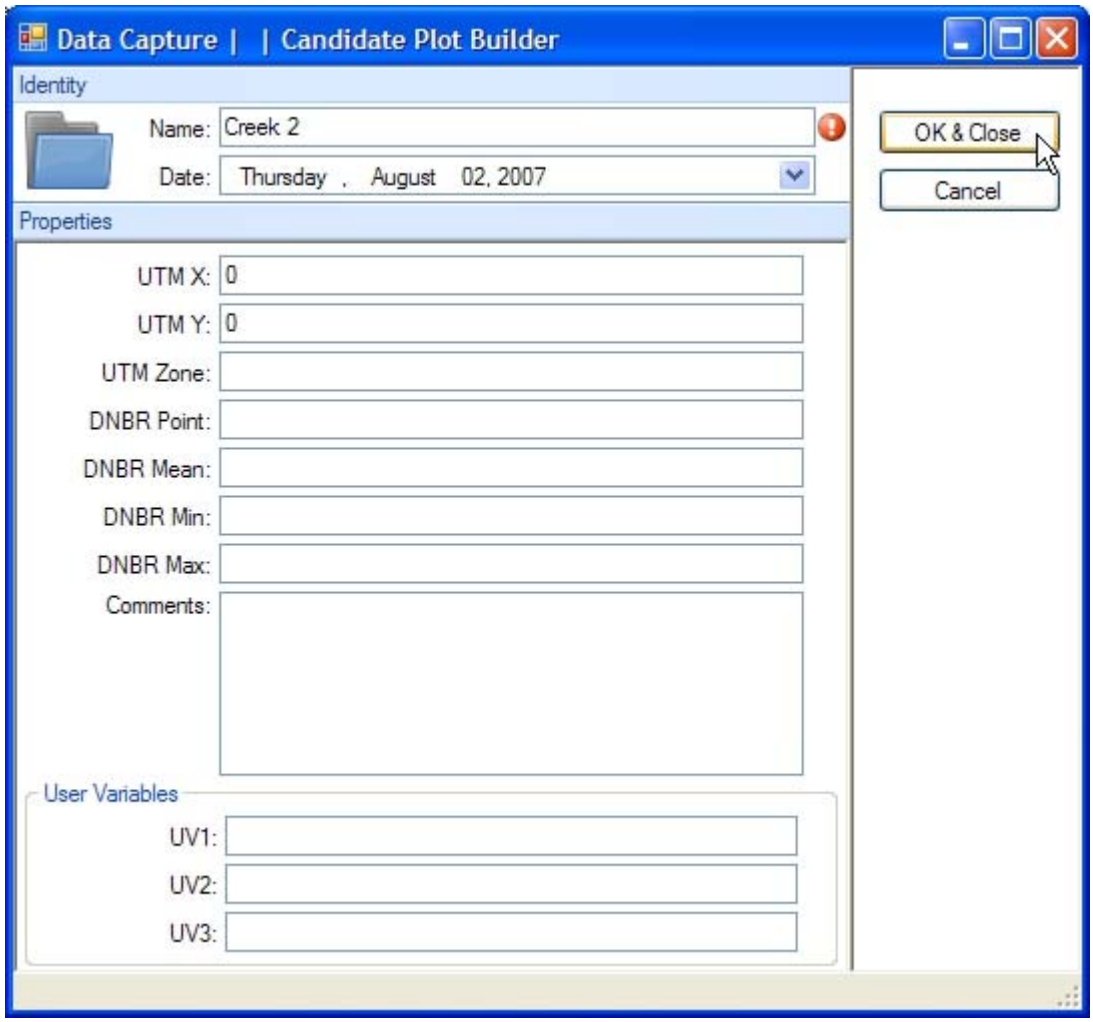
continued

Creating a project unit (continued)

5. **Candidate plots** tab. Use this tab to create, edit, delete, promote, or reject candidate macro plots.



- Click **Add** in the tab toolbar to open the **Candidate Plot Builder**. Name the candidate plot, and add appropriate descriptive data. Click **OK & Close** when finished.
- If you promote a candidate plot, the plot will be moved into the Project Management tree view as a macro plot. Click **Promote** to promote a plot.
- Click **Reject** to remove a candidate plot from the list of candidate plots.



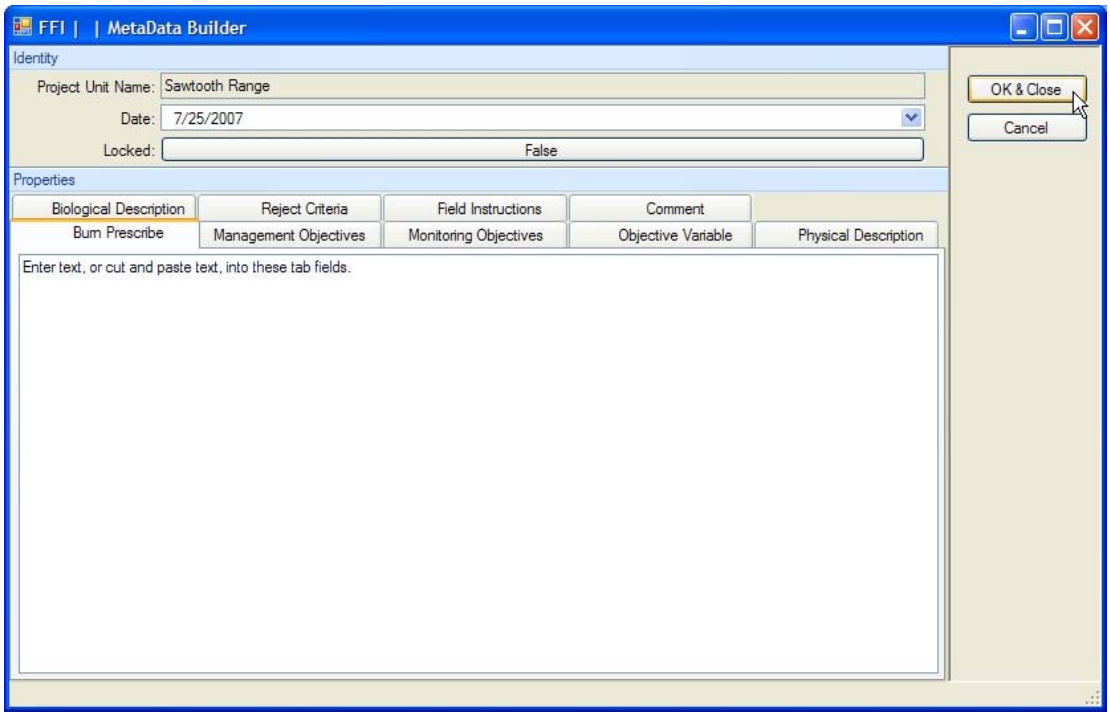
NOTE: The indicates a required field.

continued

Creating a project unit (continued)

6. **Metadata** tab. To add metadata to further describe the project unit, click the **Metadata** tab and select **New.** The **Metadata Builder** window, shown below,

opens.



- You can cut and paste text, such as existing documentation about the project unit, into the metadata tab text fields, or enter text directly. Metadata can be added, edited, or updated at any time. Text can be copied and pasted into a word processing package for formatting and printing.
- Metadata records are labeled and sorted by date. Accept the default date, or use the calendar to select another date for the record.
- If desired, toggle the **Locked** bar to **True** to ensure that the metadata are not changed.
- After entering data, click **OK & Close** to save the record. The record will be listed within the **Metadata** tab in the **Project Unit** details window.

7. In the **Objectives** tab in the **Project Unit** window, enter the monitoring objective.
8. In the **Description** tab in the **Project Unit** window, enter a description for the project unit.
9. Use the **Comment** tab in the **Project Unit** window to enter any pertinent notes and comments.
10. **GIS code** tab. If the project unit is spatially described, this field will auto-fill.

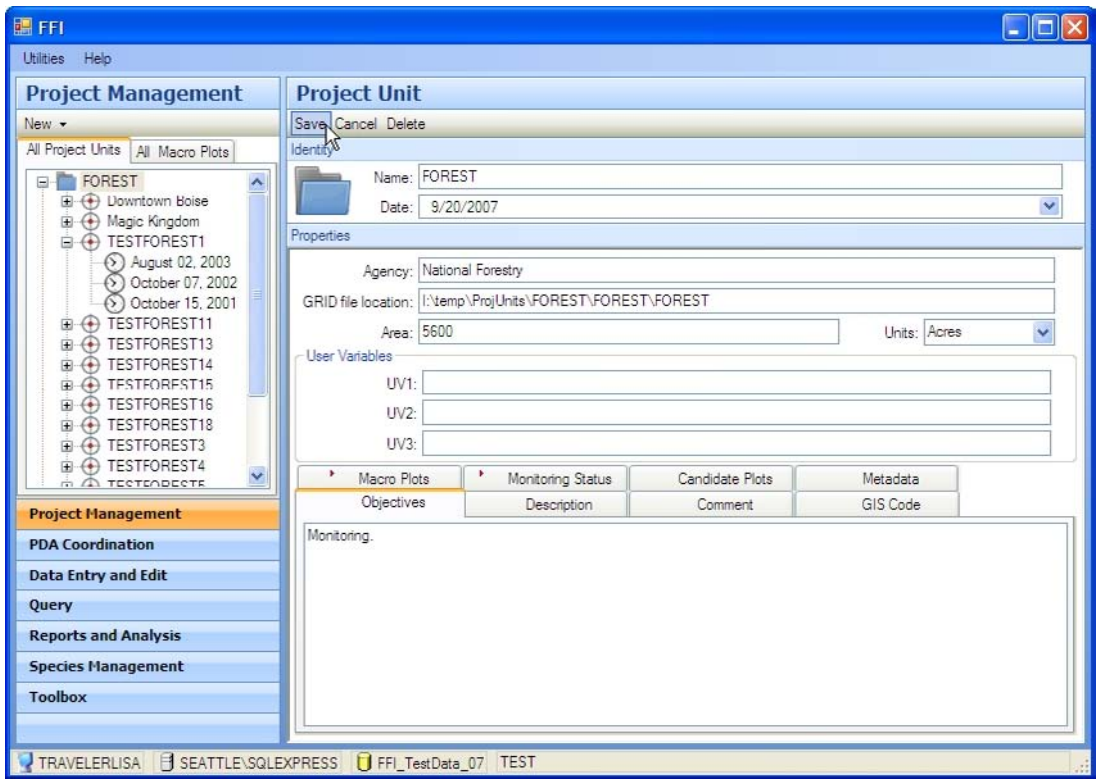
See also:

- Editing a project unit
- Deleting a project unit

Editing a project unit

To edit an existing project unit:

1. In the **Project Management** tree view, highlight the project unit to be edited. The **Project Unit** window opens.
2. Make any necessary changes or updates to the data in the **Project Unit** window, and click **Save**.



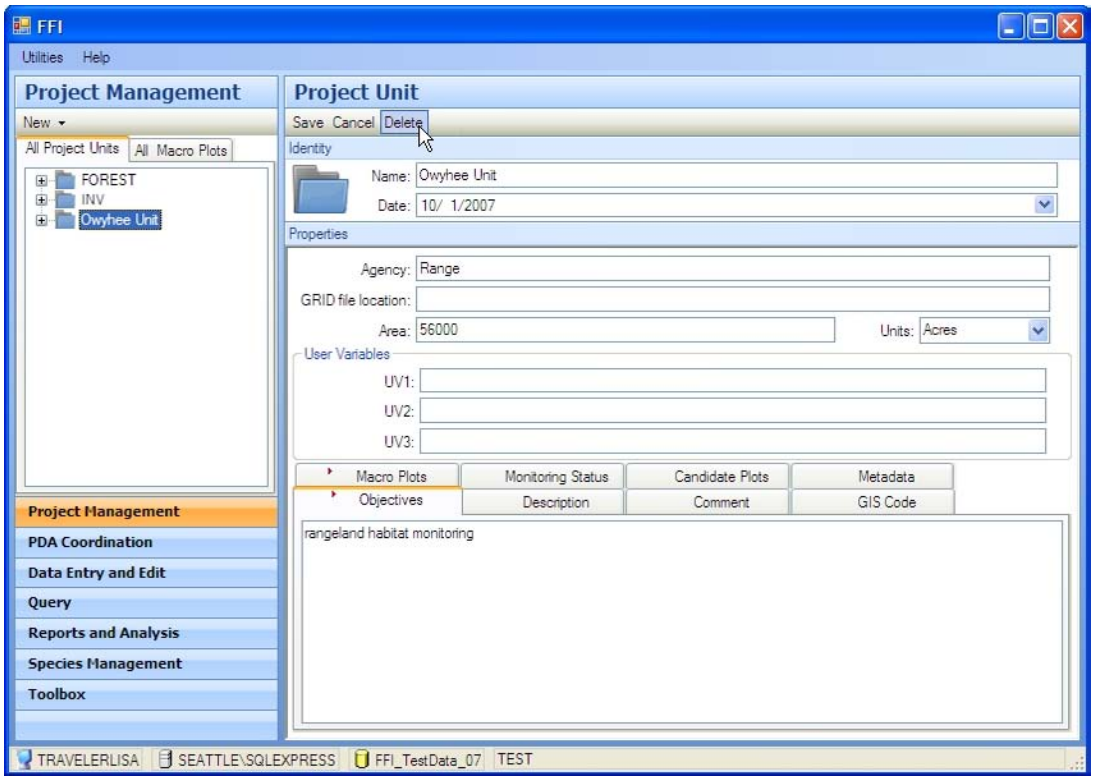
Return to Working with project units

Deleting a project unit

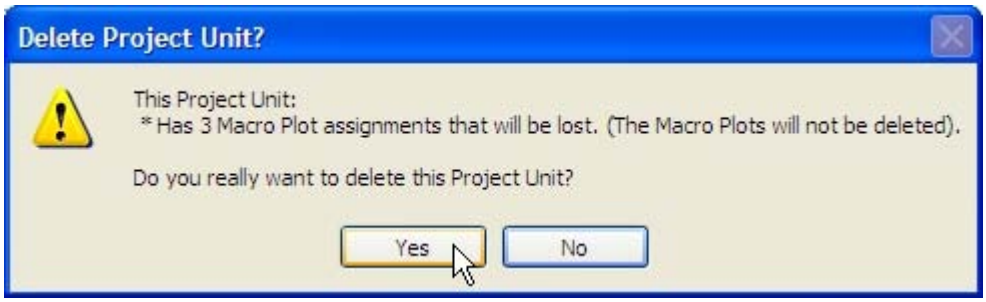
Project units can be deleted from the main **Project Unit** window. You might want to delete a project unit if it was initially set up incorrectly, or after a project has been completed. Deleting a project unit does not affect your macro plots or collected and stored data.

To delete a project unit:

1. In the tree view in the main **Project Management** window, highlight the project unit to be deleted.
2. Click **Delete** at the top of the **Project Unit** window.



3. Click **Yes** in the confirmation box, as shown below.



NOTE: Any assigned macro plots will be retains, although the linkage to the project unit will be lost.

Return to Working with project units

Working with macro plots

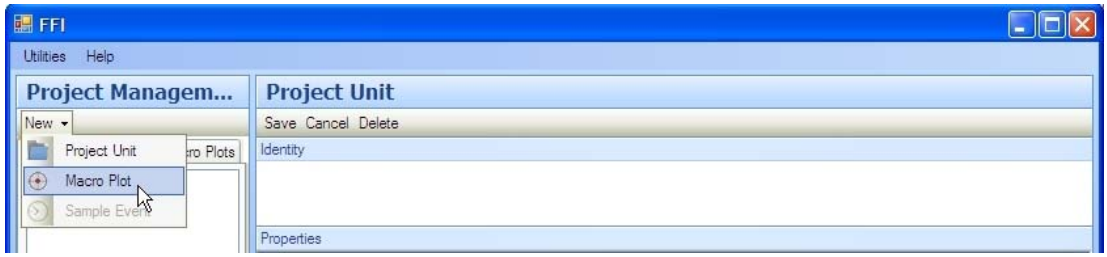
This section covers:

- Creating macro plots.
- Editing macro plots.
- Deleting macro plots.

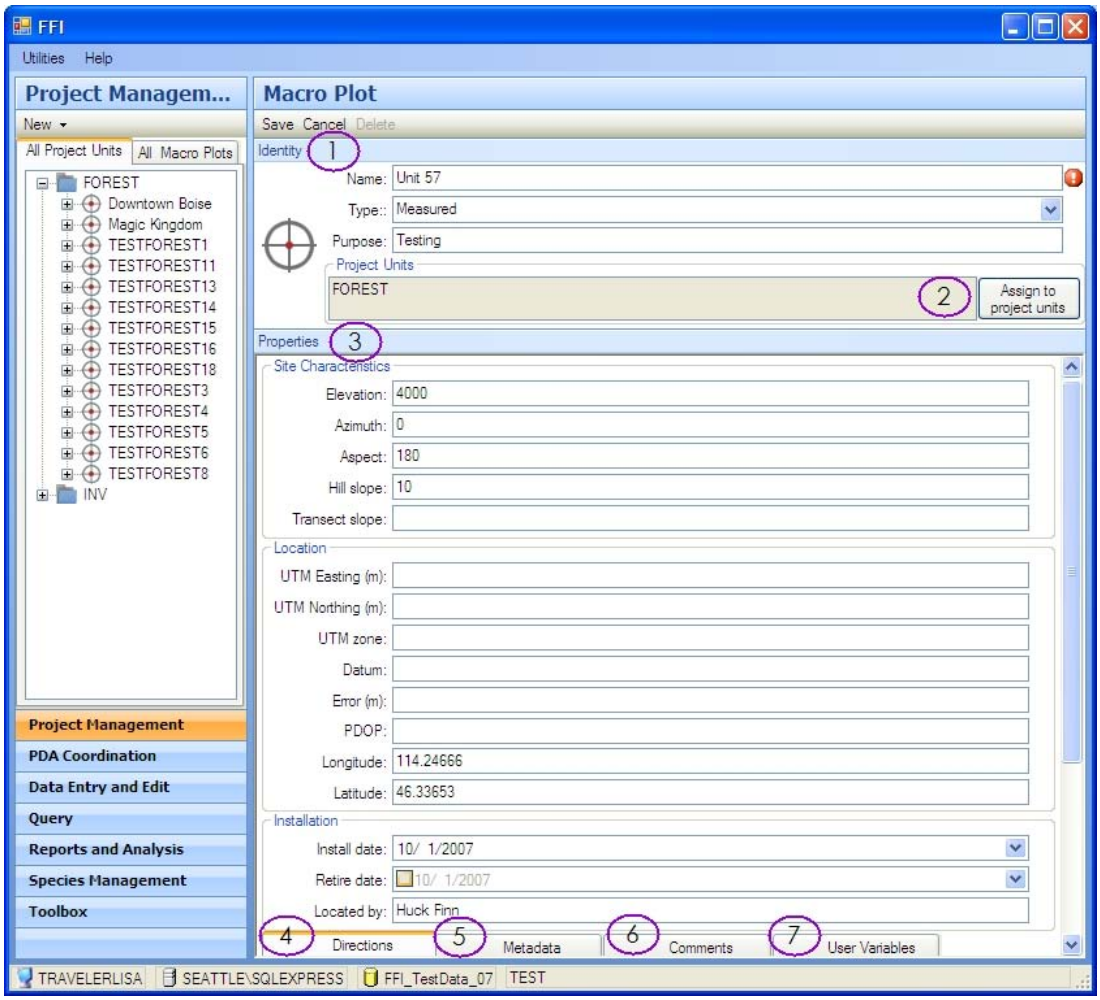
Creating a macro plot

*NOTE: A **macro plot** is a geographic sample point within a project unit that has a specific azimuth around which method data are collected. It is the same as the **macro plot** in FEAT and is comparable to **plot location** in FIREMON.*

To create a new macro plot, select **Macro Plot** in the **New** pull-down menu of the **Project Management** window.



The **Macro Plot Builder** form opens. The numbered paragraphs in this section correspond to the functions in the **Macro Plot** window, called out below.

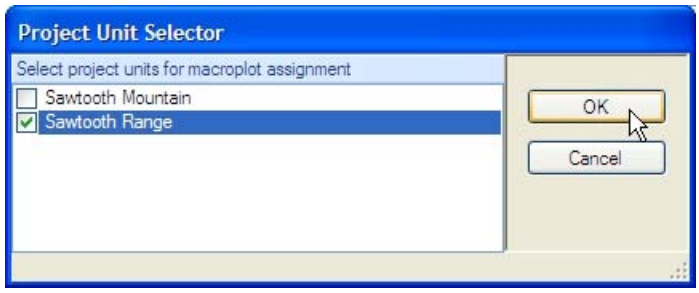


continued

Creating a macro plot (continued)

1. Add **Identity** information for the new macro plot.
   - **Name**. Add a meaningful name for the macro plot.
   - **Type**. Use the pull-down menu to select the appropriate plot type.
   - **Purpose**. Briefly describe the purpose of the plot.
2. To assign the macro plot to a project unit, click the **Assign to project units** button in the **Identity** pane. Available project units will be listed in the **Project Unit Selector**. Check the appropriate checkboxes and click **OK**.

NOTE: a macro plot can be assigned to more than one project unit.



3. Add **Properties** information for the new macro plot, using pull-down menus where provided to assign values.
    - **Site Characteristics:**
        - Elevation.
        - Azimuth.
        - Aspect.
        - Hill slope.
        - Transect slope.
    - **Location**:
        - UTM Easting (m).
        - UTM Northing (m).
        - UTM Zone.
        - Datum.
        - Error (m).
        - PDOP.
        - Longitude.
        - Latitude.
    - **Installation:**
        - Install date - Enter the date when the macro plot was created.
        - Retire date - Enter a date when the macro plot will no longer be used.
        - Located by - Enter the name of the individual who located the macro plot.

continued

Creating a macro plot (continued)

4. In the **Directions** tab, enter direction and location data in the **Start Point** and **Directions** fields.
5. In the **Metadata** tab, enter metadata as appropriate.
6. In the **Comments** tab, add comments as appropriate.

7. In the **User Variables** tab, enter any additional notes or criteria that pertain to the macro plot. You can add up to eight strings of information.

NOTE: The data that you enter as user variables can be used for stratifying, filtering, reporting, or analysis.

8. Click **Save** to save the new macro plot.

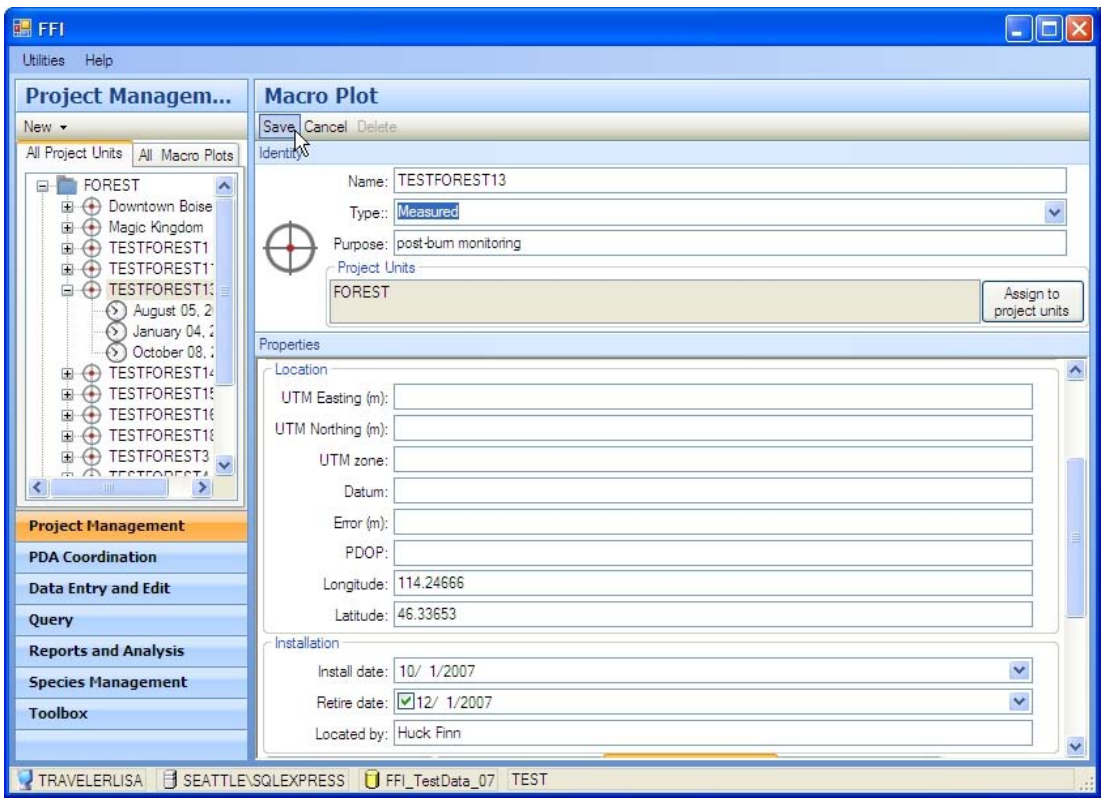
See also:

- Editing a macro plot
- Deleting a macro plot

Editing a macro plot

To edit an existing macro plot:

1. In the **Project Management** tree view, double-click the macro plot to be edited.
2. Make any necessary changes to the data in the **Macro Plot** window, and click **Save**.



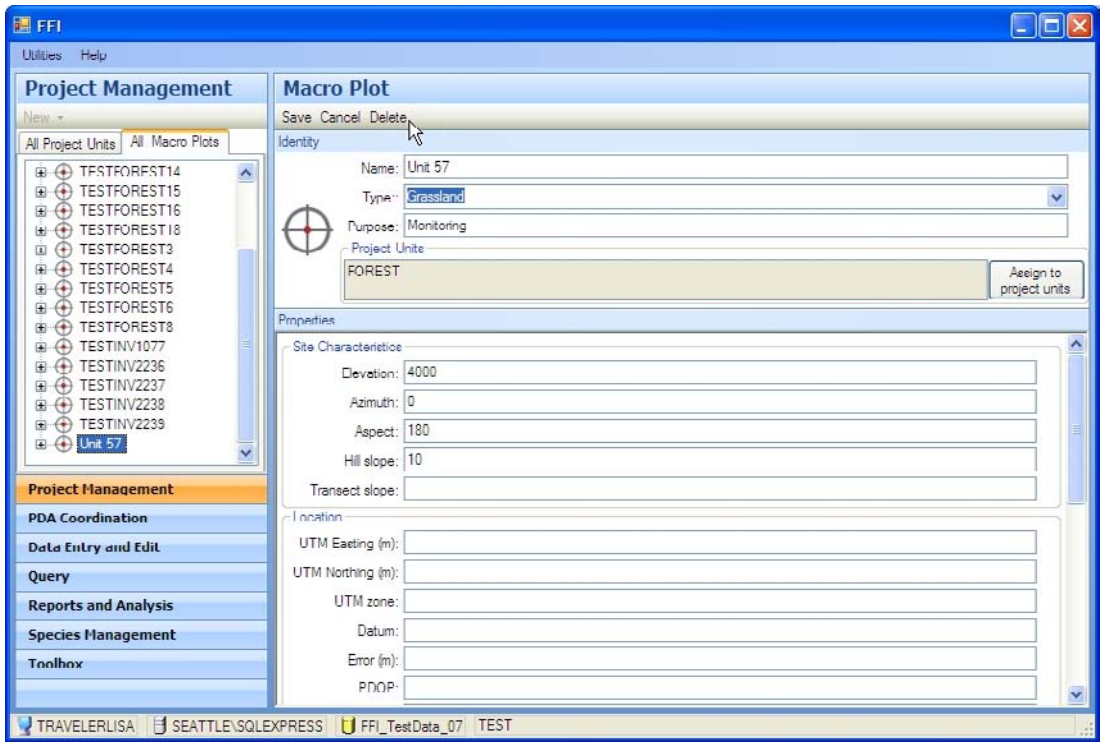
Return to Working with macro plots

Deleting a macro plot

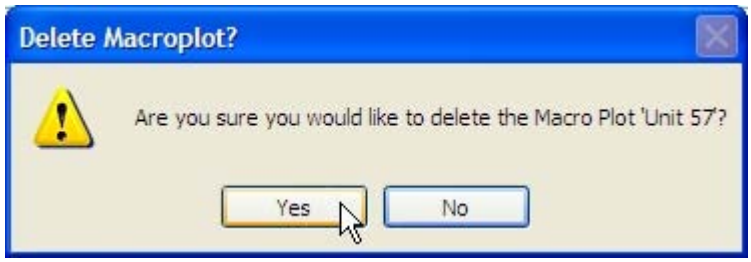
You can delete a macro plot for which no data has been collected. However, once a macro plot contains data, it cannot be deleted.

To delete an empty macro plot:

1. In the tree view in the main **Project Management** window, highlight the macro plot to be deleted.



2. Click **Delete** at the top of the **Macro Plot** window.
3. Click **Yes** in the confirmation box, as shown below.



Return to Project Management

Working with sample events

This section covers:

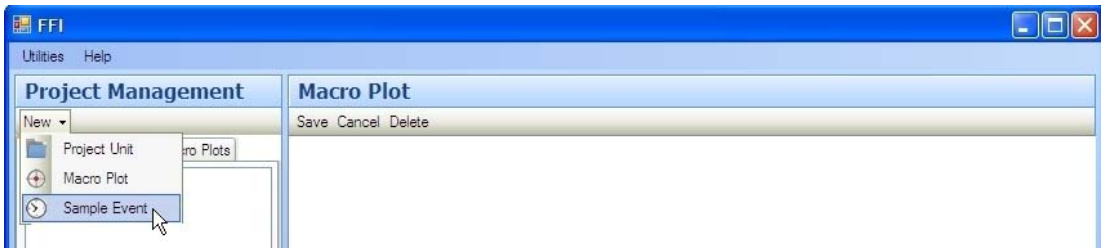
- Scheduling sample events.
- Editing sample events.
- Deleting sample events.

NOTE: You can link your sample events to photos that you take in the field. See Using photos in FFI.

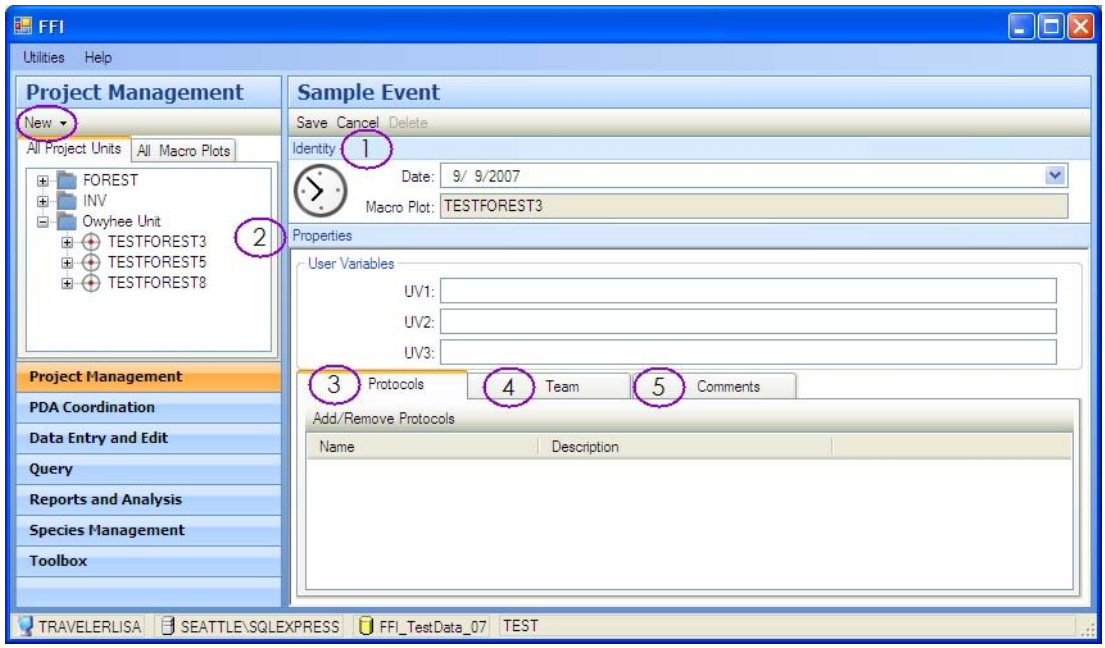
Scheduling a sample event

In FFI, a sample event is a subset of a monitoring event, which is defined as the date of a sample event, treatment, or disturbance. The sample event is a specific point in time at which sampling is to be conducted, and identifies which sampling protocols are to be applied. This section explains how to schedule a sample event and assign the protocols to be used.

To schedule a sample event, select the appropriate project unit and macro plot In the **Project Management** window. In the **New** pull-down menu at the top of the pane, select **Sample Event**.



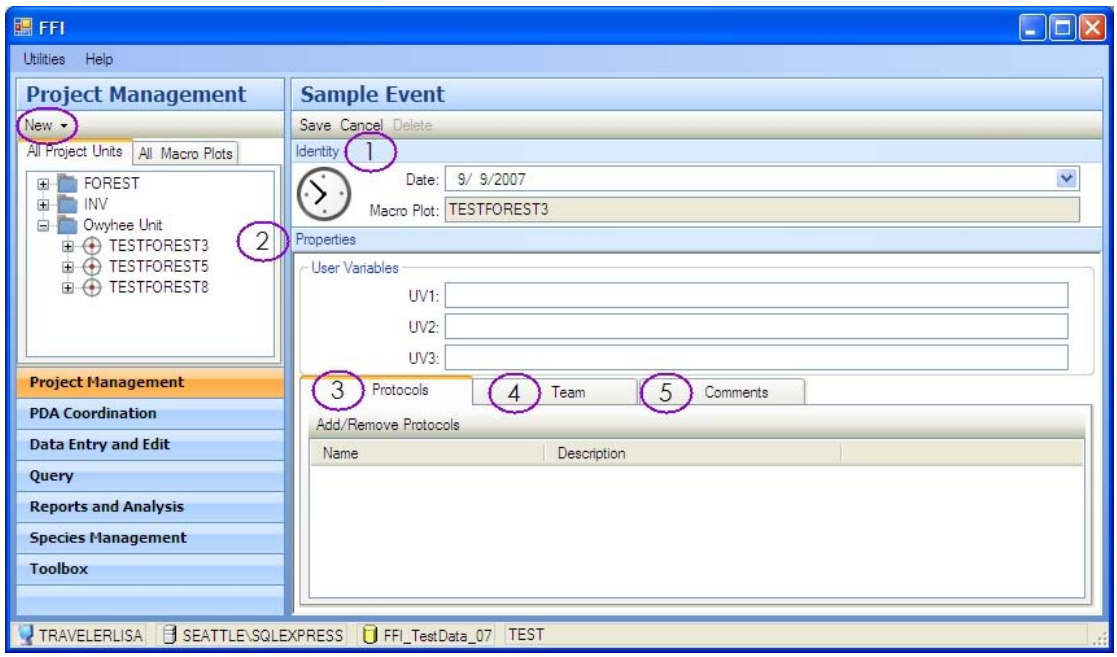
The numbered paragraphs in this section correspond to the functions in the **Sample Event** window, called out below.



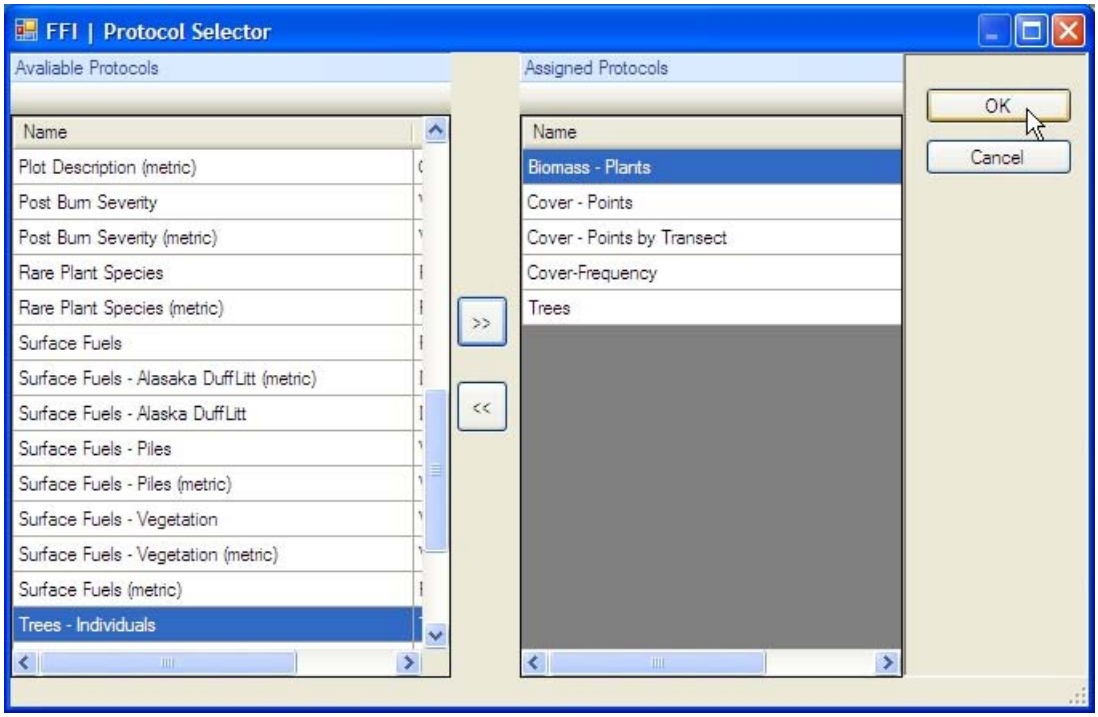
1. **Identity**. Assign a **Date** for the event, using the pull-down calendar. The **Macro Plot** field fills in automatically with the macro plot name.
2. If desired, add **User Variables** in the **Properties** pane. User variables can be simple notes or descriptors. In this context, they are not used for stratifying or filtering records.

continued

Scheduling a sample event (continued)



3. Use the **Protocols** tab in the main **Sample Event** window to select the protocols to be used during the sample event:
    - Click **Add/Remove Protocols** to open the **Protocol Selector**. Scroll through or filter the listing to locate the protocols you wish to assign to the sample event.
    - Highlight the desired protocol and either double-click or use the **>>** button.
    - Click **OK** when all applicable protocols have been added to the sample event.



*NOTE: To store photos associated with a sample event, assign the **Plot Description** protocol to the event. See Using photos in FFI for more information.*

4. In the **Team** tab in the main **Sample Event** window, identify the team scheduled to conduct the sample event.
5. Use the **Comments** tab in the main **Sample Event** window to enter any additional notes or information.

   Click **Save** in the **Sample Event** window toolbar to save the scheduled sample event.

See also:

- Editing a sample event
- Deleting a sample event

Using photos in FFI

You can file photographs taken during sample events and link them to your macro plot using the **Plot Description** protocol.

Naming and filing photos

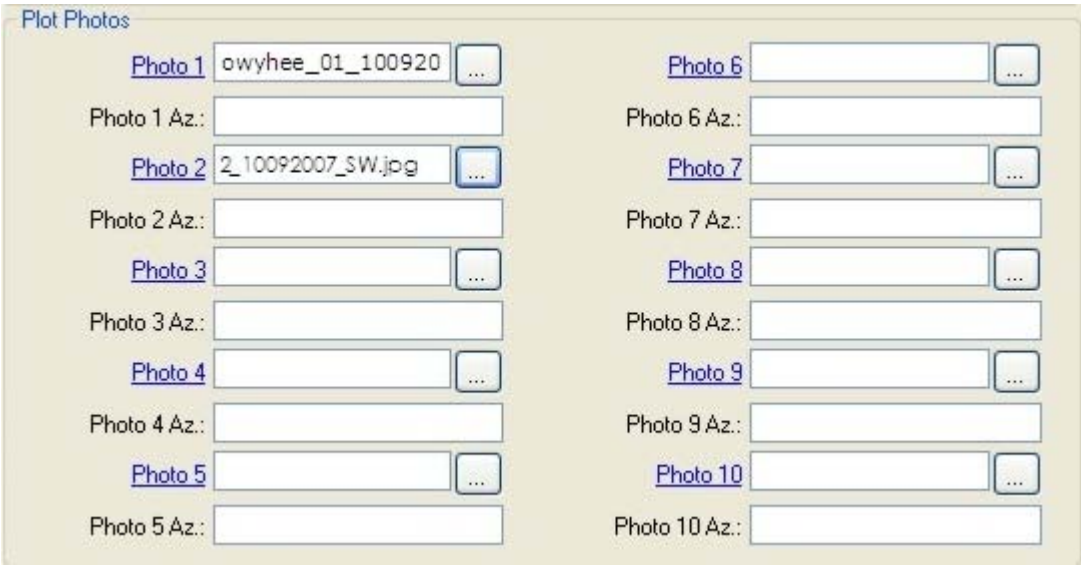
When naming your photos, be as descriptive as possible. A photo named *plot1.jpg* is difficult to tie to plot data. Instead, try something like *admin_proj_plot_date_D*, where *admin* is the administrative unit, *proj* is the Project Unit, *plot* is the macro plot ID, *date* is the date of the photograph, and *D* is the direction the photo was taken or the sequential photo number on the plot. For example, glac_redbench_001_10092007_N.jpg would be a photo of plot 1, facing north, on the Red Bench project in Glacier National Park taken October 9, 2007.

Choose whatever format works best for you, but be sure to record the format in your project metadata so photos can be located at a later date. Store plot photos in the C:\FFI\Photos subdirectory. It is also helpful to include plot information in the photograph itself. One simple way to do this is record project information (project unit, macro plot, date, direction, etc.) on a small whiteboard and include the whiteboard in your plot photos. Be sure that the whiteboard is legible in the photos. Other considerations:

- Focus the camera on the environment surrounding the plot, not the distance or foreground.
- Make sure that the camera is set for the correct exposure and aperture for existing light conditions.
- Try to include the plot center in your photographs to reference the photos geographically.

Using the Plot Description protocol

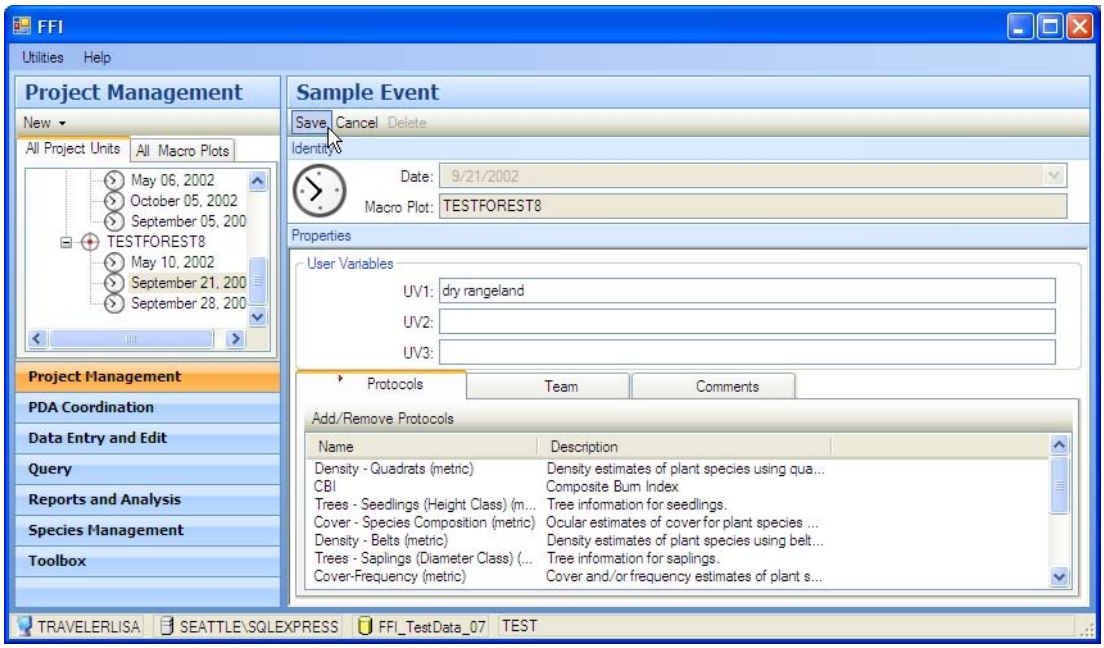
You can capture digital images at every sample visit and store their location and file names in the FFI database. To link photos, assign the **Plot Description** protocol to the sample event. When you go to the **Plot Description** form for the sample event in **Data Entry and Edit**, you can link ten photos using the hyperlink fields in **Plot Photos**, as shown below.



Editing a sample event

To edit or update a sample event:

1. In the **Project Management** tree view, select the event to be edited.



2. Make any necessary changes, and click **Save**.

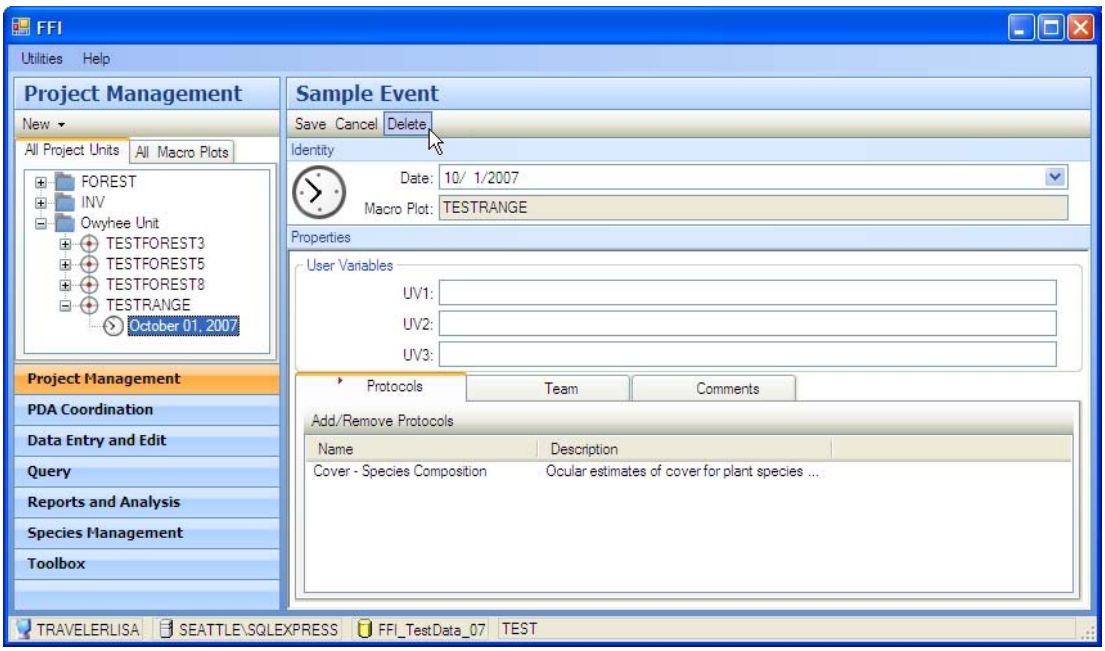
Return to Working with sample events

Deleting a sample event

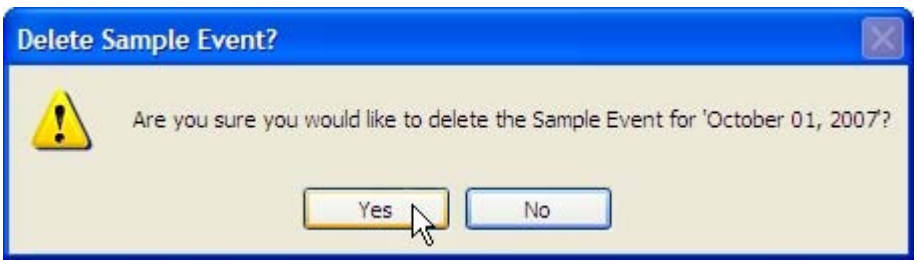
You can delete a sample event for which no data has been collected. Once an event contains data, it cannot be deleted.

To delete an unused or empty sample event:

1. In the tree view in the main **Project Management** window, highlight the sample event to be deleted.



2. Click **Delete** to delete the sample event.
3. Click **Yes** in the confirmation box, as shown below.



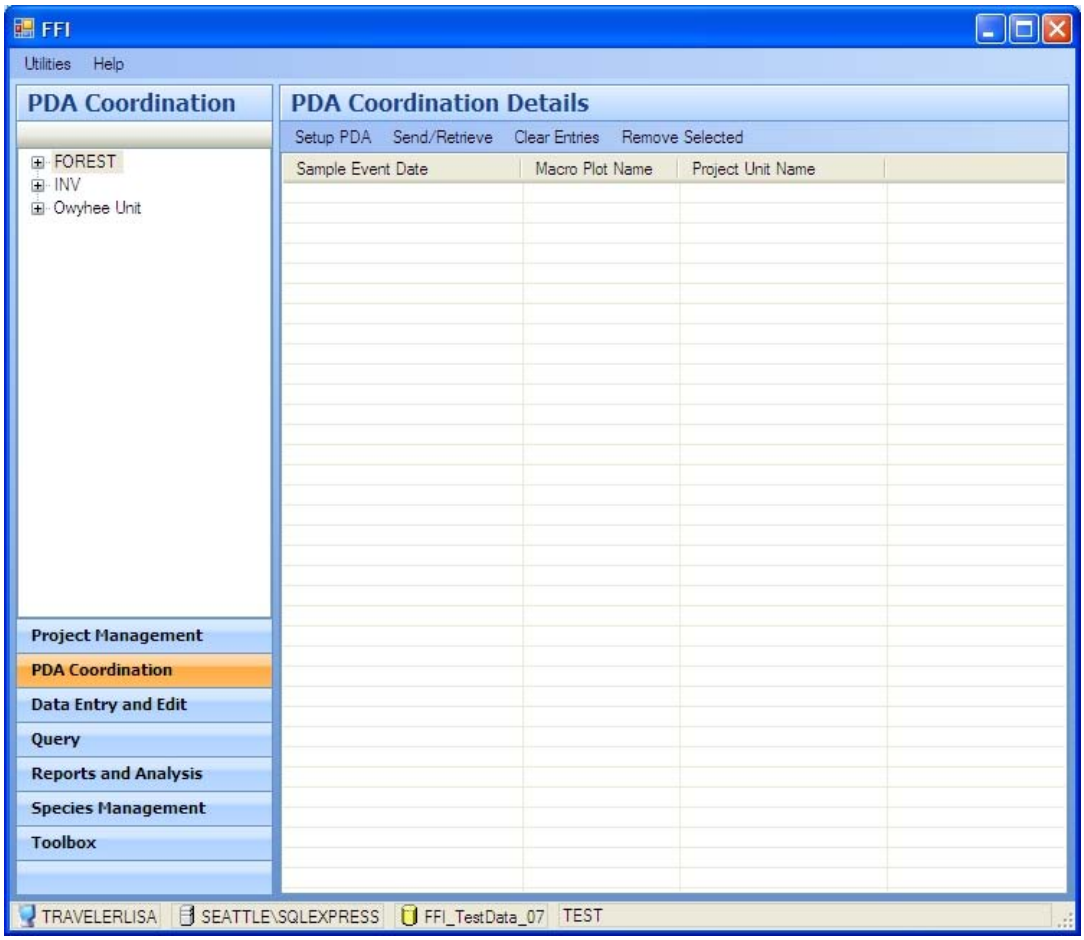
Return to Working with sample events

PDA coordination

The **PDA Coordination** window is used to support use of FFI with PDAs (personal digital assistants). Use this section of the *FFI User's Guide* together with the *FFI PDA Field Handbook*, which is also included in the installation package as a stand-alone PDF file. Operations that are performed only on the PDA, such as entering field data and performing backups, are covered in the handbook.

The basic **PDA Coordination** interface on the desktop is shown here.

Important: When FFI opens, it occupies the full screen. Whenever you use FFI with your PDA, be sure to resize the FFI window so that you can see the ActiveSync window. ActiveSync must be running every time you use FFI with your PDA.



Coordination tasks

This section of the *FFI User's Guide* covers PDA-related operations that are done on the desktop:

- Setting up a new PDA for data collection.
- Exporting sample events to the PDA for data collection in the field.
- Importing monitoring data from the PDA to the desktop.

NOTE: The FFI PDA Field Handbook is available as a PDF that you can load on your PDA for use in the field. This requires that you install Adobe Reader for Pocket PC 2.0, which can be downloaded at http://www.adobe.com-/products/acrobat/readerforppc.

Return to Using FFI main page.

Setting up a new PDA

This section presents instructions on setting up a new PDA (personal digital assistant) for using FFI PDA in the field. The steps are:

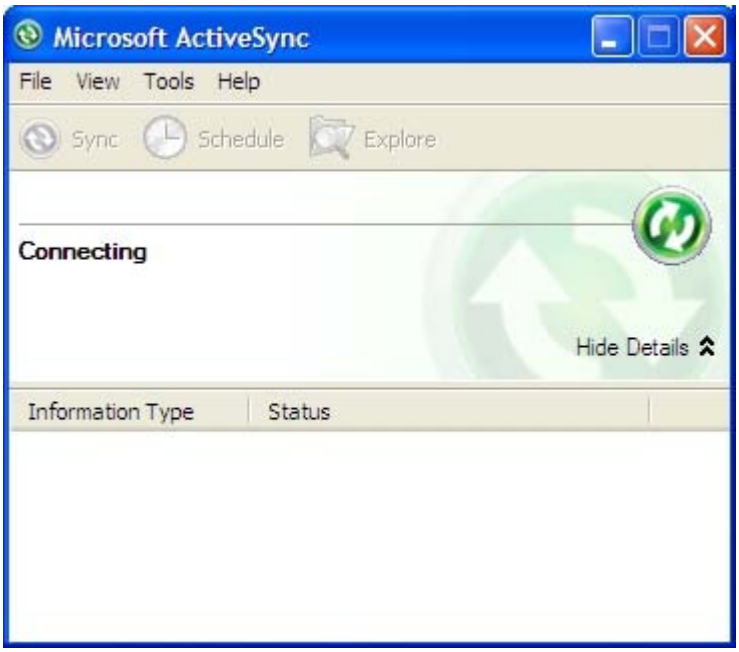
- Synchronizing the PDA.
- Installing FFI PDA.
- Loading any needed reference documents.

FFI PDA is designed to be used on PDAs that run Windows Mobile 5.0. See FFI installation for memory and speed requirements.

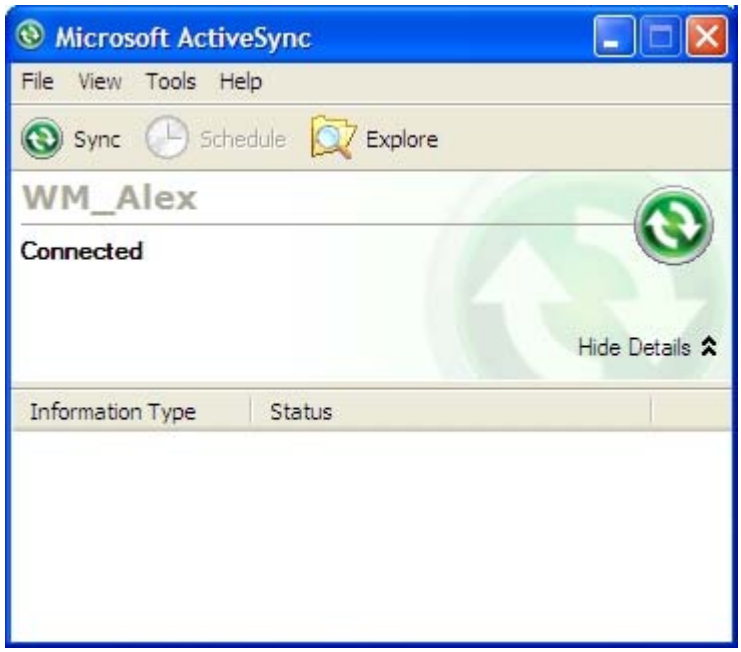
Synchronizing the PDA

The first step in installing FFI PDA is synchronization. The *User's Guide* assumes that you are using ActiveSync to synchronize your PDA. If you do not have ActiveSync on your PDA, you can download ActiveSync 4.5 from http://www.microsoft.com/windowsmobile/activesync.

To synchronize your PDA and the desktop, place the PDA in its docking station. ActiveSync will begin automatically. During synchronization, you will see the ActiveSync screens, shown below, on your desktop.



Important: When FFI opens, it occupies the full screen. Whenever you use FFI with your PDA, be sure to resize the FFI window so that you can see the ActiveSync window. ActiveSync must be running every time you use FFI with your PDA.



Important: When you run ActiveSync, be sure that all of the ActiveSync options are turned OFF, so that only ActiveSync itself is running. Follow the procedure shown below to turn off the ActiveSync options.

When synchronization is complete, move on to Installing FFI on the PDA.

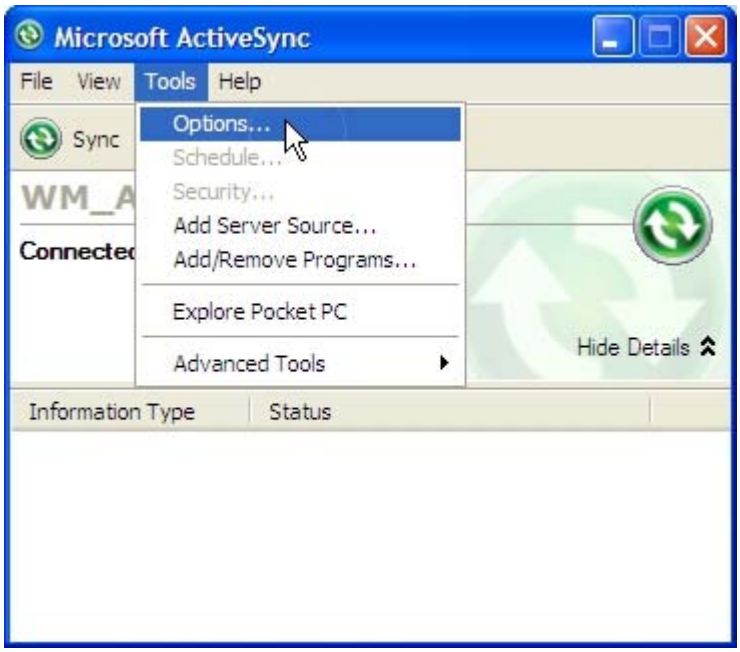
A note about ActiveSync partnerships

ActiveSync partnerships are optional. In a partnership, ActiveSync identifies your PDA with a specific desktop PC, and retains the information type settings for synchronization. You can also use ActiveSync as a guest, without forming a formal partnership. Because partnerships can trigger conflicts with FFI PDA, use them only if you also use your PDA for other applications, such as MS Outlook, that require a partnership.

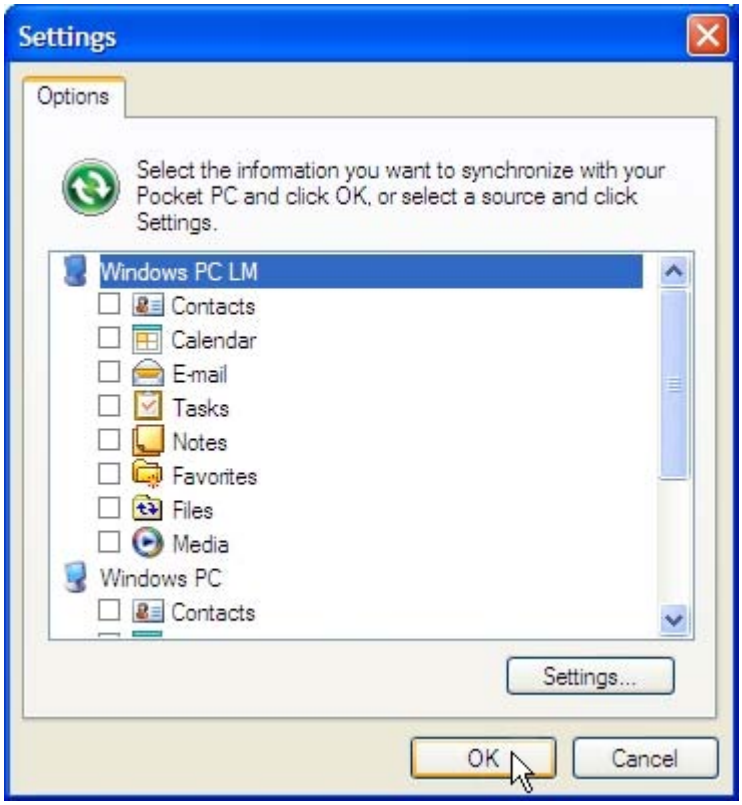
IMPORTANT: If you use an ActiveSync partnership, be sure to turn your partnership OFF before running FFI PDA. FFI PDA operations conflict with ActiveSync operations.

To turn off your ActiveSync partnership:

1. In the ActiveSync window on the desktop, click **Options** in the Tools pull-down menu.



2. Unselect each of the checkboxes, and click **OK**.



Move on to Installing FFI on the PDA.

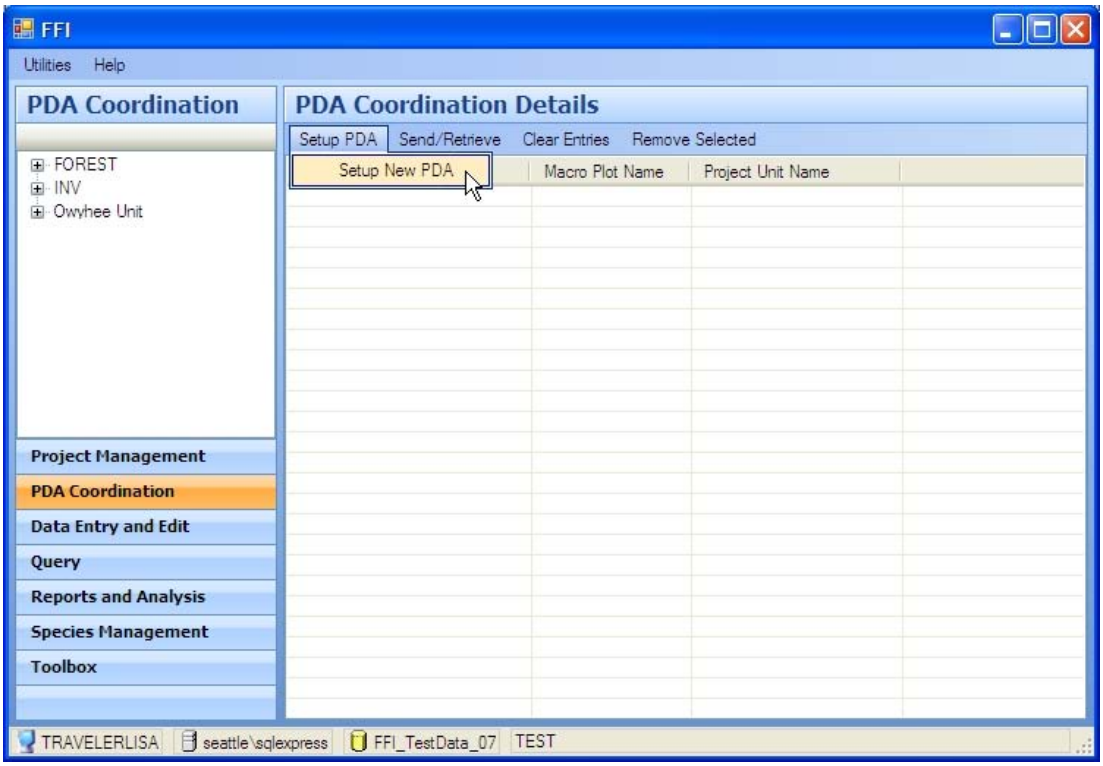
Installing FFI on the PDA

NOTE: Installing FFI PDA requires approximately 15 minutes, and requires that you carefully monitor your desktop and the PDA to read and respond to installation prompts and instructions.

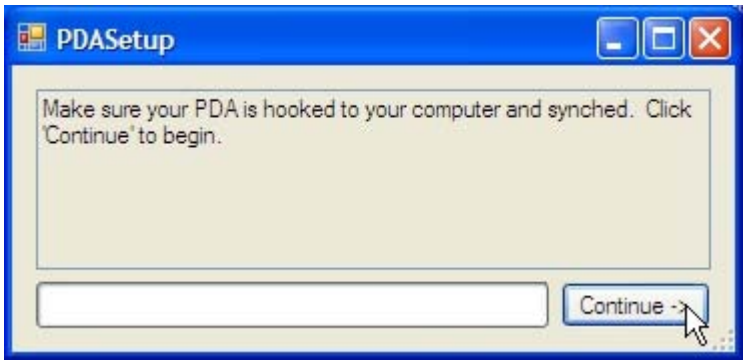
Important: Be sure to resize the FFI window so that you can see the ActiveSync window. ActiveSync must be running every time you use FFI with your PDA.

After synchronizing your PDA, follow these steps to install FFI PDA:

1. Start FFI on your desktop computer and open **PDA Coordination**.
2. In the **Setup PDA** pull-down menu, select **Setup New PDA**.



3. The **PDA Setup** window opens on your computer. This window will remain open throughout the installation, and will periodically give you instructions and prompts. Click **Continue** in the window to begin the installation process.



4. IMPORTANT: Pay close attention during the installation process. You will need to watch both the desktop and the PDA windows to read and respond to dialogs. Although the installation procedure varies somewhat from PDA to PDA, the installation generally follows this sequence:

    a. Respond to all dialogs on the PDA until you reach the main PDA window and the PDA has synchronized. Let the PDA install any component it asks to. When it is ready, tap **OK** in the upper right corner of the PDA window.

    b. Click **Continue** in the desktop **PDA Setup** message box.

    c. Then continue through the next set of PDA dialogs, until you reach the main window and the PDA has synchronized again.

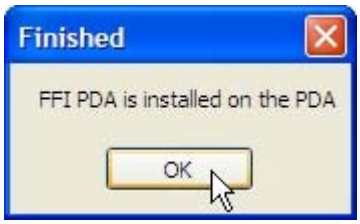
    d. Then click **Continue** in the **PDA Setup** message box on the desktop.

    e. This cycle may repeat another time or two.

    General installation notes:

    - Any time the PDA asks about reinstalling existing components, click **Yes**.
    - Any time the PDA asks to restart, click **OK**.
    - When the PDA announces that it has successfully installed something, click **OK**.
    - Click **Continue** in the **PDA Setup** window after the PDA has finished a particular task.

5. When installation is finished, a **Finished** message box will display on the desktop. Click **OK**.



After FFI is installed on your PDA, the **FFI PDA** program icon appears in the PDA **Programs** window.

NOTE: You need only install FFI on the PDA once, although there is no harm in reinstalling it.

After FFI PDA is successfully installed, see Exporting sample events to the PDA.

Exporting sample events to the PDA

To prepare for sampling in the field with the PDA, you must export sample events to FFI PDA. FFI will also export the local species list and its associated picklists to the PDA.

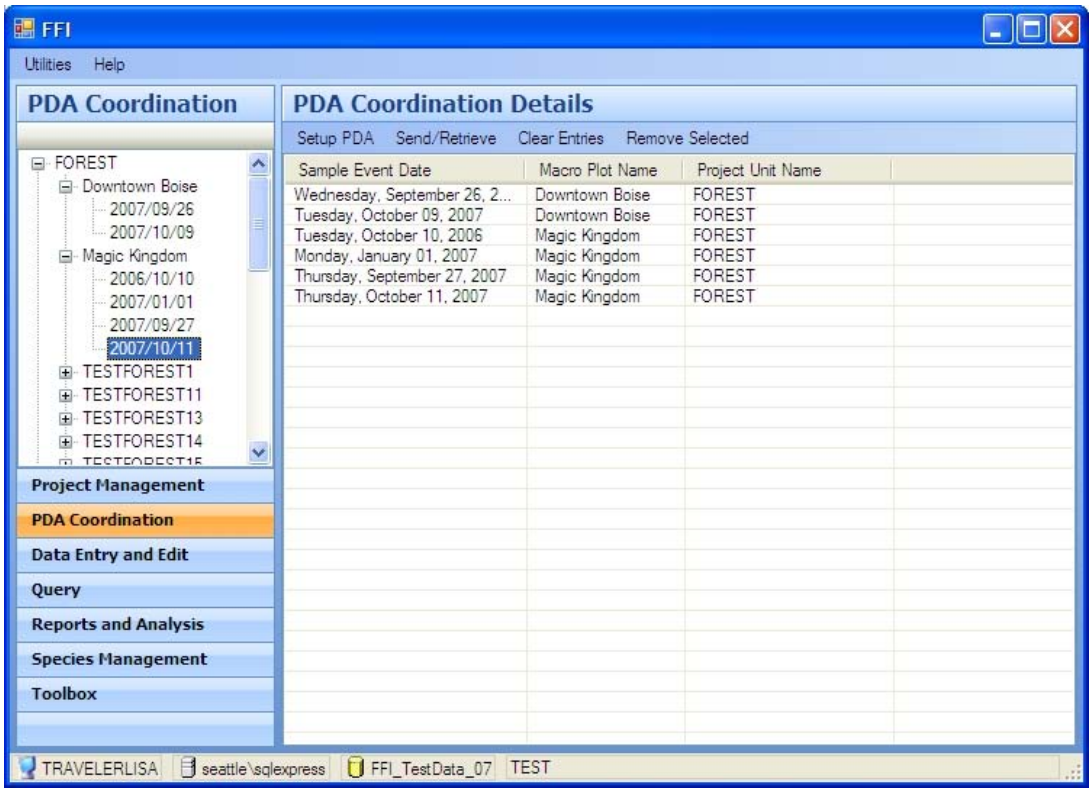
Following are some important tips to observe when you export sample events:

- If you have an ActiveSync partnership, be sure to turn it OFF before running FFI. Also turn off any ActiveSync options, so that only ActiveSync is running.
- You can only collect data for the macro plots and sample events that you specify when you export to the PDA. Therefore, if you are installing a new plot, you must create the plot in the FFI Project Management module, even if you don't yet have any coordinates or other information about the plot. You can edit the macro plot description after you return from the field.
- Sample events are unique to macro plots. You must select each sample event for each macro plot you wish to visit. Example: if you want to visit three plots on May 29, 2008, that date should appear three times in the **PDA Coordination Details** data grid, as shown below.
- Be sure to export a sample event to the PDA only once. The PDA doesn't retain any data, so once you import a completed sample event into FFI, the PDA has no memory of it. If you export the sample event again later, none of its method data will be exported with it.

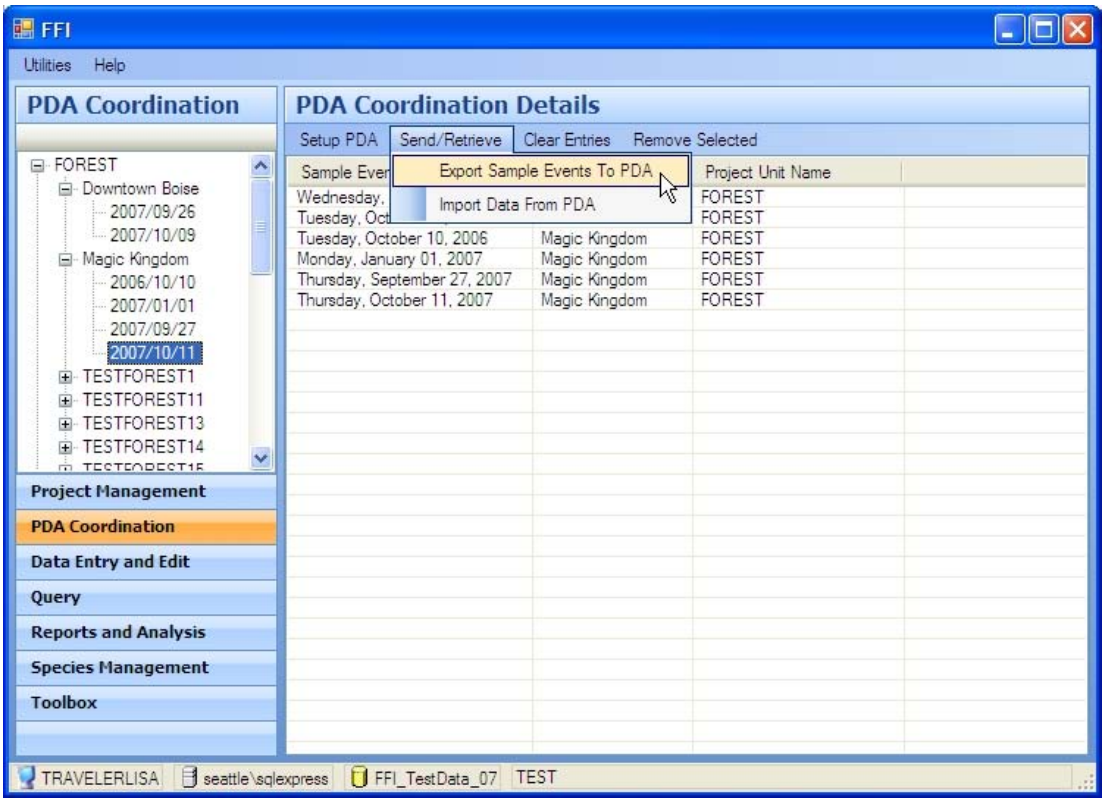
To export sample events:

1. On your desktop, start FFI and select **PDA Coordination**.
2. Place the PDA in its docking station.
3. In the **PDA Coordination** tree view, navigate to the appropriate project unit and macro plot.
4. Click each sample event to be exported. The events will be listed in the grid in the **PDA Coordination Details** window. Note that sample events for two macro plots will be exported.

*NOTE: To remove an event, select it and then click **Remove Selected**. To remove all events, click **Clear Entries**.*



5. Ensure that ActiveSync is running and that FFI PDA is not running.
6. On the desktop, select **Export Sample Events to PDA** in the **Send/Retrieve** pull-down menu.



7. A progress bar will appear. The export process takes several minutes. When the bar disappears, the process is complete. The sample events will disappear from the **PDA Coordination Details** grid.

You may also wish to load reference documents on your PDA before going to the field.

Important: Before you go into the field, perform a self-restoring Sprite backup on each of your memory cards to protect against data and application loss. For information, see Creating a self-restoring Sprite backup file in the FFI PDA Field Handbook.

To work with your sample events in the field, proceed to the FFI PDA field handbook.

Loading reference documents

You may also wish to transfer Word, Excel, and Acrobat documents from your desktop to the PDA for reference in the field.

To transfer files, you need to establish an ActiveSync partnership. Then you can use the **Explore** icon on the ActiveSync window to bring up a Mobile Device explorer window, which can then be used to copy documents directly to the PDA. See your PDA operator's manual for more information on document transfer.

NOTE: Be sure to turn your ActiveSync partnership OFF before running FFI.

Acrobat Reader

The *FFI PDA Field Handbook* is available as a PDF that you can load on your PDA for use in the field. This requires that you install Adobe Reader for Pocket PC 2.0, which can be downloaded at http://www.adobe.com/products/acrobat/readerforppc.

Importing data from the PDA

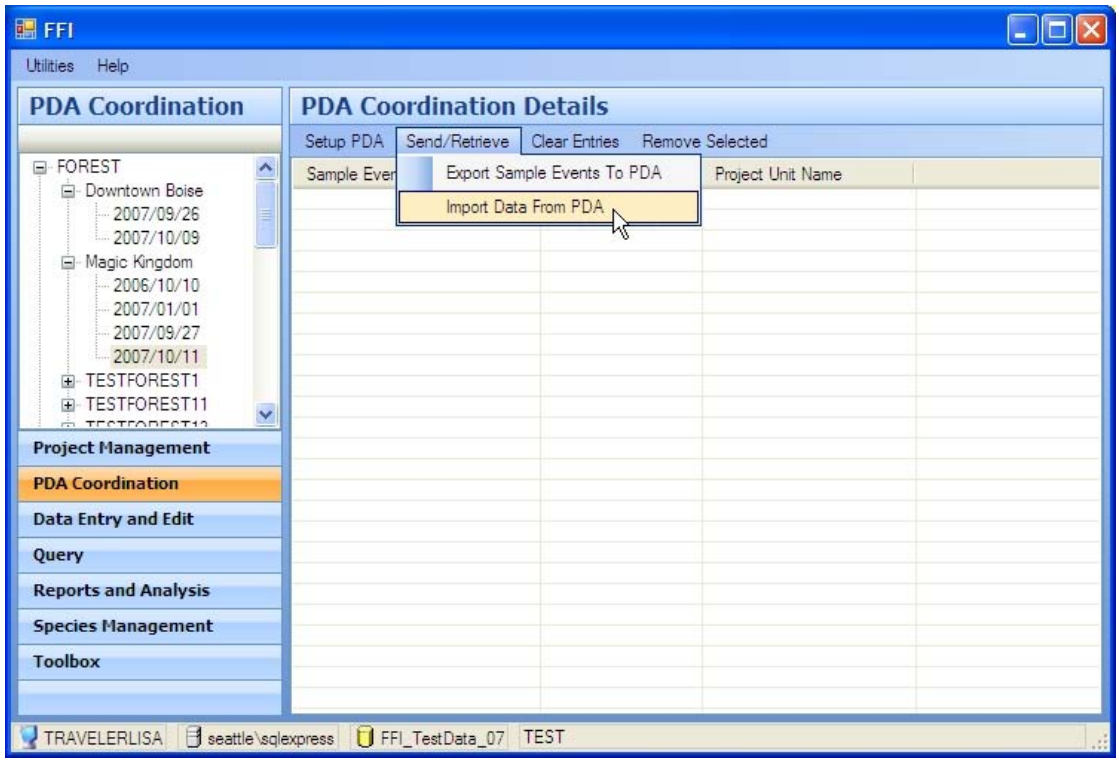
After you have collected field data and returned to the office, import your data into the administrative unit database on the desktop.

NOTE: Be sure to turn your ActiveSync partnership and any ActiveSync options OFF before running FFI.

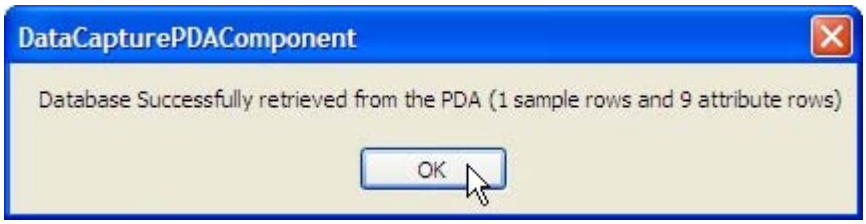
1. Synchronize the PDA by placing it in the docking station. FFI PDA should not be running. Be sure that ActiveSync recognizes the PDA, ensuring that the computer and the PDA are communicating.

*NOTE: ActiveSync does **NOT** download your field data from the PDA.*

2. On the desktop, start FFI and log into the appropriate administrative unit and database.
3. Click **PDA Coordination**.
4. In the **Send/Retrieve** pull-down menu, click **Import Data From PDA**. The import begins automatically and may take a few minutes.



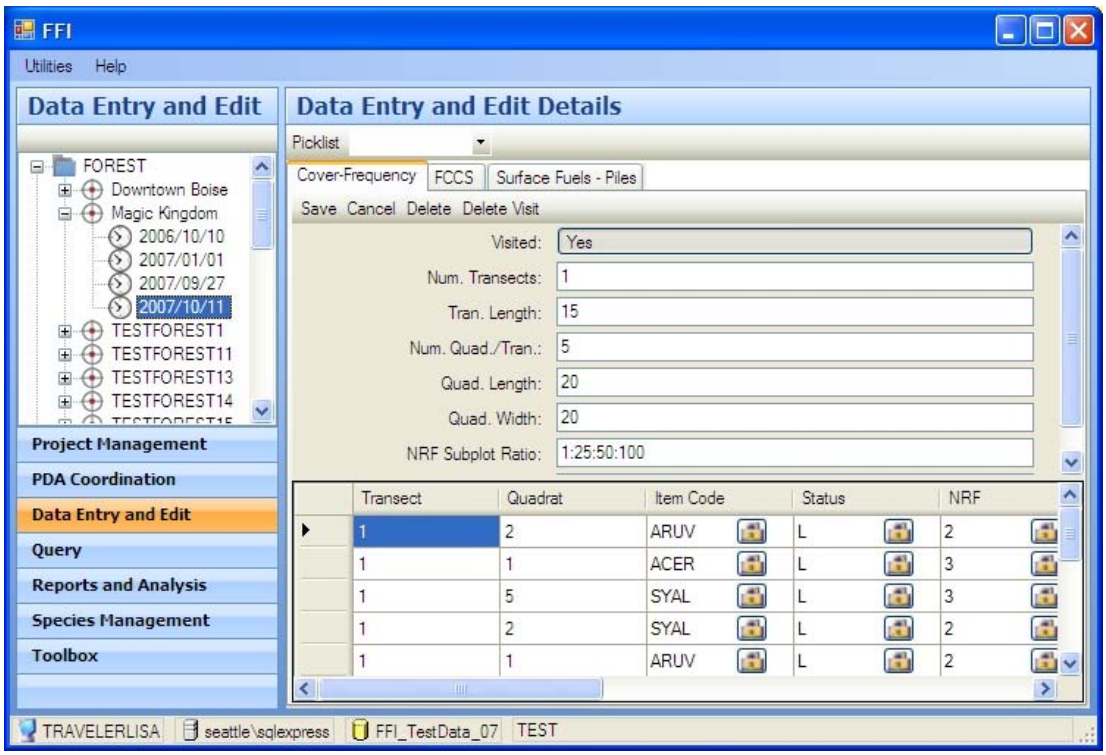
5. When the import is complete, a message window opens. Click **OK** in the **Data Capture PDA** message window.



NOTE: All of the field data that you designated for import is now contained in the administrative unit database on the desktop, and no longer resides on the PDA. However, if other administrative unit databases are present on your PDA, they will not be affected.

6. You can now go to **Data Entry and Edit** in FFI on your desktop and view the data for the sample events that you imported. The screenshot below shows the data that was imported for the *Magic Kingdom October 11, 2007* sample event.

NOTE: See Data entry and edit for more information on viewing and working with data.



Return to Using FFI

Data Entry and Edit

Use the **Data Entry and Edit** function to enter sampling data into the FFI database after a sample event has been completed, or to confirm data quality after uploading data from a PDA. **Data Entry and Edit** is protocol-based.

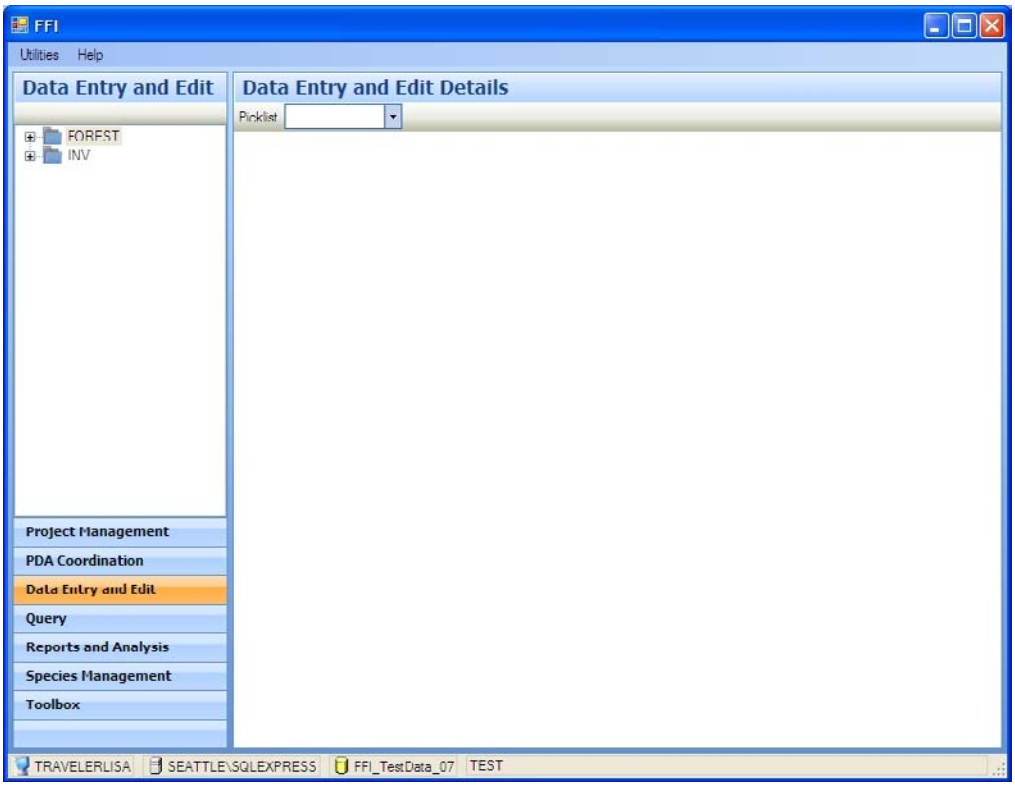
*NOTE: The **Data Entry and Edit** function assumes that you have worked with and understand the methods and protocols, and are familiar with the standard data forms used to collect monitoring data in the field. FFI is modeled after standard data collection forms; however, it does not generate paper forms.*

This section of the *User's Guide* contains:

- A brief tutorial on how to use the Data Entry and Edit function, with some very basic guidelines on data entry methods.
- A brief discussion of fuel constants, which are integral to three of the surface fuels protocols.

Data Entry and Edit user interface

The basic **Data Entry and Edit** user interface is shown below.



Next, see Data Entry and Edit basics.

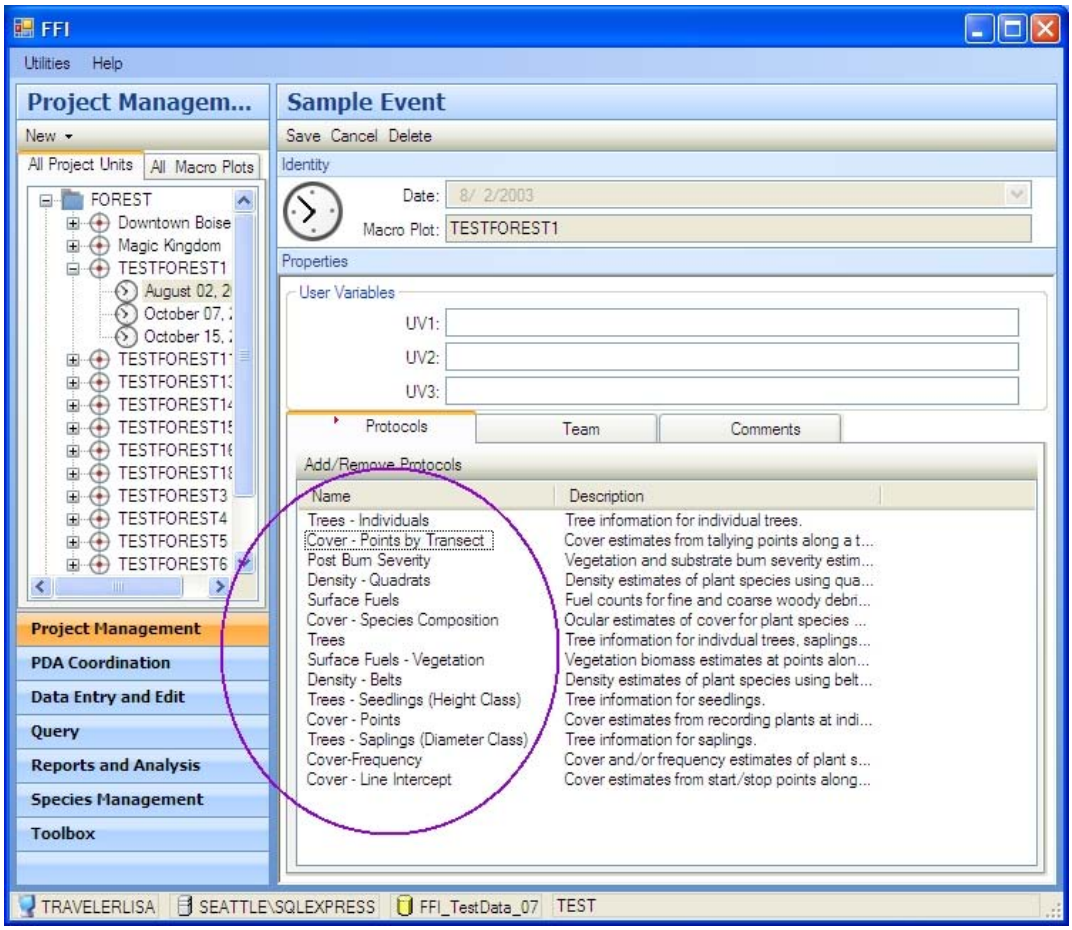
Return to Using FFI main page.

Data Entry and Edit basics

Protocols and sample events

When you select a sample event from the **Data Entry and Edit** tree view, FFI opens data collection tabs in the **Data Entry and Edit Details** window that correspond to each sampling protocol assigned to that sample event.

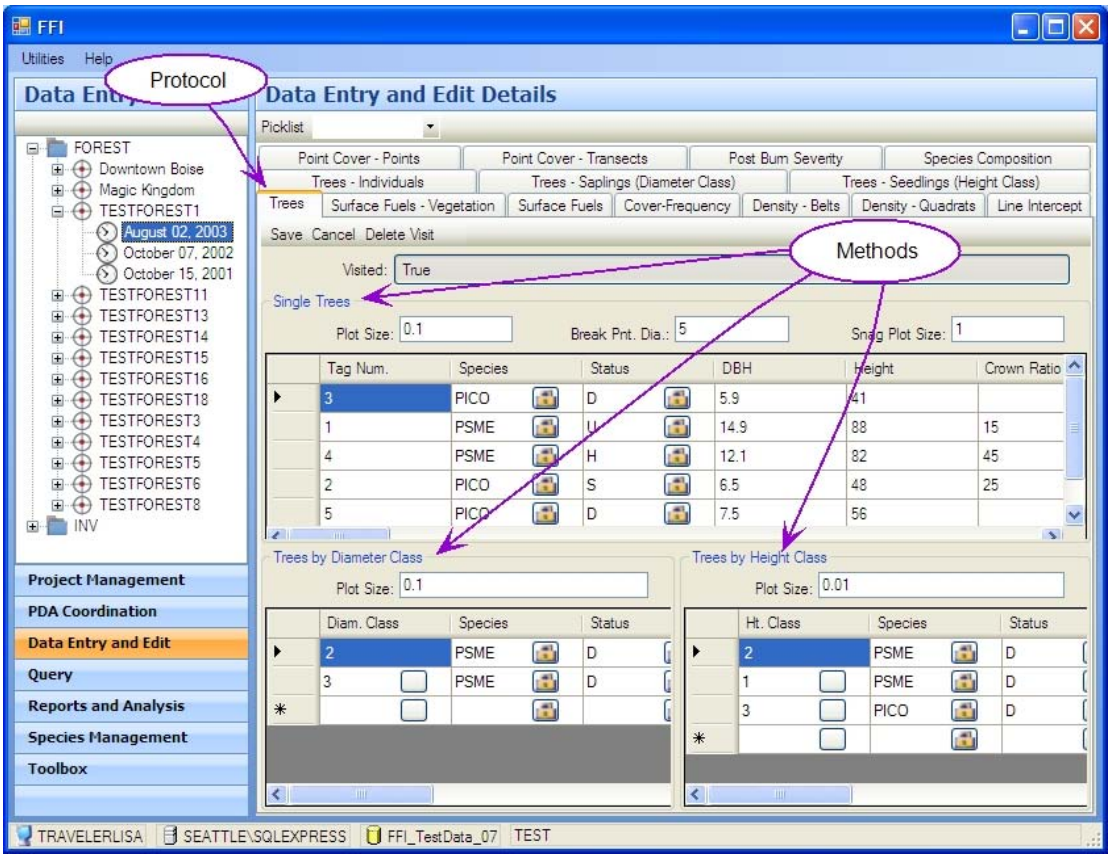
This screenshot of the **Project Management Sample Event** window identifies the 14 protocols that are assigned to the **August 02, 2003** sample event in macro plot TESTFOREST1 of the TEST project unit.



When the **August 02, 2003** sample event is opened in **Data Entry and Edit**, as shown here, the **Data Entry and Edit Details** window presents tabs for each of the assigned protocols. Each protocol data entry form covers all of the methods contained in the protocol.

- Click a tab to open the data entry form you wish to work with.
- Save your data before moving from one protocol tab to another.
- Use the toolbar to save the record, cancel data entry, or delete the entire visit.

*NOTE: Clicking **Delete Visit** clears only the record in the active tab. It will not affect other protocols attached to the sample event.*



[continued]

See also:

- [Data entry guidelines]
- [Method-specific data entry tips]
- [Applying picklists in Data Entry and Edit]

Data Entry and Edit basics (continued)

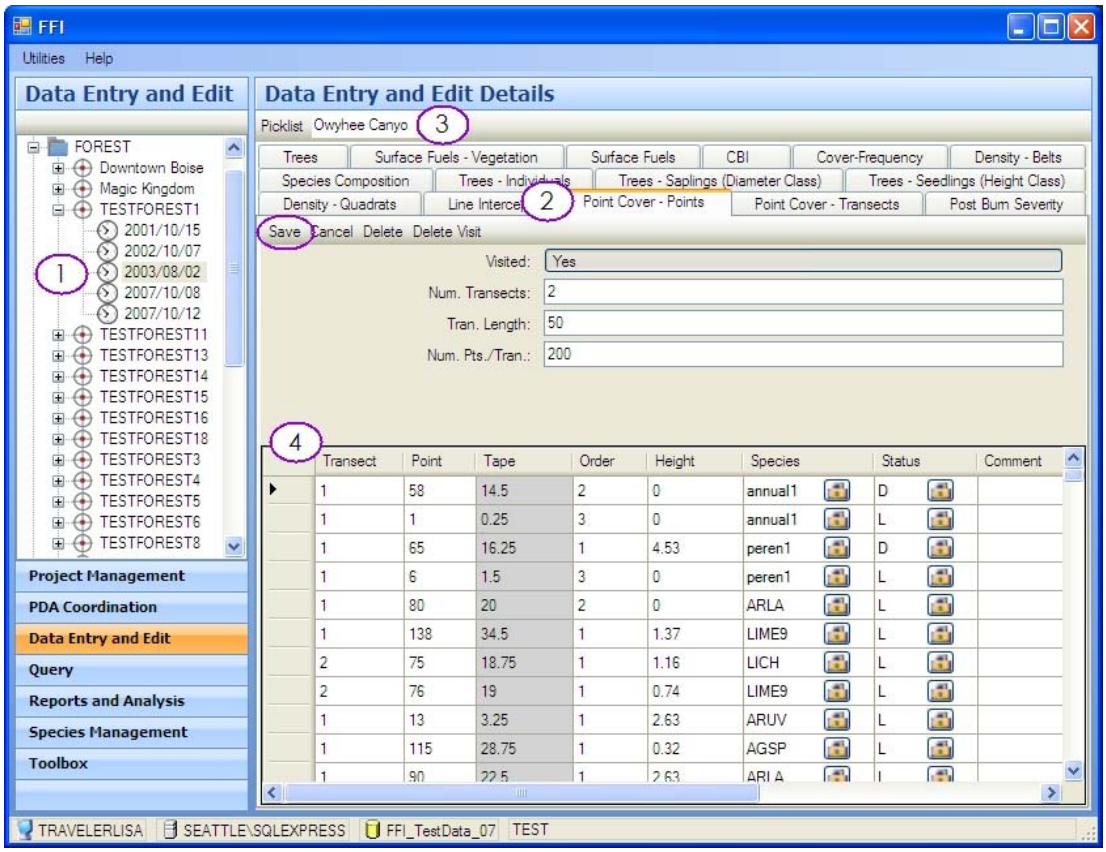
Basic data entry procedures

This page outlines basic data entry procedures. See [Data entry guidelines] for additional information.

To enter data for a completed sample event:

1. In the **Data Entry and Edit** tree view, select the sample event that you wish to enter. In this example, **FOREST TESTFOREST1 August 02, 2003** is selected.
2. In the **Data Entry and Edit Details** window, select a protocol data collection tab to work with. The **Point Cover - Points** protocol is selected and the form is now open.
3. If you wish, click the **Picklist** pull-down menu and select a picklist. Here, the **Owyhee Canyonlands** picklist is selected.

4. Begin to enter data. To add a new record row, press **`Enter`** on the keyboard. Click **Save** to save the record row.



Notes

- To cancel data collection for a protocol, click **Cancel**.
- To delete a record row, select the entire row (by clicking in the row selector box at the left of the row) and press `Delete` on your keyboard.
- To delete all entered data for a protocol, click **Delete Visit**.
- Grayed-out columns, like **Tape** in this example, are calculated fields. When you click **Save** after completing a record row, the calculated values will appear. You cannot enter data into these fields.
- If you conduct a sample event but have no data to report, toggle the **Visited** switch to **True** and click **Save**. This ensures that the plot visit is included in any calculations that you make, such as density or frequency calculations.
- FFI checks for errors when you save data, rather than as you enter data. To save your data, click **Save** in the protocol tab toolbar.
- The protocols *Trees - Individuals, Trees - Saplings*, and *Trees - Seedlings* can be assigned to a sample event as individual protocols. However, they are also contained in the protocol Trees. The data for, as an example, *Trees - Seedlings* is stored in the database in the same location as data collected for the *Trees*

protocol. Therefore, you might find that, if you use those protocols, some of the fields in the data forms that you use may already contain data.

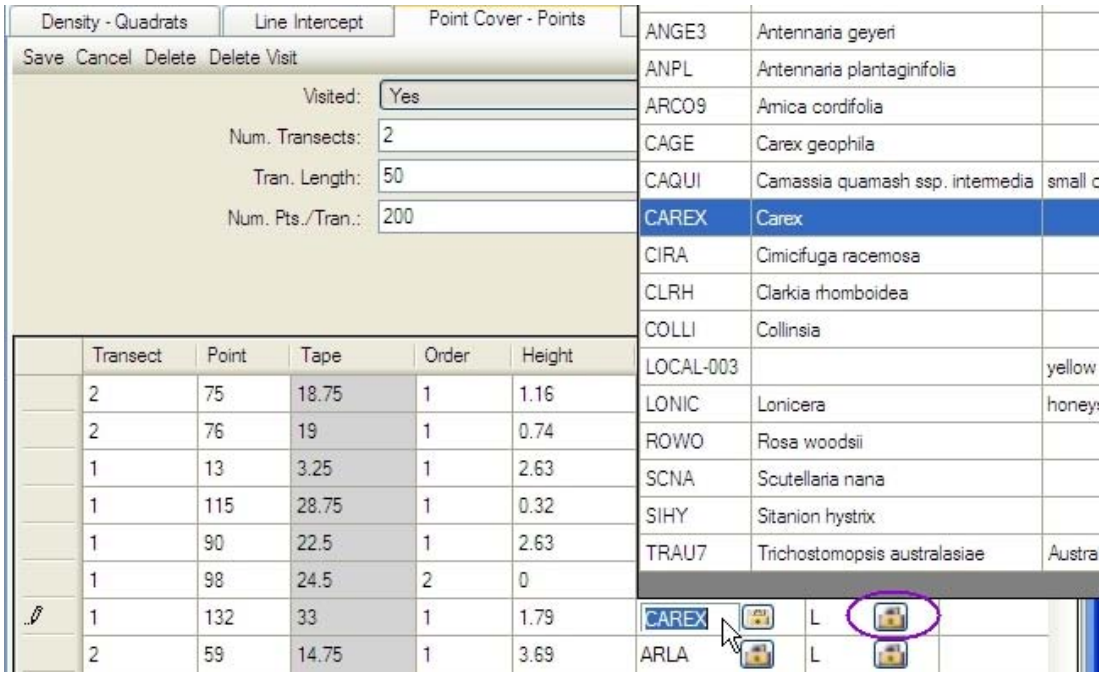
Data entry guidelines

Using picklists in Data Entry and Edit

Data entry guidelines

This section presents some general guidelines for entering data into protocol data entry forms.

- A record is a row. All fields (columns) within the record must be completed correctly before the record can be saved. For this reason, completing data entry row by row is preferable to a column-by-column approach.
- Data entry forms are columnar. Be sure to scroll all the way to the right to ensure that you locate and complete all fields.
- Hover over the column headings for a description of the data to be entered into the field.
- Column widths can be changed. However, the order of the columns in the form cannot be changed.
- Press **`Enter`** on the keyboard to add a new record.
- Each hit on a point or point transect is entered as a new row. There can be multiple rows for a single point.
- Method attribute codes and species data types, such as **Species**, **Class**, and **Status**, are entered into the forms through pull-down lists. The lists contain all permitted values for the attribute or species, and are identified in data entry forms by a lock symbol, indicated in the example below. Reach these lists by clicking on the lock icon to open the list, and then selecting the desired value. In this example, clicking the lock icon opens the local species list or the picklist, if one was selected, and the species *Carex* is highlighted.



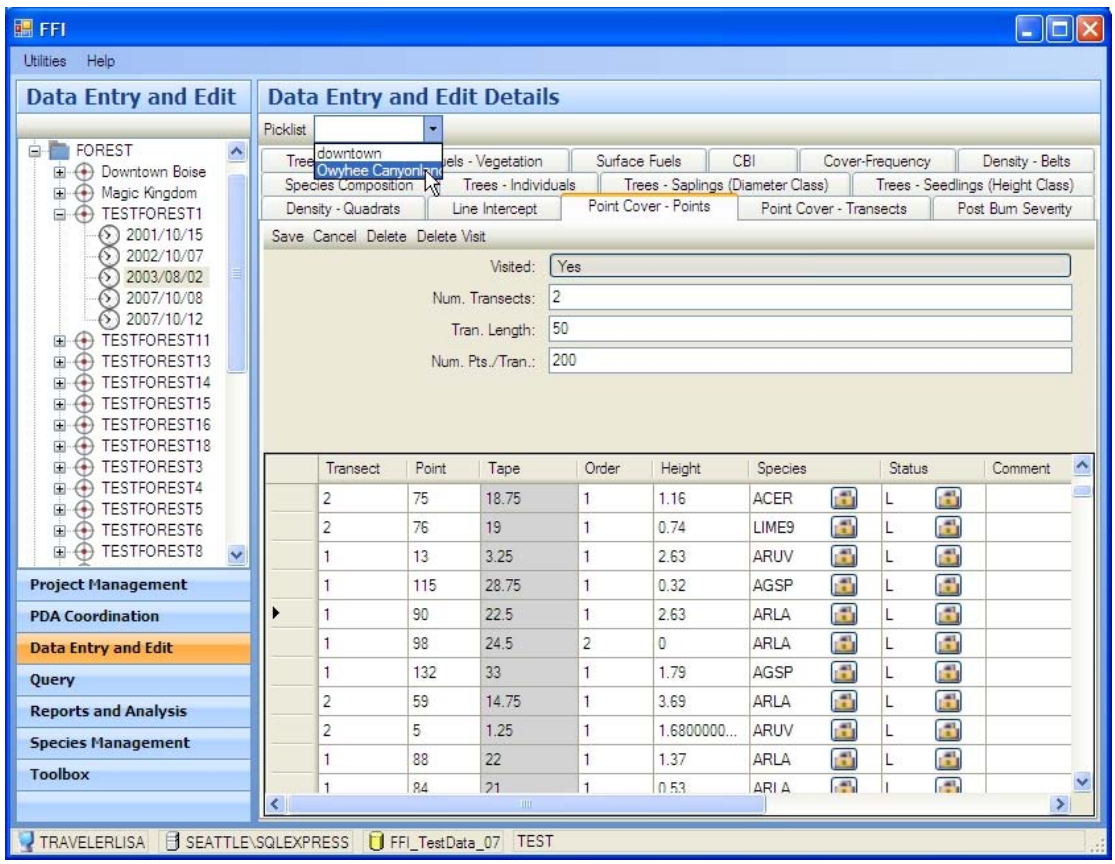
- Method attribute codes and species data types can also be entered into the forms using the auto-complete feature. Tab into the field, and begin entering text. Tab away from the field when you see the desired value.
- Grayed-out columns, like the **Tape** column above, contain calculated values. When you click **Save** after completing a record row, the calculated values will appear. Do not enter data into these fields.
- **Comment** and **User Variable (UV)** fields are always text fields.
- UV fields can be used to contain any data you wish to record but that is not specifically called for in the form. For example, when you are using a data entry form that uses specific ranges, use a UV field to enter and retain the actual readings. Or, you might use a UV to record whether the right or left side of a transect is being sampled. When performing analyses, you can stratify by UVs.
- Columns and fields that contain calculated values are read-only and are grayed out to indicate that data entry is not required.
- To delete a record row, select the entire record row (by clicking in the row selector box at the left of the row) and press **`Delete`** on your keyboard.
- To delete all entered protocol data for a sample event, click **Delete Visit** on the protocol toolbar.
- You must save or cancel changes within a protocol tab before switching to another protocol tab. FFI will prompt you to cancel or save your changes. Click **Save** or **Cancel** in the protocol tab.
- A red **Attention** icon will notify you of required data or form errors. Hover over the icon to view the message. A form cannot be saved until all errors have been resolved. Once you resolve the errors and click **Save**, the **Attention** icon will disappear.

See Using picklists in Data Entry and Edit and Data Entry and Edit basics

Using picklists in Data Entry and Edit

When you enter data for a sample event, you can apply the picklist that you used while collecting sample data in the field. This limits the number of species available for selection in the data entry forms to only those that you know to be present in the sampled area, which can save considerable time. You can readily switch between picklists at any time to change the available species, or turn off the picklist selection altogether by highlighting the name in the **Picklist** box and pressing the **`Delete`** key on your keyboard.

To select a picklist, click the **Picklists** pull-down menu in the toolbar of the **Data Entry and Edit Details** window. Select the desired list (**Owyhee Canyonlands** in this example).



The species now available for selection in the pull-down list in the **Species** field will be limited to the species in the **Owyhee Canyonlands** picklist.

> *NOTE: To turn off the picklist, highlight the name in the **Picklist** box and delete it by pressing the **`Delete`** key on your keyboard.*

Return to Data entry guidelines

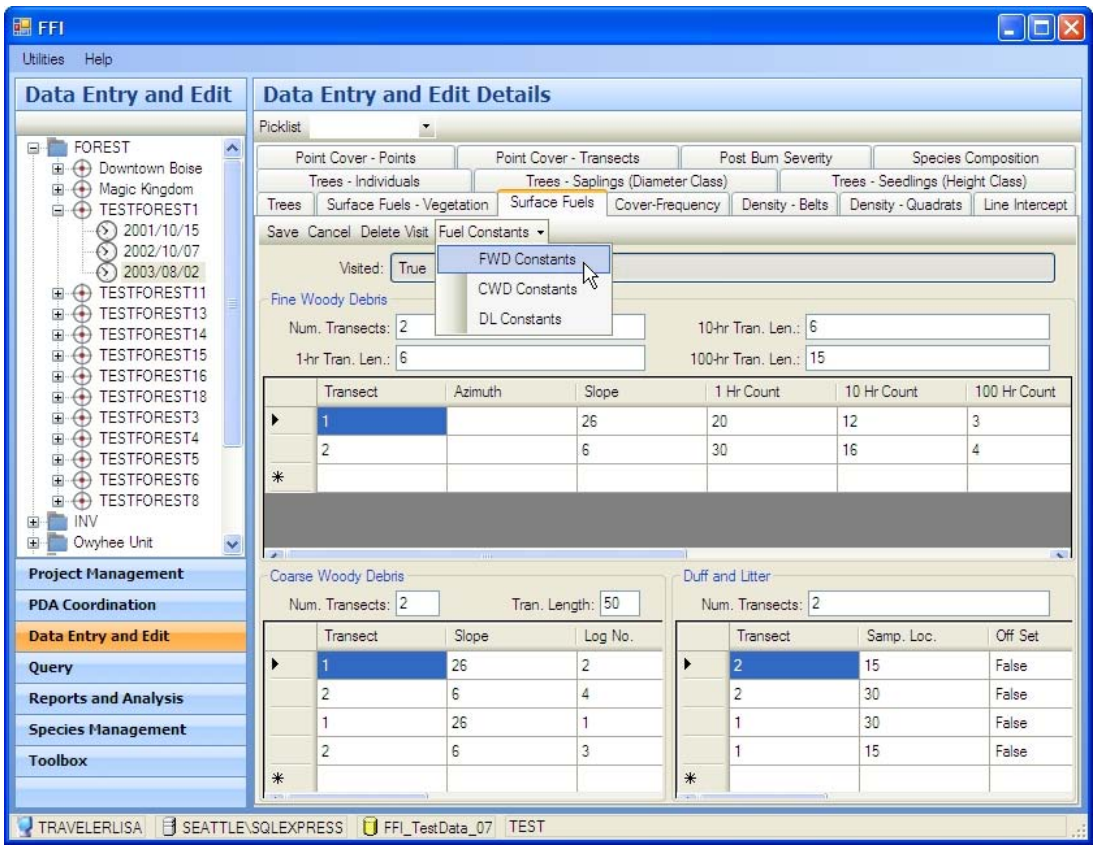
Fuel constants

Fuel constants are used in equations to calculate fuel loads. They are associated with the surface fuel protocols, as shown here:

PROTOCOL	FUEL CONSTANTS
Surface fuels	FWD (fine woody debris), CWD (coarse woody debris), and DL (duff/litter) constants
Surface fuels - Alaska duff/litter	Alaska DL constants
Surface fuels - vegetation	FL vegetation constants

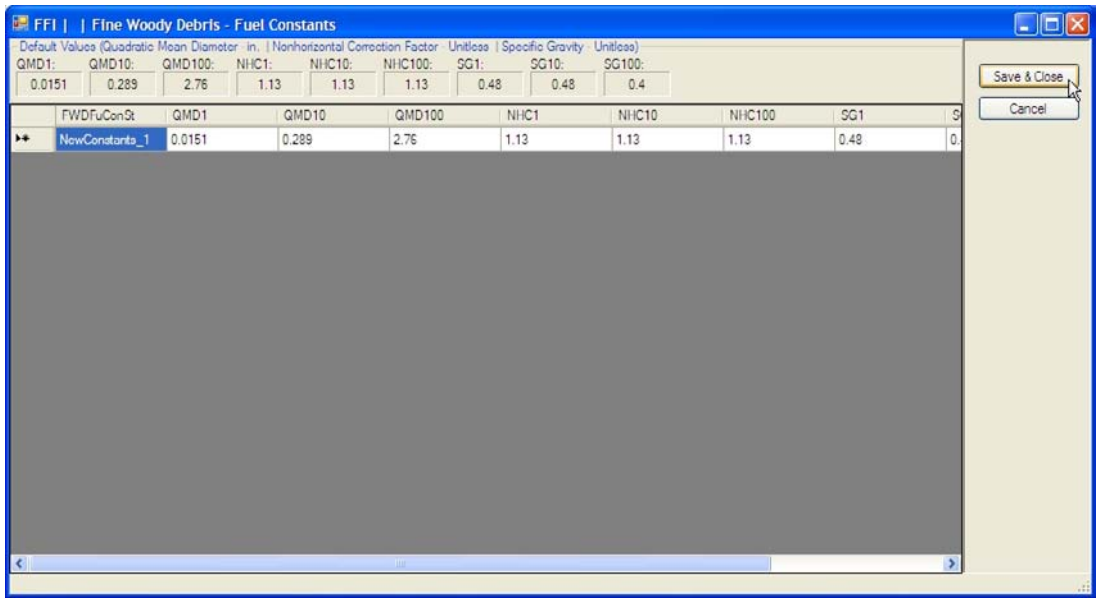
The use of the fuel constants is not required, however; the default values for the *Surface Fuels* and *Surface Fuels - Vegetation* protocols (duff, litter, FWD, CWD and vegetation) are typical for the U.S. Northern Rocky Mountain states and may not be applicable for your area. A partial list of references for fuel constants is available on the FFI FRAMES Web site. The fuels constants used in the *Surface Fuels - Alaska duff/litter* protocol are typical for that state.

The **Fuel Constants** menu is embedded in the protocol data entry sheets. As shown in the example below, the **Fuel Constants** menu within the **Surface Fuels** protocol includes *FWD Constants*, *CWD Constants*, and *DL Constants*.



In this example, the FWD fuel constant worksheet has been selected. Default values are displayed at the top of the Fuel Constant data entry screen. The first custom Fuel Constant Set is named *NewConstant_1* and displayed in the grid below the default

values. The fuel constant values for the new set are initially the same as the default values. Change the Fuel Constant Set name and one of more constants as desired then click **Save & Close** when finished.



Return to Data entry guidelines

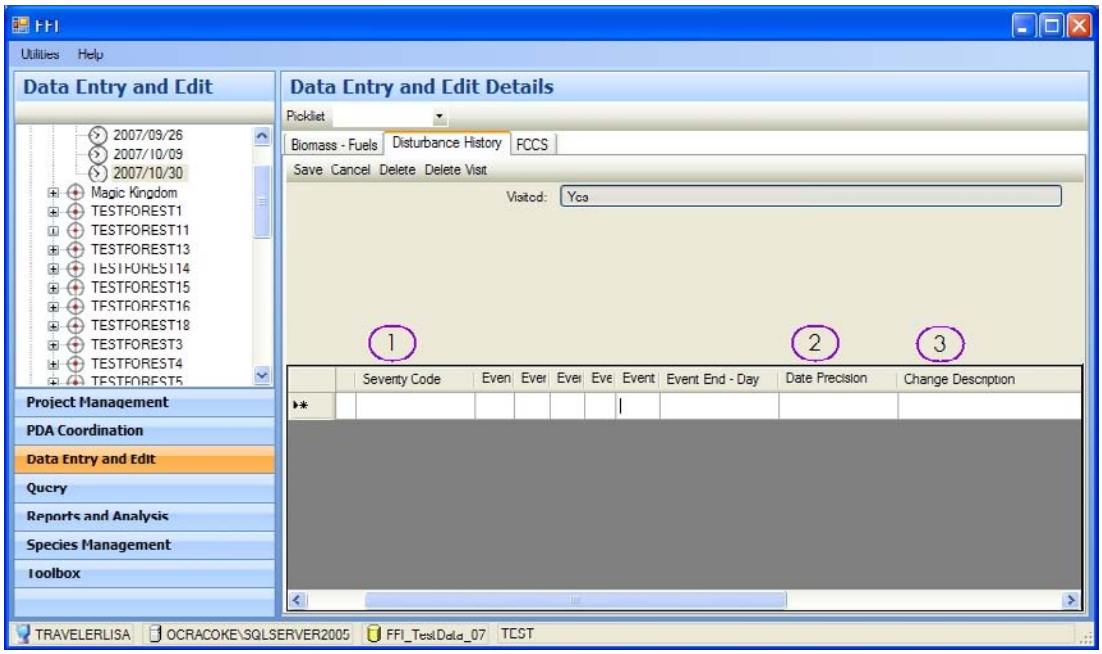
Method-specific data entry tips

This section includes notes and tips that are pertinent to specific methods.

- Disturbance history
- Biomass - fuels

Disturbance history

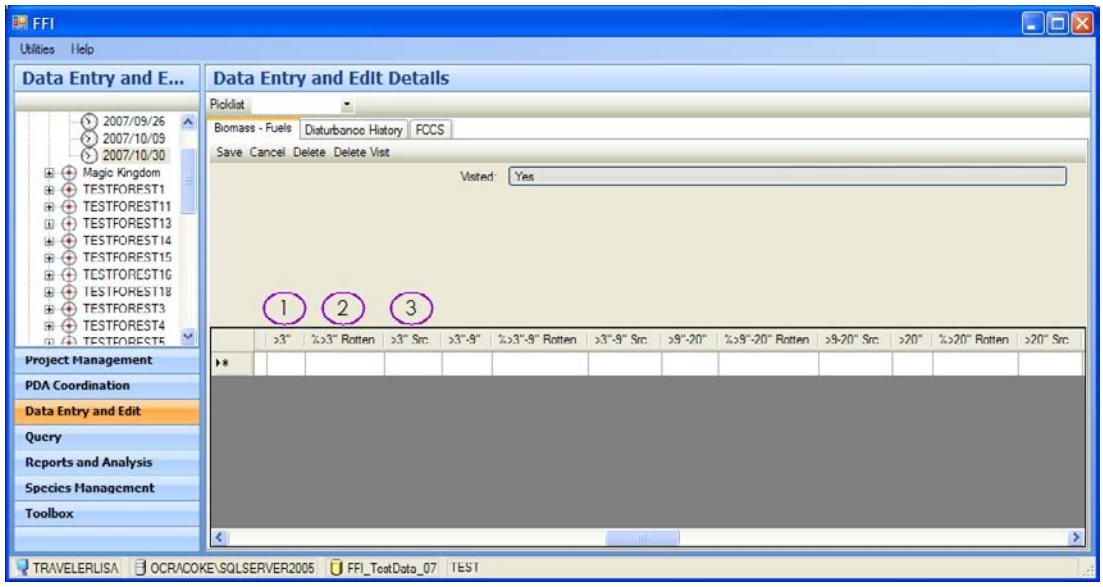
For clarification of certain fields in the **Disturbance History** data entry form, see below.



1. **Severity Code**: This is a user-defined field, since there is no standard set of codes for severity of disturbance. Establish a set of codes to meet your particular situation before going to the field.
2. **Date Precision**: This is a decimal field that allows users to indicate how sure they are of the time of disturbance noted in the previous six data fields (these fields are truncated on the graphic above), in years. For example, you might know the precise date of a prescribed fire but not the dates or insect- or disease-related disturbance. In this field, you could, for example, enter a value of 2 to indicate that your level of certainty as expressed in the previous fields is within about two years.
3. **Change Description**: This is a text field. Use it to describe the change that has occurred, or to provide additional data to describe the change agent.

Biomass - fuels

Biomass fuels values vary. Before going into the field, select a photo guide that describes fuels in your area. These guides generally divide fuels into either a >3" class or the smaller classes. In the field, visually divide the fuels into the classes used in the selected photo guide and record these values in the data entry form.



1. The data to be recorded for the **> * "** field is tons per acre.
2. The data to be recorded for the **% > * " Rotten** field is the percentage of the class that is rotten vs. sound.
3. The data to be recorded for the **> * " Src.** field is the source - this is a text field.

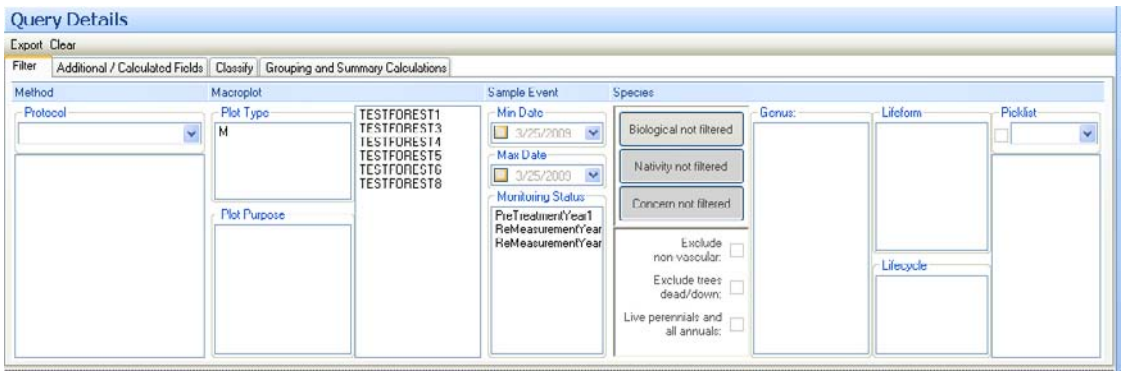
Query

The **Query** screen lets you retrieve and explore your method data within a powerful and flexible user interface. Within the **Query** screen, you have complete control over the method data that you want to look at, the macro plots that you want to include in calculations, and even the types of calculations that you want to do. **Query** is used to:

- View data for selected plots that fit designated criteria.
- Group data in unique ways for exploration.
- Explore how individual species change with monitoring status.
- Explore the effect of treatments during each sampling event.
- Classify attributes with user-defined names.
- Calculate measures of density, DBH, or cover.
- Export unique data combinations for further analysis.

This section includes descriptions of the four main functions that are included within the query process. These functions include Filtering, selecting Additional Data, Classifying, and Grouping and Calculating summary data (see FFI screen below). Each function is described is this guide using examples that illustrate specific queries that can be developed. Because this feature is so flexible, however, these examples cannot show the many possibilities for creating data sets that a user has.

NOTE: Be aware that FFI will not prevent you from making inappropriate selections. Not every query that can be created will be useful or meaningful.



- The **Filter** tab lets you quickly pick the method that you want to explore data from, the macro plots that you would like to include in a data set, the sample events or monitoring status that are important to you, species or group of species that you want to focus on; and it gives you many options to explore your data sets.
- **Additional/Calculated Fields** allows you to include attributes from the event, plot, and species tables that would otherwise not be included in the results.
- **Classify** lets you break continuous values like DBH into classes, which can then be grouped in the results.

- **Grouping and Summary Calculations** can be used to summarize data by the values in one or more fields and perform calculations. To view the sample calculations, see Calculation examples.

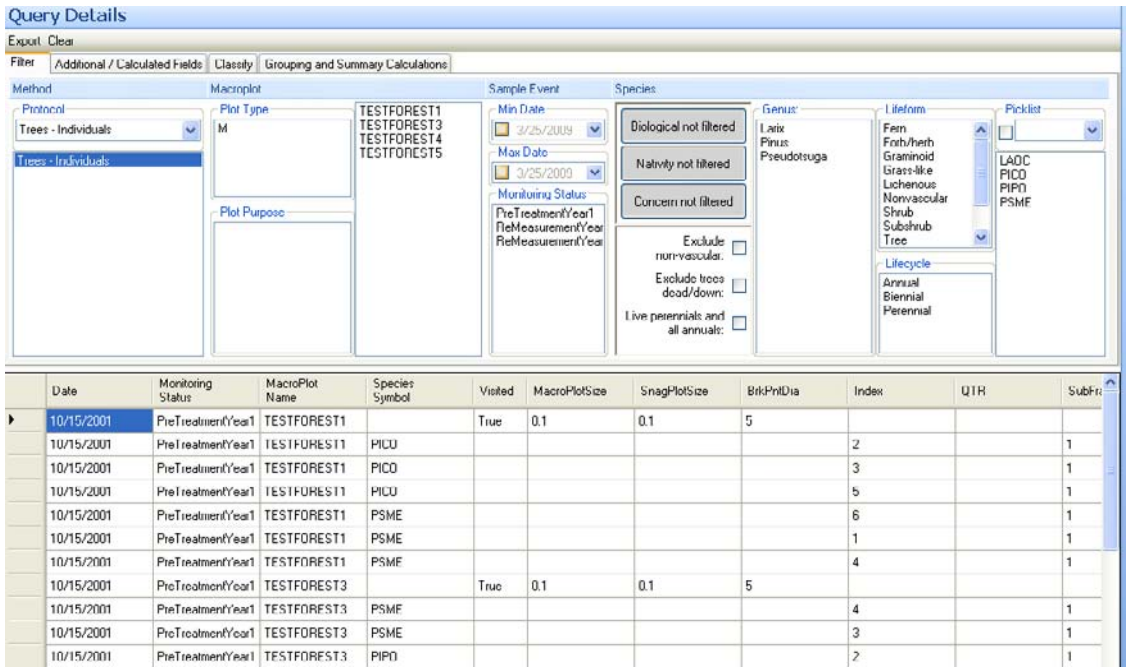
See Exporting a query

Return to Using FFI main page

Query – Filter tab

The FFI **Filter** tab lets you select records by project unit, method, macro plot, sample event, and species. After you have selected the project, you can proceed through the filtering fields and other **Query** tabs to refine your query output. Filtered records are displayed in the grid at the bottom of the **Query Details** window and can be exported as an Excel file.

*NOTE: **Filter** is based on **method**, rather than **protocol**.*



*NOTE: Basic descriptive data for a macro plot, such as **Visited** status and **MacroPlotSize**, is shown only in the first record of each macro plot in the lower grid.*

Using the Filter tab

1. Select the project unit in the tree view.
2. Select the protocol in the drop-down listing, and then select the appropriate method (in this example, *Tree Data - Individuals*). This limits the query to only those macro plots that include sample events using the selected method.
3. Continue making choices in each field to create the query. In this example, macro plots *TESTFOREST4* and *TESTFOREST14* are selected, and the option to

exclude dead/down trees is checked. Note that each time you apply a filtering criterion, the record grid updates.

4. Click **Export** to export the grid as a data file for use in other software packages. The query itself is not exported.
5. Click **Clear** at any time to clear all selections within the query. The Protocol field will remain selected until it is changed by the user so the lower table will also display all data from this protocol until it is changed.

Some filtering guidelines:

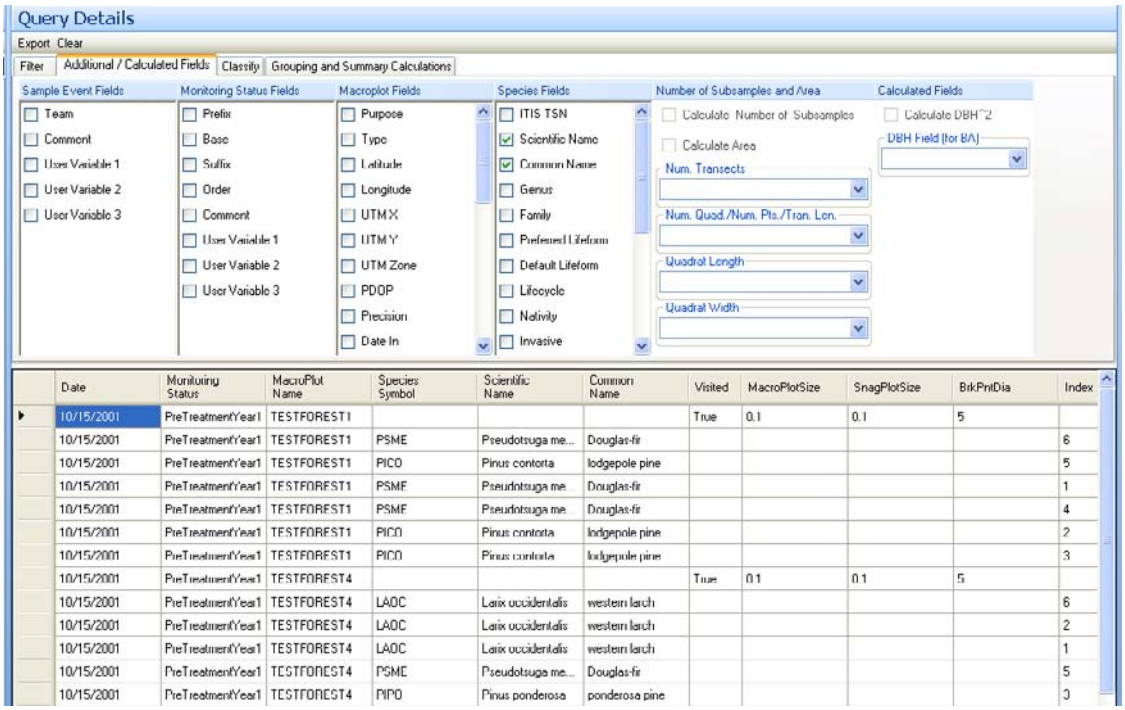
- Only one project unit can be selected at a time. If you would like to explore data from different project units within one query, you should create a new project unit under Project Management (you could call it analysis project, for example), choose the macro plots you would like to combine under the new analysis project, and then query to filter or group plots within that analysis project as described in the **Query** section. This gets around the 'query within a single project' rule.
- Only one method can be queried at a time.
- Make multiple selections in any list box (except **Method**) by clicking each item you want. Click an item a second time to unselect it.
- To select a range of sample event dates, enter a minimum and maximum date (inclusive). To select a single date, make the two the same. To include all dates, leave both blank (as in the example above) by unselecting the checkboxes.
- If a sample event has no status, the **Date** field will be blank.
- You can select a picklist as a filtering criterion.
- Click on any column heading to sort the records by that data element. In the example above, the records are sort by date.
- When viewing the records, scroll horizontally across the grid to view all record fields.

*NOTE: If you click the **Query All Project Units** button on the **Filter** page, the query will show all of the macro plots (and all sampling events within each macro plot) for the selected method. All of the method attributes within the method will also be listed in the grid. You will not be able to filter on monitoring status in any query because all sampling events are already included in your output when you chose this option.*

Additional/calculated fields

Query – Additional/Calculated Fields tab

The **Additional/Calculated Fields** tab lets you include additional fields in your query. As indicated below, you can select any of the description fields that are assigned to a macro plot, sample event, monitoring status, or species if the field contains data.



*NOTE: Basic descriptive data for a macro plot, such as **Visited** status and **MacroPlotSize**, is shown in the first record for each macro plot.*

Using the Additional/Calculated Fields tab

1. Select additional data fields to expand the query. In this example, the species fields *Scientific Name* and *Genus* are selected.
2. Each time you apply a filtering criterion, the record grid updates. Note that columns have been added for *Scientific Name* and *Genus*.
3. Click **Export** to export the grid as a data file for use in other software packages. The query itself is not exported.
4. Click **Clear** at any time to clear the query.

Some guidelines:

- If the selected method does not have species data, the **Species** checkboxes will be grayed out.
- Select only fields that contain values.
- If you click **Query All Project Units**, monitoring status will not be available. The query will show all macro plots (and all sampling events within each macro plot for the selected method). All of the method attributes within the method will also be listed in the grid. You will not be able to filter on monitoring status in any query because all sampling events are already included in your output when you chose this option.
- Some methods that are sampled in quadrats have length and width attributes, but not area. To calculate area, enter the **Width** and **Length** and click the

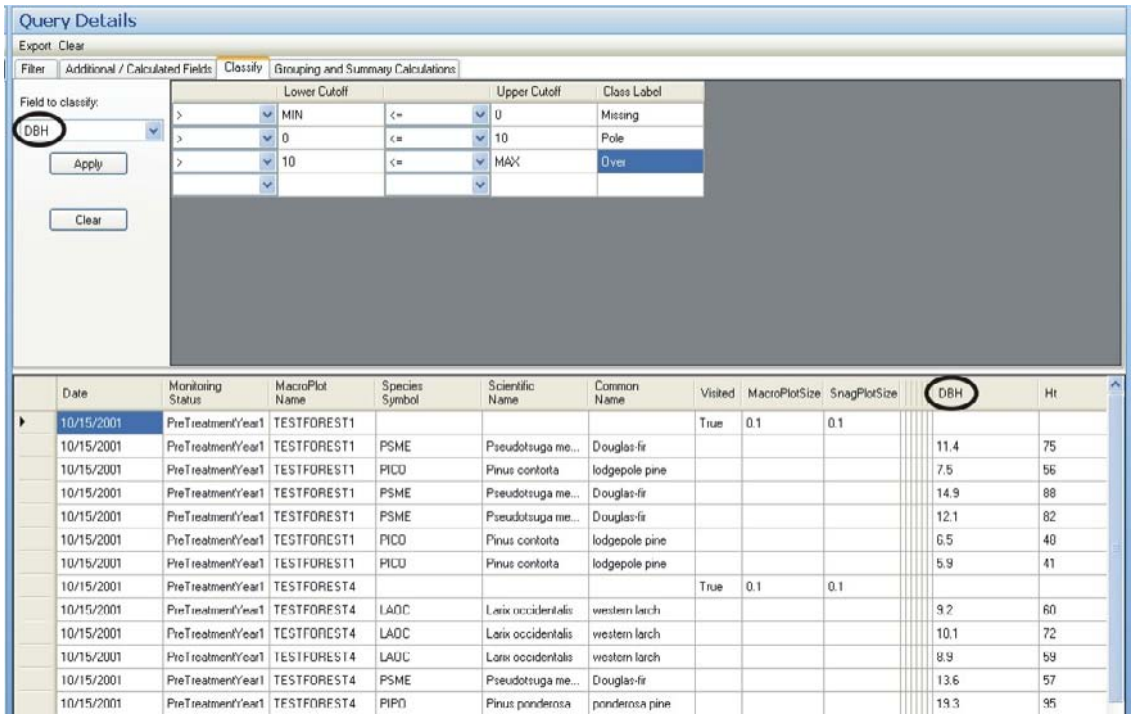
Calculate Area checkbox. Calculated areas will be summed automatically in the **Grouping** tab.

- Click on any column heading to sort the records by that data element. In the example above, the records are sort by date.
- When viewing the records, scroll horizontally across the grid to view all record fields.

Classify tab

Query – Classify tab

The **Classify** tab allows you to classify any attribute that is displayed as numeric field in your query, such as tree DBH or plant height. The classes that you create can be used in calculations within FFI or exported to use in other applications.



*NOTE: Basic descriptive data for each macro plot, such as **Visited** status and **MacroPlotSize**, is shown in the first record for each macro plot in the lower table on the screen. This table contains all attribute data for your selected macro plots, status, method and field.*

Using the Classify tab

1. Select a protocol/method that contains the data you want to classify. Protocols and methods are selected on the preceding **Filter** tab. In the example above, the method that contains the DBH data that we want to classify is Tree Data – Individuals.

2. In the drop-down list on this **Classify Tab** screen, select the **Field to classify**. In this case, we chose DBH.
3. On the first available line in the upper table, enter the 'Upper cutoff value' and a 'class label' name that you want to assign to this class. In this example, there are two classes. From 0 to 10 (the upper cutoff value) our trees will be classified as Poles. Those trees greater than 10 will be classified as Overstory. Note that there is no upper limit to the overstory class in this example.
4. Click **Apply** to classify the records, or **Clear** to clear the values. **Clear** will clear only values in the upper table where the classification is set. When you click **Apply**, the original numeric values for the classified column (i.e., DBH) in the lower table are replaced with your new class names. These new names cannot be cleared or changed by clicking **Clear**. They must be reclassified to change them.

Some guidelines:

- For the first class, provide only a class label, not a lower cutoff value (It defaults at '0').
- For each subsequent class, the lower cutoff you provide will also be the upper cutoff for the previous class. All you need to supply is your upper value for the class and a class label on each line.
- If you make a mistake in your classification process, click clear or use the arrows to maneuver to the cell with the error and begin your classification process again.
- You may classify more than one field when you are within the Classify tab.
- To exclude missing values from the classification, label the lowest class 'missing' and then set the Lower Cutoff of the next class to > 0. (This is the default when you enter the Classify Tab.) If you want to eliminate this option, begin typing your classification on the first line by changing the 'MIN' to '0' and setting the 'Upper cutoff' and 'Class Label' as described above.
- Your new class descriptions will show up automatically in the lower table of the Filter tab and in the Grouping tab when you click Apply.
- Click on any column heading to sort the records by that data element. In the example above, the records are sorted by *Date*.
- When viewing the records, scroll horizontally across the grid to view all record fields.

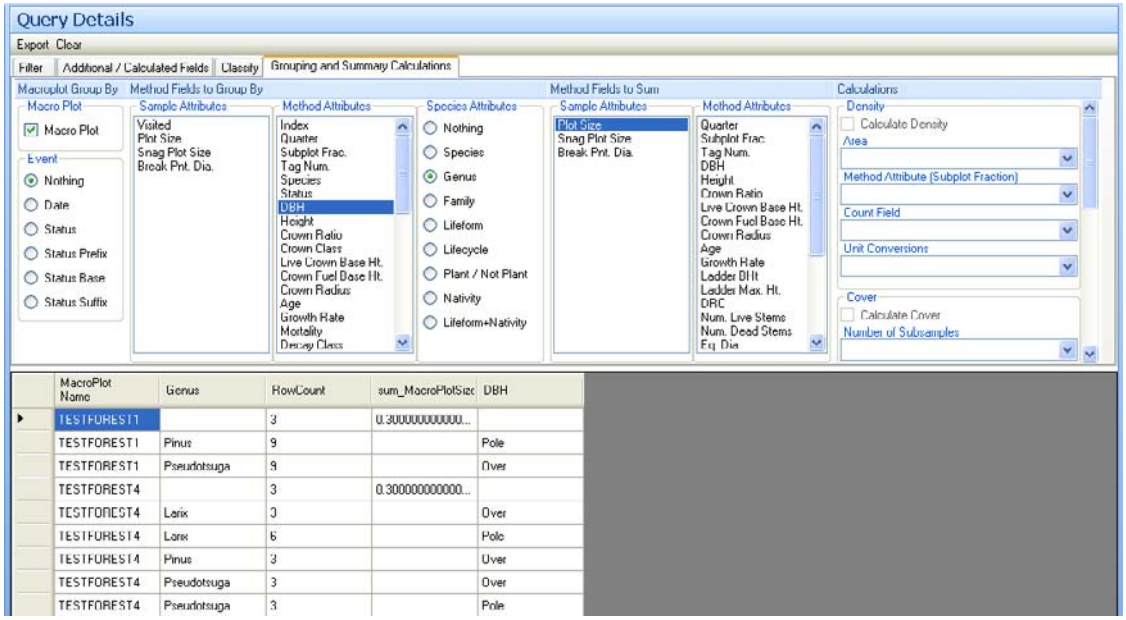
Grouping and summary calculations tab

Query – Grouping and Summary Calculations tab

The **Grouping and Summary Calculations** tab allows you to group data by any method field or to sum values in any numeric method field for selected records. You can group by macro plot, sample event date, monitoring status, and various species fields. To see a set of sample calculations, refer to the Calculation examples.

Also, for any set of filtered/grouped data, you can calculate the total area, total transect length, or total count of transect points sampled by summing the appropriate sample attribute. Using the count or sum of the grouped data, along with the area,

length, or number of points, you can calculate density, frequency, or percent cover. Filtered and grouped records are displayed in the grid at the bottom of the **Query Details** window and can be exported to Excel.



*NOTE: Basic descriptive data for a macro plot, such as **Visited** status and **MacroPlotSize**, is shown in the first record for each macro plot.*

Using the Grouping and Summary Calculations tab

- Click **Clear** at any time to clear the query.

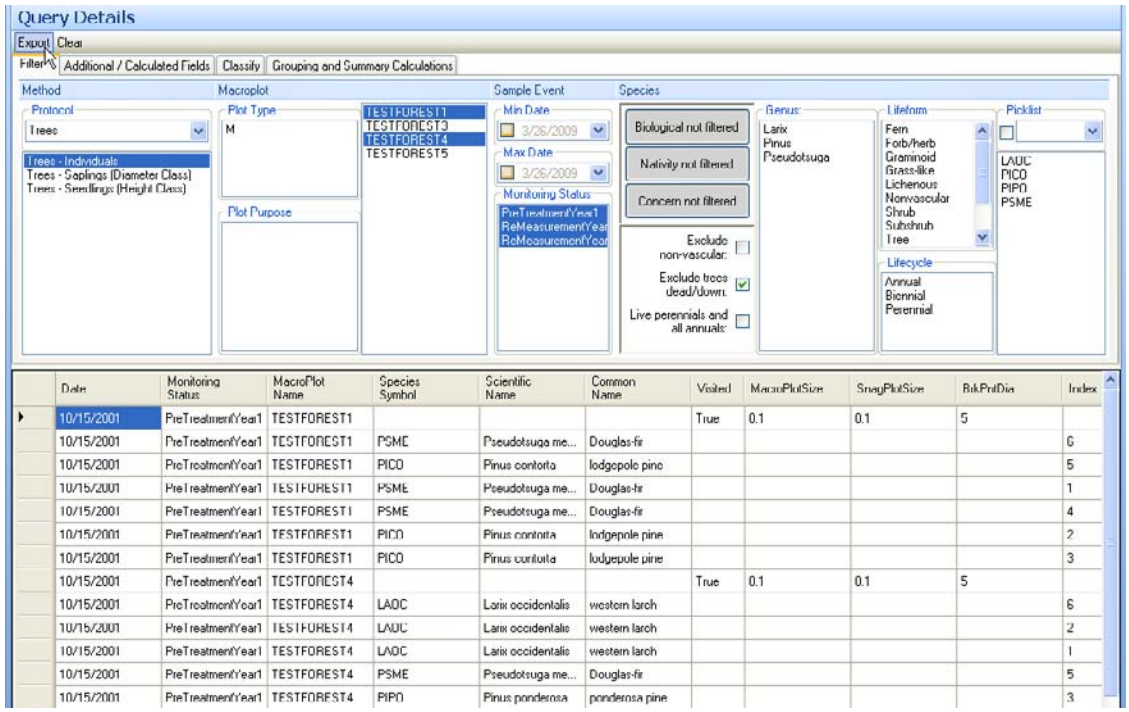
Some guidelines:

- You cannot select the same fields to group by and to sum.
- Tally fields are generally the only fields that you will want to sum. Never group by tally fields. For example, in the method *Cover - Points*, don't group by number of transects or points per transect.
- Be sure to review the summed area or point counts in your results. Your sample configuration may result in sums that do not reflect reality.

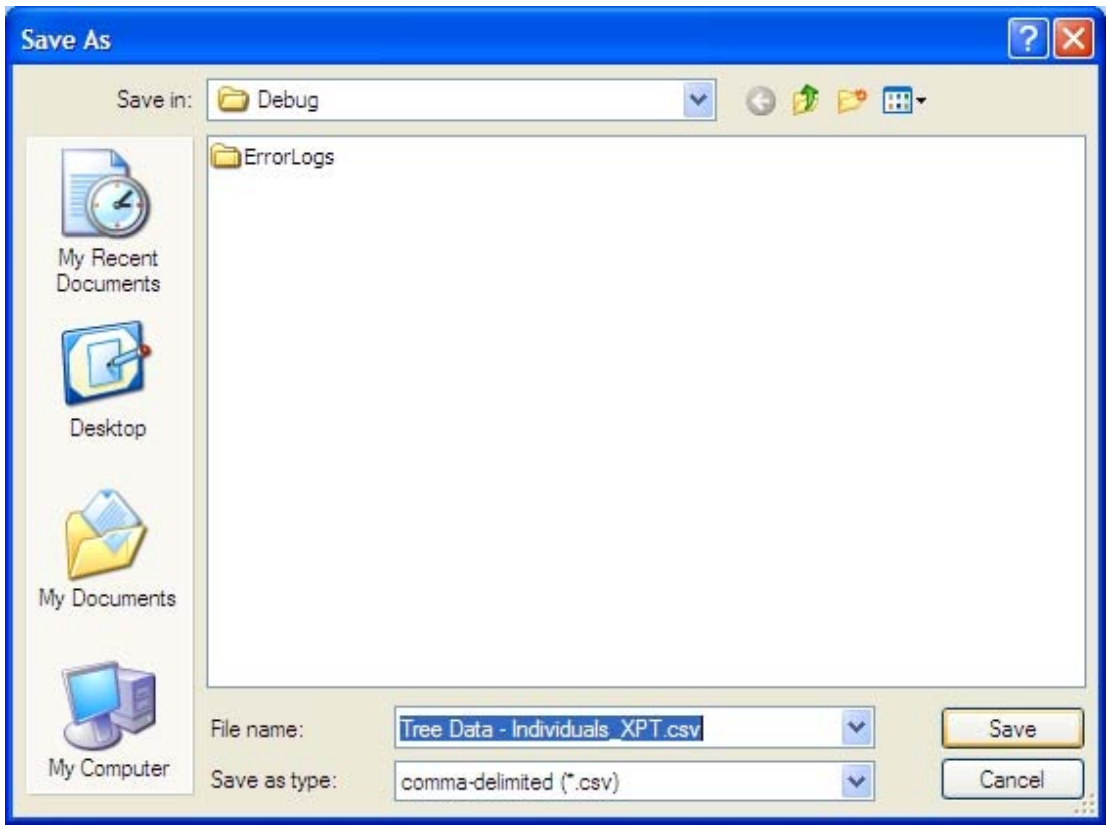
Exporting a query

The results of queries generated by the FFI query builder can be saved and exported as a *.csv file for use in reporting or analysis. To export a query as a *.csv file:

1. Develop a query that contains the fields and data list that you would like to work on in an external application.
2. Click **Export** in the **Query Details** toolbar.



3. Browse to the location where you would like to save the file, enter a name for the export file, and click **Save**.



NOTE: See Suggested file structure for file directory recommendations. In this example, the file is exported to C:\\Program Files\FFI\Admin_unit_name\Project Files\Debug.

Calculation examples

This section contains examples that suggest various ways that you can build and execute calculations based on queries.

In order to apply calculations to data selected in the Query Builder, you must first calculate the subsampled area (for density and basal area) or the number of subsamples (for cover and frequency).

> *NOTE: Line Intercept cover calculations require the total length of line sampled, which would be interpreted in this case as the number of subsamples or the number of inches or cm sampled. If the subsampled area is the entire macro plot or is entered as a fraction of the macro plot size, then plot area times the subplot fraction may be used for the density and basal area calculations.*

The calculations for Density and Basal area take plot area, an optional method attribute (subplot fraction), one summary field used for the calculation (such as count, or DBH^2), and a units conversion field. Plot area may be the macro plot area or the total area subsampled by quadrats or belt transects. The subplot fraction is used for items sampled in areas smaller than the total macro plot area or in subplots of the larger quadrat or belt transect. For example, FMH samples pole trees on a plot 0.25 x the larger plot in Q4. Some FIREMON users sample items in various size belts or quadrats using the Density – Belts or Density – Quadrats sampling methods. Subplot fraction is optional if it is always set to the default value of 1. The summary field for Density is the sum of Count in the density and tree sampling methods where items are counted by categories. The summary field for Density when sampling individual trees would be RowCount, which is the number of individual trees by some grouping. The summary field for Basal Area will always be the DBH^2 field calculated in the Additional Fields tab and carried over to the Grouping and Calculation tab. The unit conversion field is used to convert density or basal area to per acre or per hectare units depending on the units used for sampling.

The calculations for Cover take the number of subsamples, an optional method attribute (subplot fraction), and one summary field used for the calculation (such as cover, points, intercept). The number of subsamples would be the total number of quadrats sampled, the total length of line sampled (number of inches or number of cm), or the total number of points sampled. The subplot fraction is only used here in the line intercept method where users might sample some items on only a portion of the total line intercept transect. The summary field here is the sum of Cover (Cover / Frequency), the sum of intercepts (Line Intercept), the sum of Points (Cover - Points) or the sum of Unique Hits (Cover – Points by Transect).

The calculations for Frequency take the number of subsamples and one summary field. The number of subsamples would be the total number of quadrats sampled. The summary field would be RowCount, which is the number of quadrats in which an item occurred.

See the following examples:

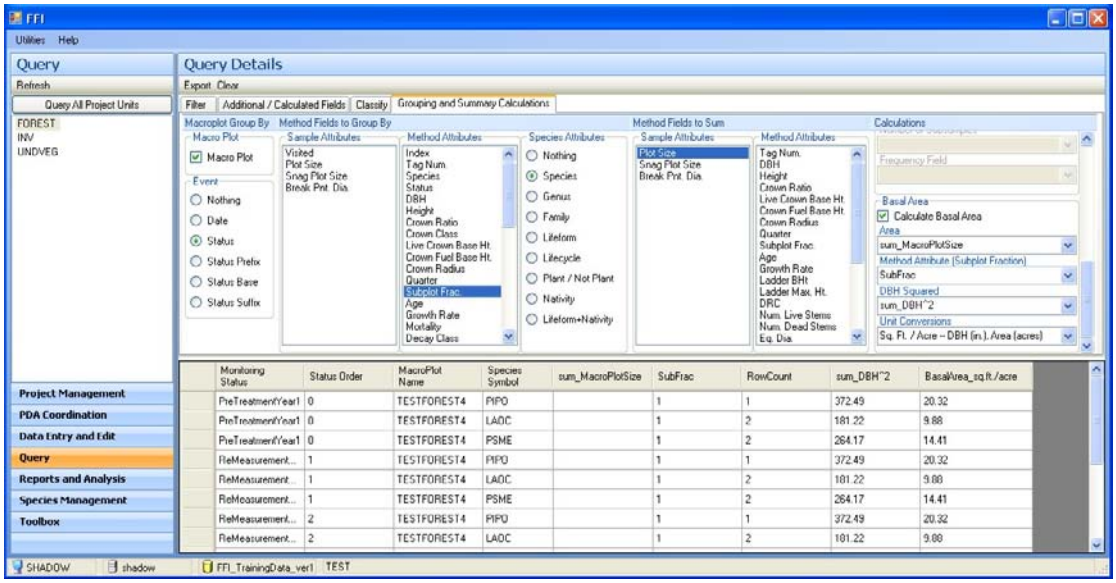
- Basal area by species, Trees–Individuals method
- Density by species, Trees–Individuals method
- Cover by species, Cover–Frequency method

- Frequency by species, Cover–Frequency method
- Cover by species, Cover–Points method
- Cover by species, Cover–Line Intercept method

Basal area by species, Trees–Individuals

In this example, basal area is calculated by species for trees sampled using the *Trees – Individuals* sampling method.

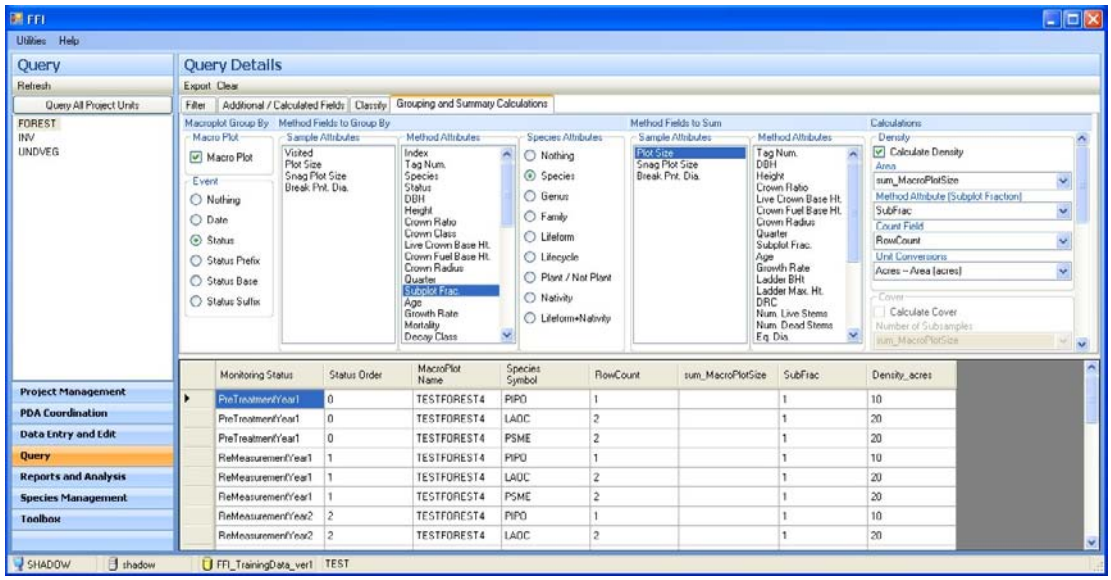
Data is grouped by monitoring status, macro plot, subplot fraction, and species. The **Macroplot Area** field selected is *sum_MacroPlotSize* and the **DBH Squared** field selected is *sum_DBH^2*. DBH^2 was calculated in the **Additional Data** tab. The **Method Attribute** selected is *SubFrac*, which is the subplot fraction field in *Trees – Individuals*. In this example, its value is always 1, so it is an optional field. The **Unit Conversion** selected will display the results in *sq. ft. / acre*, given that DBH was measured in inches and plot area was measured in acres. Basal area is calculated as a conversion factor: *X sum_DBH^2 / the sum of macro plot size*.



Density by species, Trees–Individuals

In this example, density is calculated for tree species sampled using the *Trees – Individuals* sampling method.

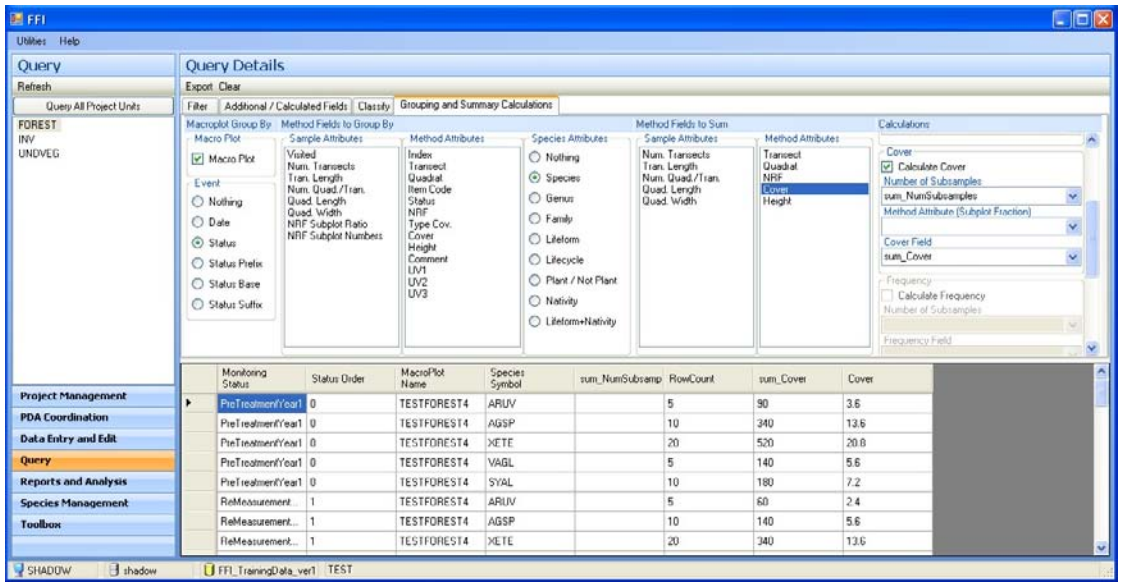
Data is grouped by macro plot, monitoring status, subplot fraction, and species. The **Area** field selected is *sum_MacroPlotSize*, the **method attribute** selected is the *subplot fraction*, and the **Count Field** selected is *RowCount*. In this example, *RowCount* is the count for each species on the macro plot. The unit conversion selected displays density in acres, given that the sampled area was measured in acres. Density is calculated as RowCount / the sum of macro plot size.



Cover by species, Cover–Frequency

In this example, cover is calculated by species sampled using the *Cover / Frequency* sampling method.

Data is grouped by macro plot, monitoring status, and species. The **Number of Sub-samples** field selected is *sum_NumSubsamples* and the **Cover** field selected is *sum_Cover*. The number of subsamples was calculated on the **Additional Data** tab as the number of transects times the number of quadrats per transect. The **Method Attribute** field (*subplot fraction*) is not needed in this case since it is not part of the *Cover/Frequency* method. Note that there is no conversion factor needed for percent cover. Cover is calculated as the sum of cover for each species / the number of sub-samples.

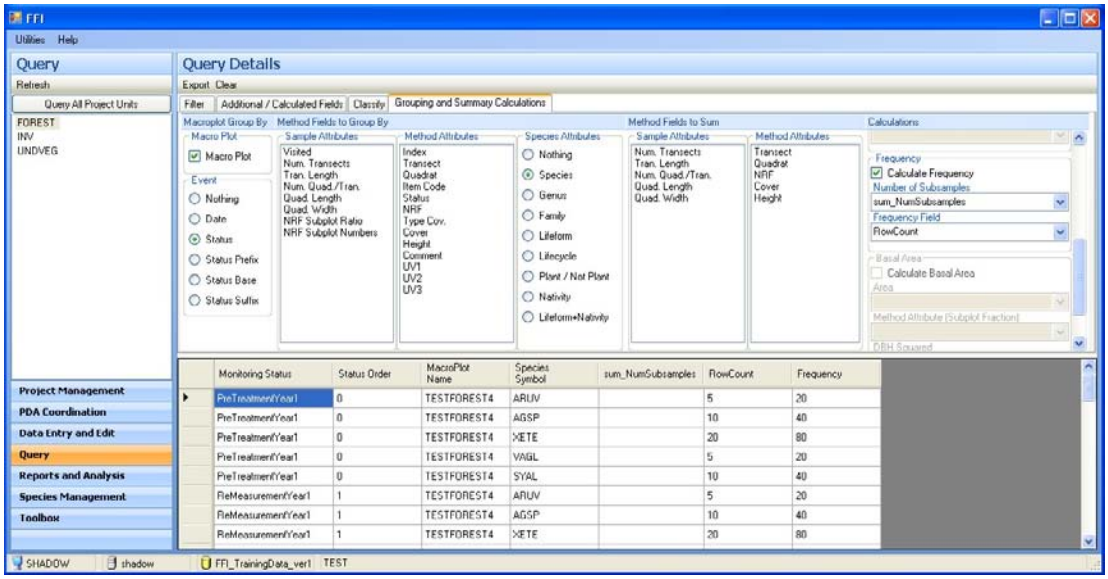


Frequency by species, Cover–Frequency

In the following example, frequency is calculated by species sampled using the *Cover/Frequency* sampling method.

Data is grouped by macro plot, monitoring status, and species. The **Number of Sub-samples** field selected is *sum_NumSubsamples* and the **Frequency** field selected is *RowCount*. The number of subsamples was calculated on the **Additional Data** tab as the number of transects times the number of quadrats per transect.

RowCount in this example is the number of quadrats in which a species occurred. The **Method Attribute** field (*subplot fraction*) is not needed in this case, since it is not part of the Cover/Frequency method. Note that there is no conversion factor needed for frequency. Frequency is calculated as *RowCount / the number of subsamples*.



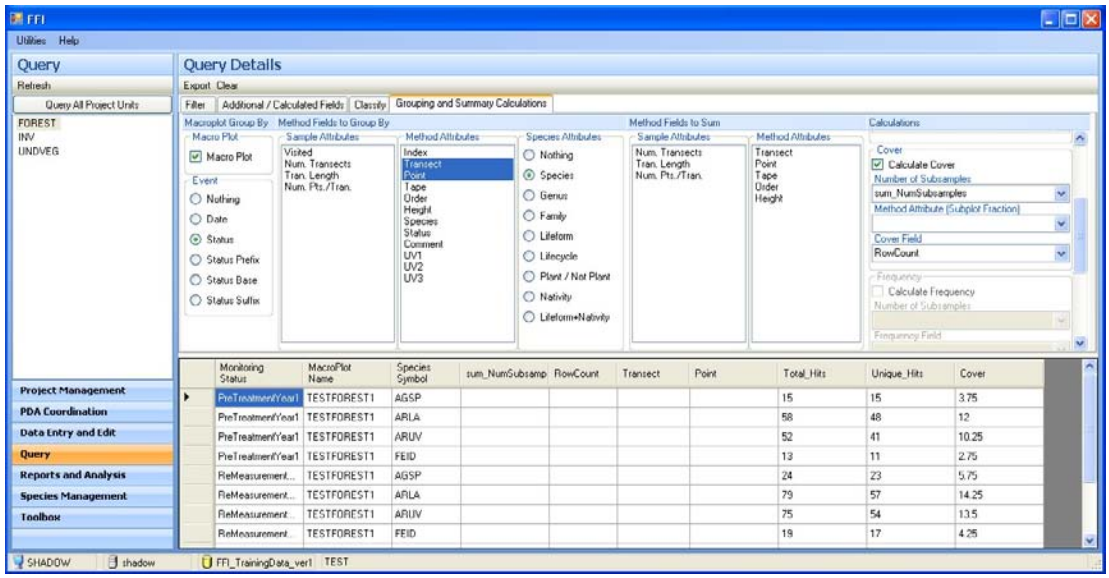
Cover by species, Cover–Points

In the following example, cover is calculated for species sampled using the Cover – Points sampling method.

Data is grouped by macro plot, monitoring status, and species. The **Number of Sub-sample**s field selected is *sum_NumSubsamples* and the **Cover** field selected is *Row-Count*. The number of subsamples was calculated on the **Additional Data** tab as the number of transects times the number of points per transect. Note that in this case the data is also grouped by **Transect** and **Point**. The *RowCount* will be the number of hits recorded for an individual species at each point on each transect. It is necessary to group this data by transect and point so only the unique hits at each point are used to calculate cover. When the data is grouped by transect and point, the summary below is displayed with *Total_Hits*, *Unique_Hits*, and *Cover* for each species. Cover is calculated as the number of unique hits for each species / the number of points sampled.

If the data is not grouped by transect and point, cover will be calculated using the total number of hits / the number of points sampled. This calculation over-estimates cover when multiple hits are recorded at each point. However, this calculation may

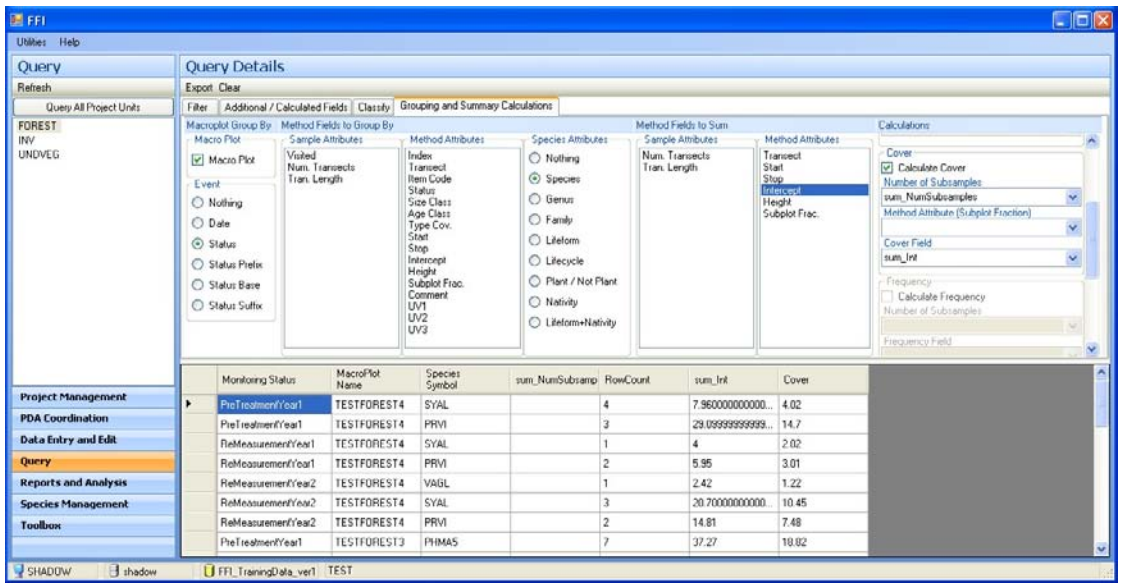
be used if data is collected using the Cover – Point Transects method which sums hits along a transect, only recording one hit for a species at each point.



Cover by species, Cover–Line Intercept

In this example, cover is calculated for species sampled using the *Cover - Line Intercept* sampling method.

Data is grouped by macro plot, monitoring status, and species. The **Number of Subsamples** field selected is *sum_NumSubsamples* and the **Cover** field selected is *RowCount*. The number of subsamples was calculated on the **Additional Data** tab as the number of transects times the transect length. In this example, the number of subsamples is the number of inches (or cm for the metric method) sampled. The **Cover** field selected is *sum_Int*, which is the sum of intercept sampled for each species along a transect. Cover is calculated as the sum of the intercepts for each species / the total transect length sampled.

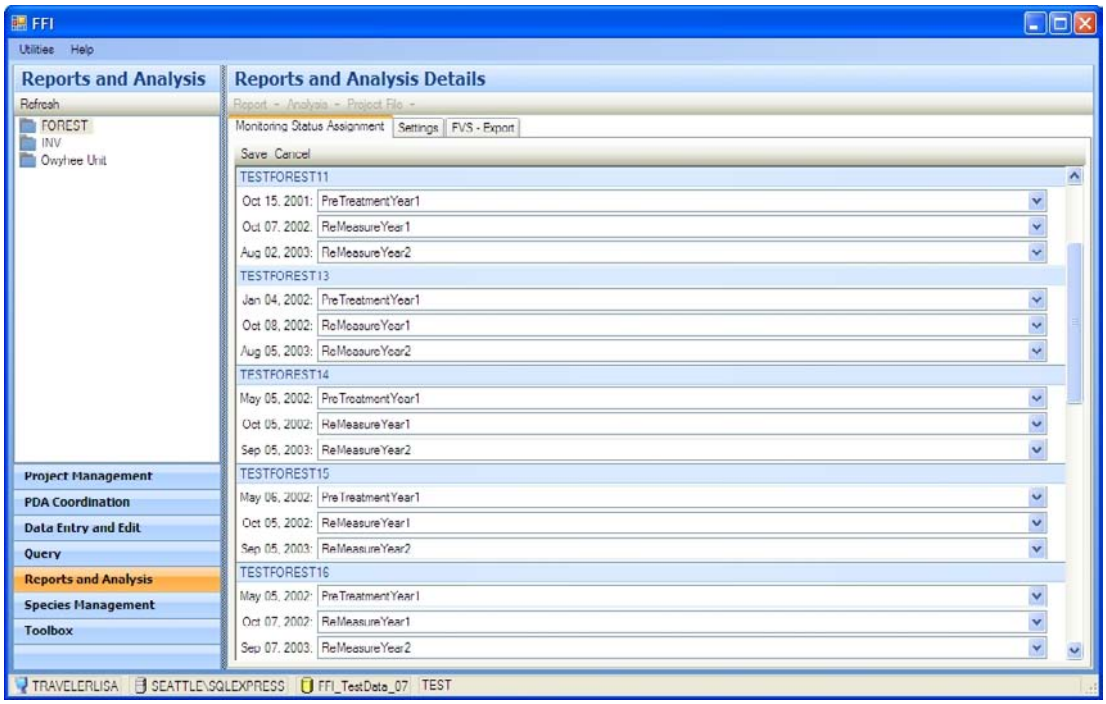


Reports and analysis

This section of the *User's Guide* presents procedures for using FFI's **Reports** and **Analysis** functions.

NOTE: In FFI, all analysis takes place within a project unit. If you wish to perform an analysis using data representing multiple project units, you can create an analysis project unit and assign the macro plots of interest to the new project unit.

- Reports.
- Analysis.



Return to Using FFI main page.

Creating reports

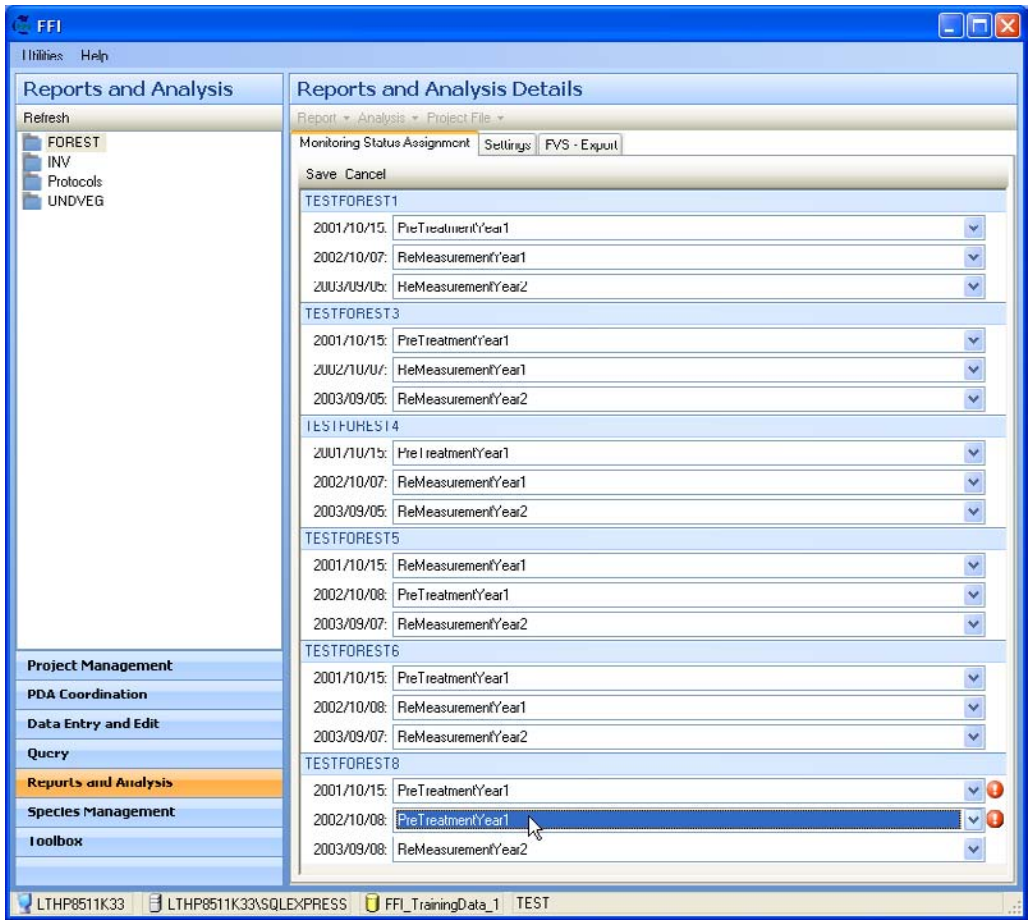
In FFI, you can create data summary reports for a project unit based on the standard FFI protocols or other protocols that you have imported. Reports can be formatted, printed, or exported as either Excel or Acrobat PDF files.

The standard FFI reports are listed below. For descriptions of each report type, see About the reports.

Biomass - Plants	CBI	Cover - Line Intercept	Cover - Points
Cover - Points by Transect	Cover - Species Composition	Cover - Frequency	Density - Belts
Density - Quadrats	Disturbance History	Pilot Sampling	Post Burn Severity
Surface Fuels	Surface Fuels - Alaska Duff/Litter	Surface Fuels - Vegetation	Trees and Trees by Species

To create a report:

1. Select **Reports and Analysis** from the main FFI menu to open the **Reports and Analysis Details** window.
2. Select the desired project unit. The **Monitoring Status Assignment** window opens, listing all associated macro plots and sample events for the selected project unit.



3. Using the pull-down lists, assign the appropriate monitoring status for each sample event to be analyzed. Click **Save** when finished.

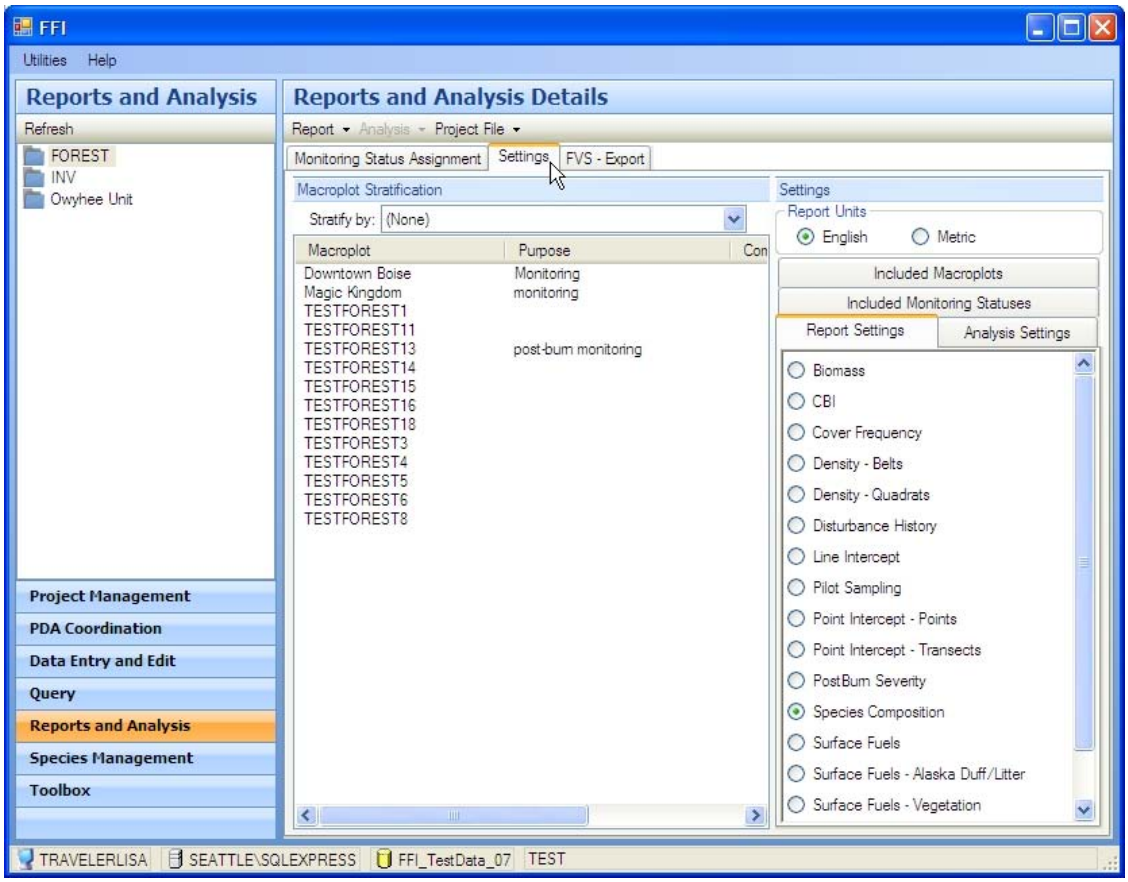
*NOTE: A monitoring status can be set for only one sample event per macro plot. In this example, **PreTreatmentYear1** has been selected for the **Oct. 15, 2001** sample event. An error is shown for macroplot **TESTFOREST8** because an attemp has been made to assign the monitoring status **PreTreatmentYear1** to more than one sample event.*

continued

Creating reports (continued)

4. Using the **Settings** tab, you can select report options.
    - Use the **Stratify by:** pull-down to select stratification criteria, if desired.

NOTE: The available stratification criteria are the organization codes, or user variables, that you may have assigned to the macro plot during creation or subsequent editing. For more information, see Creating a macro plot.



- Select either English or metric **Report Units**.

- Select the desired data summary report in the **Report Settings** tab.

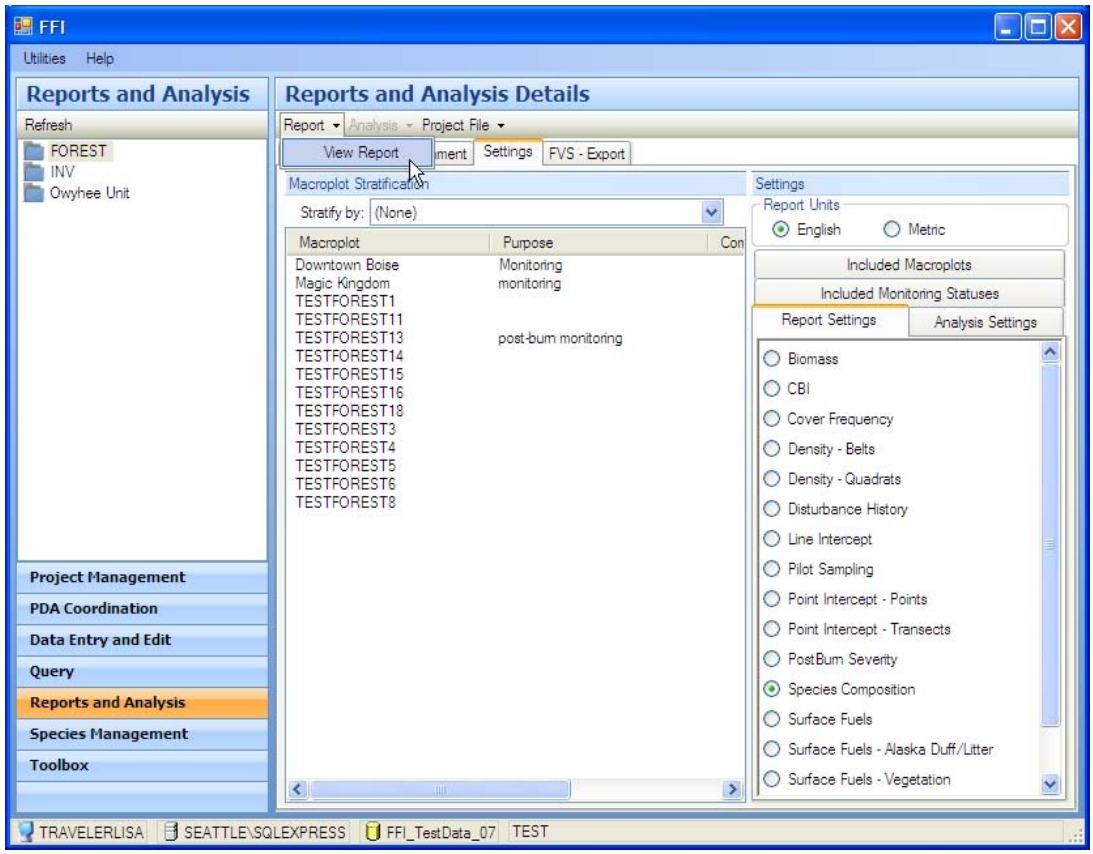
NOTE: For information on the data summary reports available in FFI, see About the reports.

- In the **Included Monitoring Statuses** tab, unselect any monitoring statuses that you do not wish to include in the report.
- In the **Included Macro Plots** tab, unselect any macro plots that you do not wish to include in the report.

continued

Creating reports (continued)

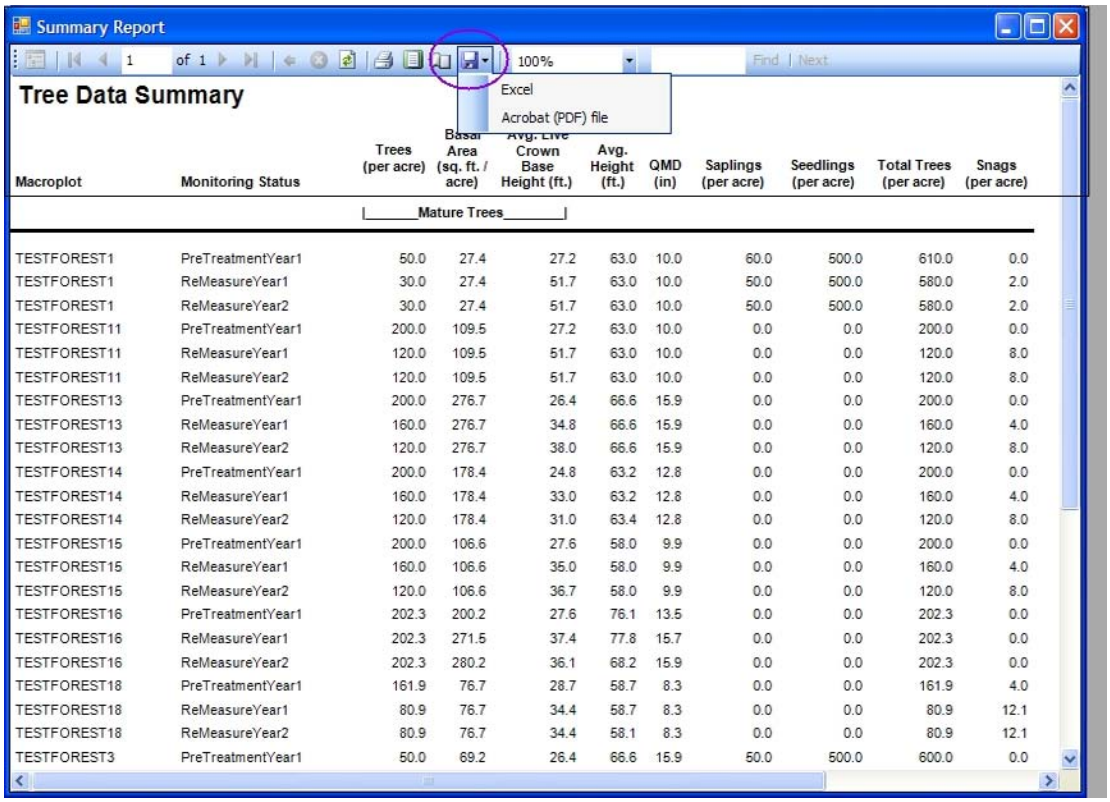
5. To view the report, click **View Report** in the **Report** pull-down.



continued

Creating reports (continued)

A tree data summary report is shown here. Note that the report can be saved as an Excel or PDF file.



Tree Data Summary

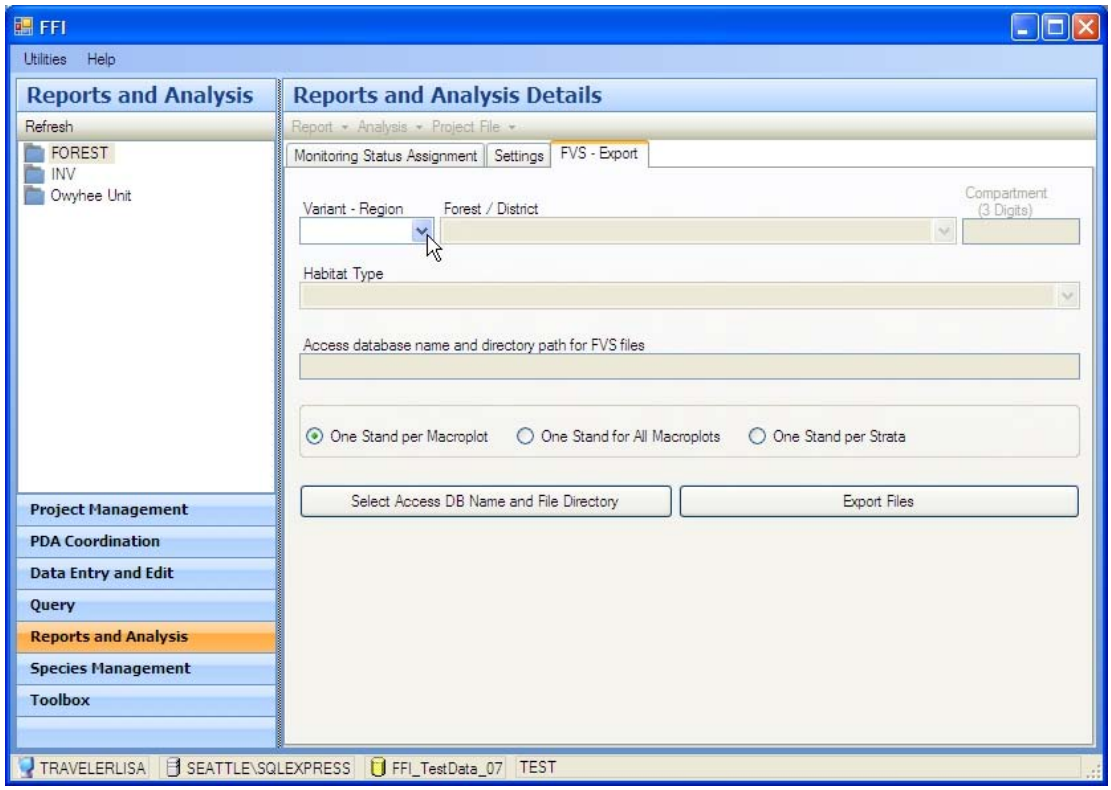
Macroplot	Monitoring Status	Trees (per acre)	Basal Area (sq. ft. / acre)	Avg. Live Crown Base Height (ft.)	Avg. Height (ft.)	QMD (in)	Saplings (per acre)	Seedlings (per acre)	Total Trees (per acre)	Snags (per acre)
		Mature Trees								
TESTFOREST1	PreTreatmentYear1	50.0	27.4	27.2	63.0	10.0	60.0	500.0	610.0	0.0
TESTFOREST1	ReMeasureYear1	30.0	27.4	51.7	63.0	10.0	50.0	500.0	580.0	2.0
TESTFOREST1	ReMeasureYear2	30.0	27.4	51.7	63.0	10.0	50.0	500.0	580.0	2.0
TESTFOREST11	PreTreatmentYear1	200.0	109.5	27.2	63.0	10.0	0.0	0.0	200.0	0.0
TESTFOREST11	ReMeasureYear1	120.0	109.5	51.7	63.0	10.0	0.0	0.0	120.0	8.0
TESTFOREST11	ReMeasureYear2	120.0	109.5	51.7	63.0	10.0	0.0	0.0	120.0	8.0
TESTFOREST13	PreTreatmentYear1	200.0	276.7	26.4	66.6	15.9	0.0	0.0	200.0	0.0
TESTFOREST13	ReMeasureYear1	160.0	276.7	34.8	66.6	15.9	0.0	0.0	160.0	4.0
TESTFOREST13	ReMeasureYear2	120.0	276.7	38.0	66.6	15.9	0.0	0.0	120.0	8.0
TESTFOREST14	PreTreatmentYear1	200.0	178.4	24.8	63.2	12.8	0.0	0.0	200.0	0.0
TESTFOREST14	ReMeasureYear1	160.0	178.4	33.0	63.2	12.8	0.0	0.0	160.0	4.0
TESTFOREST14	ReMeasureYear2	120.0	178.4	31.0	63.4	12.8	0.0	0.0	120.0	8.0
TESTFOREST15	PreTreatmentYear1	200.0	106.6	27.6	58.0	9.9	0.0	0.0	200.0	0.0
TESTFOREST15	ReMeasureYear1	160.0	106.6	35.0	58.0	9.9	0.0	0.0	160.0	4.0
TESTFOREST15	ReMeasureYear2	120.0	106.6	36.7	58.0	9.9	0.0	0.0	120.0	8.0
TESTFOREST16	PreTreatmentYear1	202.3	200.2	27.6	76.1	13.5	0.0	0.0	202.3	0.0
TESTFOREST16	ReMeasureYear1	202.3	271.5	37.4	77.8	15.7	0.0	0.0	202.3	0.0
TESTFOREST16	ReMeasureYear2	202.3	280.2	36.1	68.2	15.9	0.0	0.0	202.3	0.0
TESTFOREST18	PreTreatmentYear1	161.9	76.7	28.7	58.7	8.3	0.0	0.0	161.9	4.0
TESTFOREST18	ReMeasureYear1	80.9	76.7	34.4	58.7	8.3	0.0	0.0	80.9	12.1
TESTFOREST18	ReMeasureYear2	80.9	76.7	34.4	58.1	8.3	0.0	0.0	80.9	12.1
TESTFOREST3	PreTreatmentYear1	50.0	69.2	26.4	66.6	15.9	50.0	500.0	600.0	0.0

See also Exporting a report.

Exporting a report

Exporting a report as an Access file

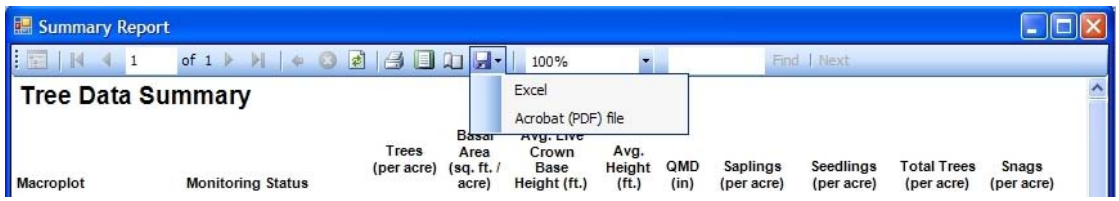
To export a report as a Microsoft Access (*MDB) file, click **Select File Directory** in the **FVS- Export** tab. In the **Save As** window that opens, name the new file and click **Save**.



Exporting a data summary report

To export a generated report:

1. Click the **Export** pull-down menu in the toolbar of the report, as shown below.



2. Select either **Excel** or **Acrobat (PDF)** format.
3. Specify the file location, and click **Save**.

Reports can also be printed or formatted using the command icons on the **Summary Report** toolbar.

About the reports

The data summary reports are available through the **Reports and Analysis** menu. Each of the summaries can be customized by selecting specific macro plots and monitoring statuses needed with the **Report Settings tab**. Any of the results from these summary reports can also be copied and pasted into external applications for more comprehensive analysis if desired. Each report type is summarized below.

Biomass - Plants

The Biomass report simply returns the average biomass for each macro plot. Dry weights are totaled by analysis group (such as lifeform or individual species) and the totals are divided by the number of transects. The average dry weight is then multiplied by a conversion factor that takes the transect areas and converts the weights by transect area to lbs/acre or kg/m^2.

CBI

The CBI summary report displays an average burn severity rating (Composite Burn Index) for three analysis scales including (1) the total plot, (2) each vegetation strata requested, (3) and the substrate. Severity ratings range from 0 (no burn effect visible) to 3 (highest burn effect). For each analysis, the burn effects are averaged. The greater the average CBI number, the greater the burn severity for the analyzed unit.

Cover/Frequency

The Cover/Frequency summary displays the average percent cover for a macro plot and the average frequency of each species within nested plots. It also displays an average species height for each species sampled. To calculate the percent cover for each species sampled on a macro plot, the mid-point of the estimate range for the species' cover in each quadrat is summed by transect (this midpoint is actually entered when you use the drop-down box during data entry). The transect sums are divided by the number of quadrats to give an average percent cover for the species on that particular transect. The averages for each transect are summed and then divided by the number of transect lines to give an Average Cover (%) for the macro plot in the summary report. Average height is computed by summing all measured heights (by species and status) and dividing by the number of species' entries on each transect line. These average heights are summed and divided by the number of transect lines to get the Average height for each species in the macro plot.

The Average Frequency for the nested samples in the Cover/Frequency summary is obtained by first determining where each species is located within each quadrat (see the Cover/Frequency description of subplots in FIREMON method descriptions at http://frames.nbii.gov/firemon). If the species is located only in a small corner of the quadrat, the plant is located in subplot "1." If it is located in the right half of the quadrat, the plant is located in subplot "4." The average nested-root frequency for subplot 1 is calculated by counting the number of times the species is in subplot "1" in the quadrats and dividing by the total number of quadrats in the macro plot. For the frequency of plants in subplot 2, the numbers of occurrences in subplot 2 and subplot 1 are summed and the total is then divided by the total number of quadrats in the macro plot. The process for calculating the frequency in For subplots 3 and 4 is the same as for

subplot 2 (i.e., count all the times a plant occurs in the desired group, add the number of times it occurs in all lower groups, and divide by the total number of quadrats). Results are displayed as a percent.

Density - Belt

The Density-Belt summary report displays a summary by macro plot and monitoring status for each species that is sampled using the density method. The total count of each species in the belt transect is divided by the number of transects to get an average count. The average counts are converted to an average per unit area (per ft2 (m2) or per acre (hectare)) by dividing the average count by the sample area and applying the appropriate conversion factors. The average height in feet (m) is also calculated for each item.

Density - Quadrat

The Density - Quadrat summary report displays the average number of items per quadrat rather than per belt. It calculates average items per unit area and average height just as in the Density-Belt report.

Disturbance History

The Disturbance History summary report displays information on change agents, damage severity, and timing of disturbance for each macro plot if the information is entered during visits to the plot. There are no calculations attached to this report.

Cover - Line Intercept

The Cover - Line Intercept summary report displays (1) the average percent cover for each species by macro plot and monitoring event; and (2) the average height values for each plant species sampled using the line intercept method. The percent cover of each species on an individual transect is calculated by totaling the species' intercepts on one transect and dividing by the total transect length. The Average Cover % for the macro plot, however, is calculated by adding the percent cover values (by species) for all transects and dividing by the total number of transects in the macro plot. The Average Height value is obtained by totaling the species heights by status and size class. The totals are then divided by the number entries in each class to obtain an average. Average height is displayed in feet or meters depending on the output units selected.

Pilot Sampling

The Pilot Sampling summary displays the counts species and substrate elements in four quadrats by macro plot and monitoring status. No calculations are made within this report.

Cover - Points

The Cover - Points summary report displays the average count, average hits, average cover percent, and average height values for plant species sampled on a macro plot

using the point intercept method. The average count and average hits calculations take into consideration that multiple hits may occur at each point. The percent cover on an individual transect is computed for each plant species and substrate item by dividing the number of hits for an item by the total number of points sampled. The average cover for the macro plot is computed by summing the individual transect-cover values and dividing by the total number of transects. Average heights for each species in feet (m) are calculated for the macro plot if they were estimated. Plant species and ground cover values for point frames are calculated by dividing the number of hits for an item by the total number of points per frame. The frame cover values are used to calculate an average cover value for the plot.

Cover - Points by Transect

The Cover - Points by Transect summary displays the average cover and average height of each species or substrate item by macro plot and monitoring status. Unlike the Cover – Points summary, this summary report uses the only the summary of total hits for each species or substrate item. Percent cover for each transect is calculated by dividing the total number of hits for a species/substrate by the total number of points sampled on the transect. Average cover for the macro plot is computed by summing all percent covers by species or substrate and dividing by the number of transect lines.

Post Burn Severity

The Post Burn Severity summary report gives separate assessments of burn effects for the substrate and vegetation strata. The severity rating for each assessment is an average obtained by adding all values and dividing by the number of points on a transect and by the total number of transects. The percent severity values are determined by counting the number of hits within each substrate category (i.e., how many hits in substrate 1) and dividing each by the total number of points per transect. If more than one transect is taken at a macro plot, all subplot totals are averaged by the total number of points on the multiple transects.

Cover - Species Composition

The Cover - Species Composition summary report displays the species cover and height data just as it is entered in the data entry/edit. No calculations are made within this report.

Surface Fuels

The Surface Fuels summary report displays the average fuel loadings in tons per acre (or kg per m^2) for each macro plot. The loadings are calculated from fuel counts and duff/litter estimates on the fuels transects along with average vegetation cover and heights. Down woody loadings are calculated for 1-hr, 10-hr, 100-hr, 1-100-hr, 1000-hr sound, 1000-hr rotten, and 1-1000-hr fuels. Biomass is calculated based on the equations presented in the Handbook for Inventorying Downed Woody Material (Brown, 1974). Non-slash, composite values are used for quadratic mean diameter, non-horizontal correction and specific gravity of fine woody debris. Pieces of coarse woody debris in decay class 1, 2, and 3 are considered sound and assigned a specific gravity of 0.40. Decay class 4 and 5 pieces are considered rotten and assigned a specific gravity of

0.30. Loading of litter and duff is calculated using bulk densities of 2.75 lbs/ft^3 and 5.5 lbs/ft^3, respectively. Duff and litter depth summaries are provided. Averages for live shrub cover, dead shrub cover, live herbaceous cover, and dead herbaceous cover are also calculated. Average shrub height and herbaceous height are calculated in feet (m). Biomass of live and dead shrubs and biomass of live and dead herbaceous plants are calculated using the equation:

$$B = H*C*BD$$

where B = biomass (kg/m^2), H = height (m), C= percent cover/100, and BD = bulk density (kg/m^3).

Bulk density used for the herbaceous and shrub components are 0.8 kg/m^3 and 1.8 kg/m^3, respectively.

Surface Fuels - Alaska Duff/Litter

This report computes the average biomass for litter, moss, duff, and lichen for each macro plot and then converts the values to tons/acre (or hectares/m2) biomass. Depths for each element are averaged and displayed by macro plot and monitoring status within the report.

Surface Fuels - Vegetation

The Surface Fuels – Vegetation report returns an average percent cover, average height, and average biomass for shrub- and herb- fuels for each macro plot and monitoring status. All results are output by lifeform (herb, shrub) and status (live, dead) within the report.

Trees; Trees by Species

The Trees summary report displays tree densities (i.e. trees per unit area) for mature trees, saplings, seedlings, and snags by macro plot. For mature trees, it also displays the calculated basal area, average live crown base height, average height, and quadratic mean diameter (QMD) for each macro plot and monitoring unit. The Trees by Species summary report displays the same elements as the Tree Data report except that each element is displayed by species for the macro plot. Within this report are the densities, basal area, average live crown base height, average height, and quadratic mean diameter for each mature tree separated by species. Densities of each species for in the sapling, seedling, and snag classes are also computed.

Performing analyses

In FFI, you can configure various types of statistical analyses. Results can be formatted, printed, or exported as either Excel files or Acrobat PDFs.

The analyses available through the **Analysis** menu are summarized below.

Descriptive statistics

Descriptive statistics display the raw data and any summary data.

- In the **Parametric** option, the descriptive statistics are the mean, standard deviation, and confidence intervals based on the selected alpha value.
- In the **Nonparametric** option, the descriptive statistics are the median, distribution-free confidence intervals based on the selected alpha value, and the actual confidence levels (the closest possible confidence level to the selected alpha value given the sample size).

Statistical analysis

In the **Statistical Analysis** option, the descriptive statistics are displayed along with tests for significant differences between monitoring statuses.

- The **Parametric** analysis generates a One-Way ANOVA with a Dunnett's T-test.
- The **Nonparametric** option generates a Friedman's test with a nonparametric multiple comparison test.

See also:

Analysis setup

Analysis output samples

Analysis setup

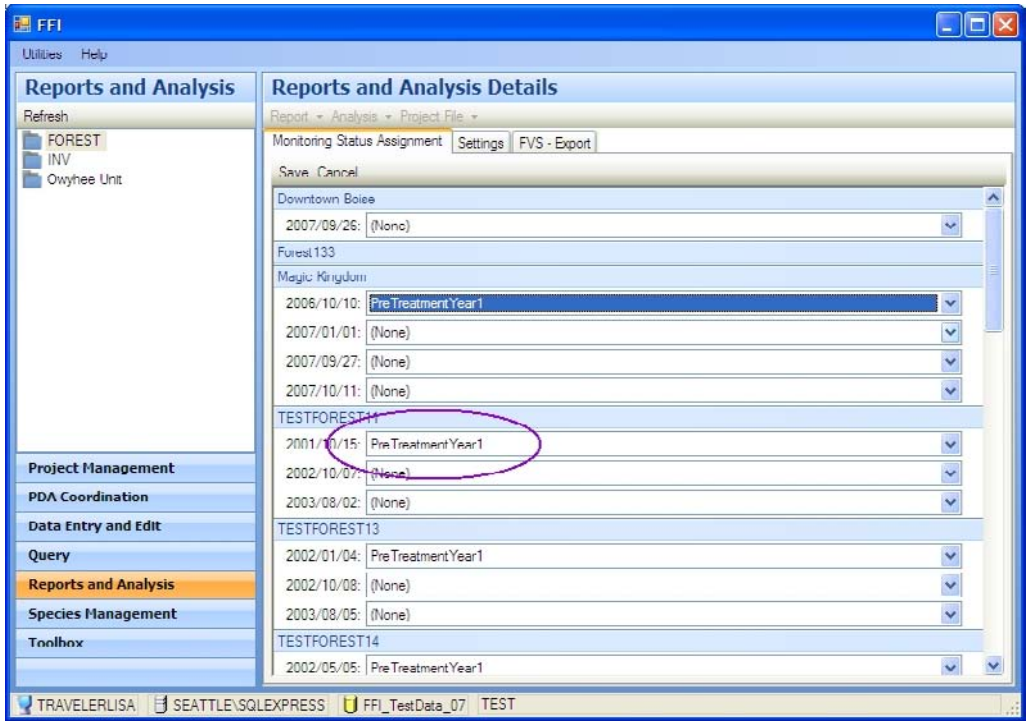
FFI offers several options to configure a statistical analysis. Select either a descriptive statistics or statistical analysis.

- A **Descriptive Statistics** analysis report will display the raw data and any summary data. If you select the **Parametric** option, the descriptive statistics are the mean, standard deviation, and confidence intervals based on the selected alpha value. If you select the **Nonparametric** option, the descriptive statistics are the median, distribution free confidence intervals based on the selected alpha value, and the actual confidence levels (the closest possible confidence level to the selected alpha value given the sample size). You can select the decimal precision of the analysis report.
- If you select the **Statistical Analysis** option, the descriptive statistics are displayed along with tests for significant differences between monitoring statuses. The parametric analysis generates a One-Way ANOVA with a Dunnett's T-test. The nonparametric option generates a Friedman's test with a nonparametric multiple comparison test. You can select the decimal precision of the analysis report.

NOTE: These analyses are further explained in the section About the analyses.

To prepare for an FFI analysis:

1. Select **Reports and Analysis** from the main FFI menu to open the **Reports and Analysis Details** window.
2. Select the desired project unit. The **Monitoring Status Assignment** window opens, listing all associated macro plots and sample events for the selected project unit.



3. Using the pull-down lists, assign an appropriate monitoring status for each sample event to be analyzed. Click **Save** when finished.

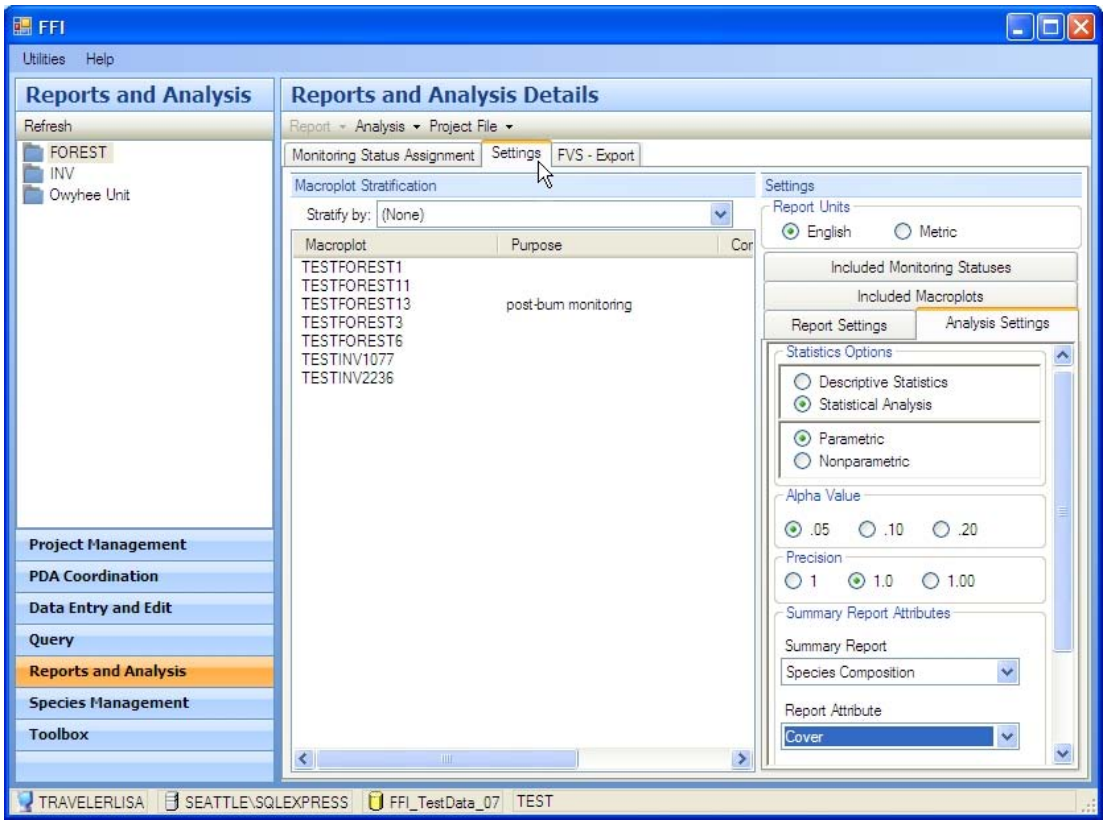
NOTE: For information on assigning monitoring status, see Monitoring status tab.

continued

Analysis setup (continued)

4. Click the **Settings** tab.
5. Use the **Stratify by:** pull-down in **Macro Plot Stratification** to select a stratification criterion, if desired.

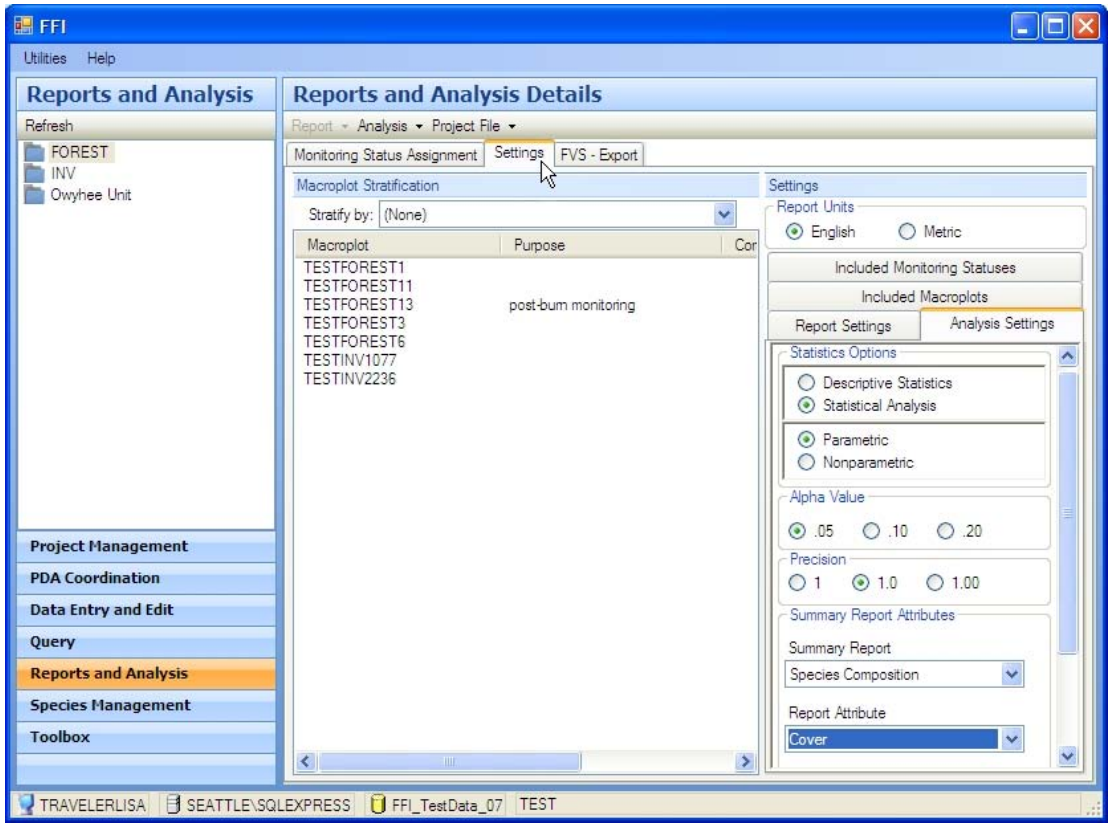
NOTE: The available stratification criteria are the organization codes, or user variables, that may have been assigned to the macro plot during creation or subsequent editing. For more information, see Creating a macro plot.



6. Select either English or metric **Report Units**.
7. Select the desired analytical parameters in the **Analysis Settings** tab.

continued

Analysis setup (continued)



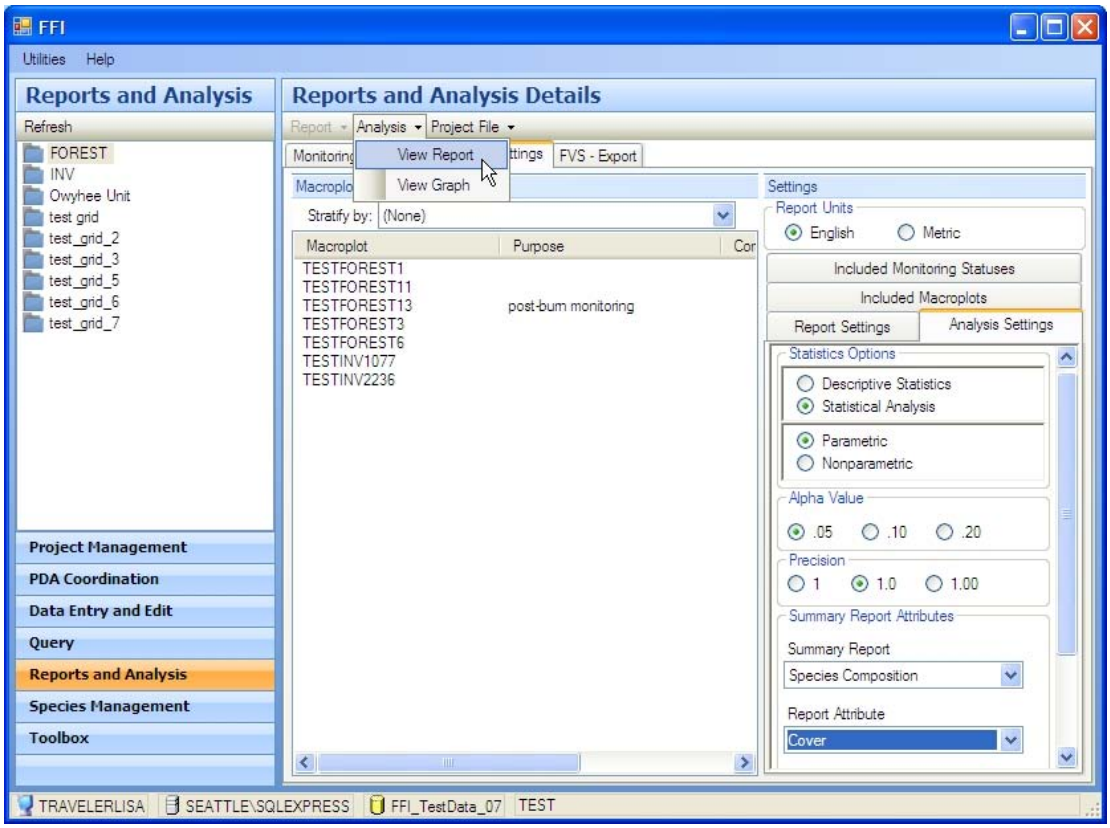
8. In the **Included Monitoring Statuses** tab, deselect any monitoring statuses that you do not wish to include in the analysis.
9. In the **Included Macro Plots** tab, deselect any macro plots that you do not wish to include in the analysis.
10. In the **Report Settings** tab, select the appropriate summary data report.
11. In the **Analysis Settings** tab:
    a. Select the desired **Statistics Options**.
    b. Select the appropriate **Alpha Value**.
    c. Select the appropriate **Precision**.
    d. Select the appropriate **Summary Report** and **Report Attributes**.
    e. If your analysis involves species data, select the appropriate **Species**
    .

continued

Running the analysis

To run the analysis and view the resulting report or graph:

1. Select **View Report** or **View Graph** in the **Analysis** pull-down menu.

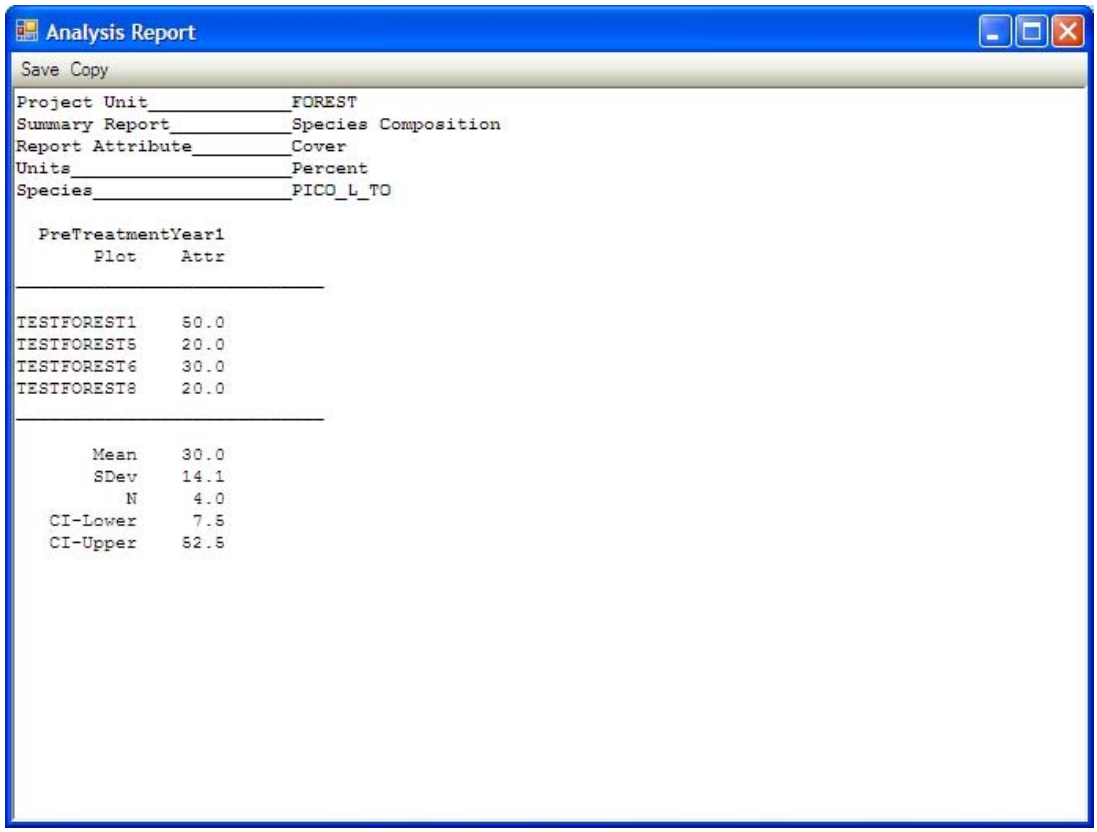


2. To see the report and graph resulting from this analysis, see Analysis results.

NOTE: See About the analyses for examples of each analysis type.

Reports and graphs can be saved and copied. To export an analysis as a Microsoft Access file, see Exporting a report. The procedure is the same.

Analysis results
Report



Analysis Report

Save Copy

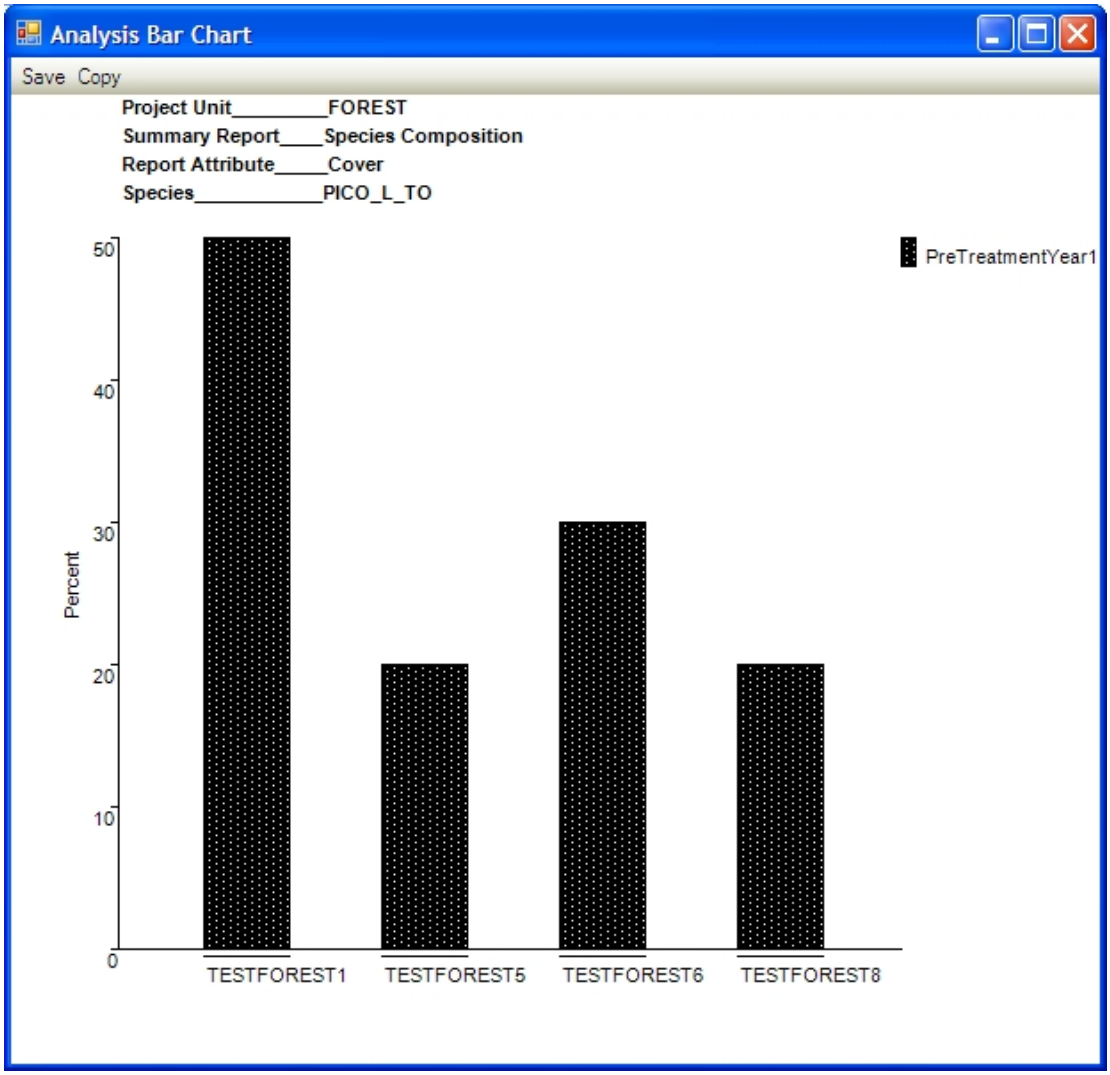
```
Project Unit_____________FOREST
Summary Report___________Species Composition
Report Attribute_________Cover
Units____________________Percent
Species__________________PICO_L_TO

  PreTreatmentYear1
       Plot     Attr
_____________________________

TESTFOREST1     50.0
TESTFOREST5     20.0
TESTFOREST6     30.0
TESTFOREST8     20.0
_____________________________

       Mean     30.0
       SDev     14.1
          N      4.0
   CI-Lower      7.5
   CI-Upper     52.5
```

Graph


Analysis Bar Chart
Save Copy
Project Unit_____FOREST
Summary Report____Species Composition
Report Attribute_____Cover
Species_____PICO_L_TO
PreTreatmentYear1
Percent
50
40
30
20
10
0
TESTFOREST1
TESTFOREST5
TESTFOREST6
TESTFOREST8

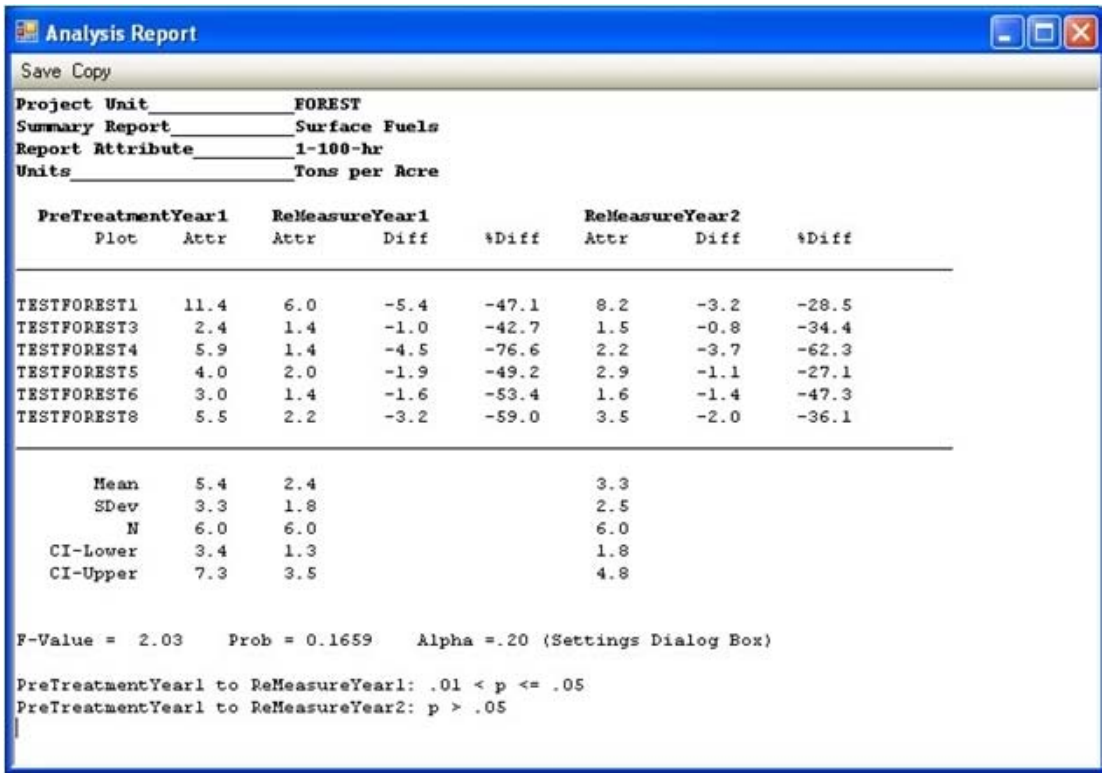
Analysis output types

This section contains examples of the reports and graphs generated in FFI:

- Parametric statistical report.
- Nonparametric statistical report.
- Parametric bar chart by strata.
- Nonparametric bar chart by strata.
- Non-stratified bar chart.

Note that reports and graphs can be saved or copied. The **Copy** button copies the report or graph to the Windows clipboard for pasting into a document. The **Save** button saves reports to a Rich Text file and graphs to a high-resolution bitmap file.

Parametric statistical reports



Analysis Report

Save Copy

```
Project Unit_____________FOREST
Summary Report___________Surface Fuels
Report Attribute_________1-100-hr
Units____________________Tons per Acre

  PreTreatmentYear1    ReMeasureYear1              ReMeasureYear2
       Plot     Attr     Attr      Diff     %Diff    Attr      Diff     %Diff
_____________________________________________________________________________

TESTFOREST1    11.4      6.0      -5.4     -47.1     8.2      -3.2     -28.5
TESTFOREST3     2.4      1.4      -1.0     -42.7     1.5      -0.8     -34.4
TESTFOREST4     5.9      1.4      -4.5     -76.6     2.2      -3.7     -62.3
TESTFOREST5     4.0      2.0      -1.9     -49.2     2.9      -1.1     -27.1
TESTFOREST6     3.0      1.4      -1.6     -53.4     1.6      -1.4     -47.3
TESTFOREST8     5.5      2.2      -3.2     -59.0     3.5      -2.0     -36.1
_____________________________________________________________________________

       Mean     5.4      2.4                         3.3
       SDev     3.3      1.8                         2.5
          N     6.0      6.0                         6.0
   CI-Lower     3.4      1.3                         1.8
   CI-Upper     7.3      3.5                         4.8


F-Value =  2.03    Prob = 0.1659    Alpha =.20 (Settings Dialog Box)

PreTreatmentYear1 to ReMeasureYear1: .01 < p <= .05
PreTreatmentYear1 to ReMeasureYear2: p > .05
```

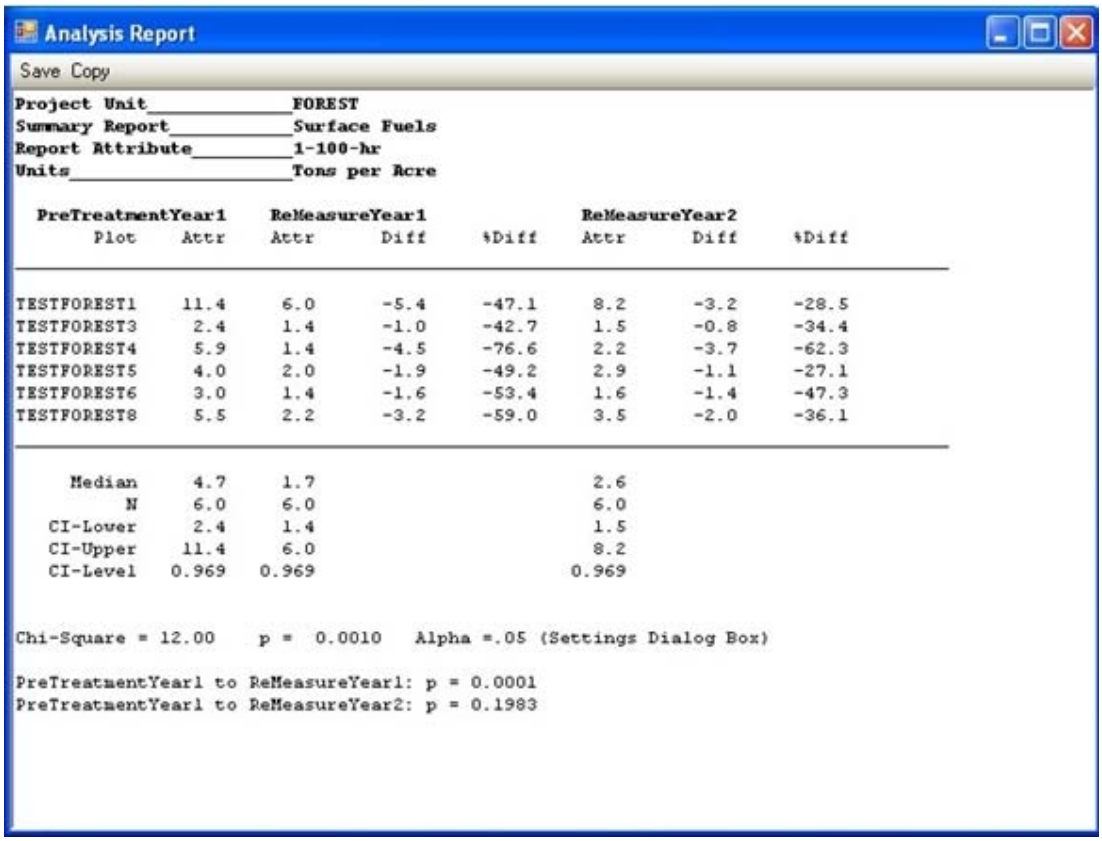
The FFI parametric statistic routine uses a one-way analysis of variance procedure for a single attribute by two or more monitoring statuses. Analysis of variance is used to test the hypothesis that several means are equal. In addition to determining that differences exist among the means, FFI determines which means differ when the ANOVA F-test indicates a significant difference. A Dunnett's pairwise multiple comparison t-test is used to compare a set of treatments against a single control mean. FFI uses the first monitoring status as the control and the subsequent sampling events as the set of treatments.

The FFI analysis report displays the attribute value for each plot and the absolute and percent difference for each value relative to the first monitoring status. The mean

values, standard deviation, and differences in mean values are displayed at the bottom of the plot attribute value table. Confidence intervals are also displayed at the bottom of the plot attribute table. The confidence level of the interval is the alpha value selected in the main analysis form. The F-statistic and associated P-value for the ANOVA table are displayed below the plot attribute table. An "S" next to an attribute mean indicates a significant difference when compared to the first sampling event using Dunnett's t-test at the 0.01 significance level. An "s" denotes significance at the 0.05 level. The pairwise comparisons between monitoring statuses and the first monitoring status are displayed at the bottom of the report.

See also Nonparametric statistical reports.

Nonparametric statistical reports



Analysis Report

Save Copy

Project Unit_____FOREST
Summary Report_____Surface Fuels
Report Attribute_____1-100-hr
Units_____Tons per Acre

	PreTreatmentYear1	ReMeasureYear1			ReMeasureYear2		
Plot	Attr	Attr	Diff	%Diff	Attr	Diff	%Diff
TESTFOREST1	11.4	6.0	-5.4	-47.1	8.2	-3.2	-28.5
TESTFOREST3	2.4	1.4	-1.0	-42.7	1.5	-0.8	-34.4
TESTFOREST4	5.9	1.4	-4.5	-76.6	2.2	-3.7	-62.3
TESTFOREST5	4.0	2.0	-1.9	-49.2	2.9	-1.1	-27.1
TESTFOREST6	3.0	1.4	-1.6	-53.4	1.6	-1.4	-47.3
TESTFOREST8	5.5	2.2	-3.2	-59.0	3.5	-2.0	-36.1
Median	4.7	1.7			2.6		
N	6.0	6.0			6.0		
CI-Lower	2.4	1.4			1.5		
CI-Upper	11.4	6.0			8.2		
CI-Level	0.969	0.969			0.969		

Chi-Square = 12.00 p = 0.0010 Alpha =.05 (Settings Dialog Box)

PreTreatmentYear1 to ReMeasureYear1: p = 0.0001
PreTreatmentYear1 to ReMeasureYear2: p = 0.1983

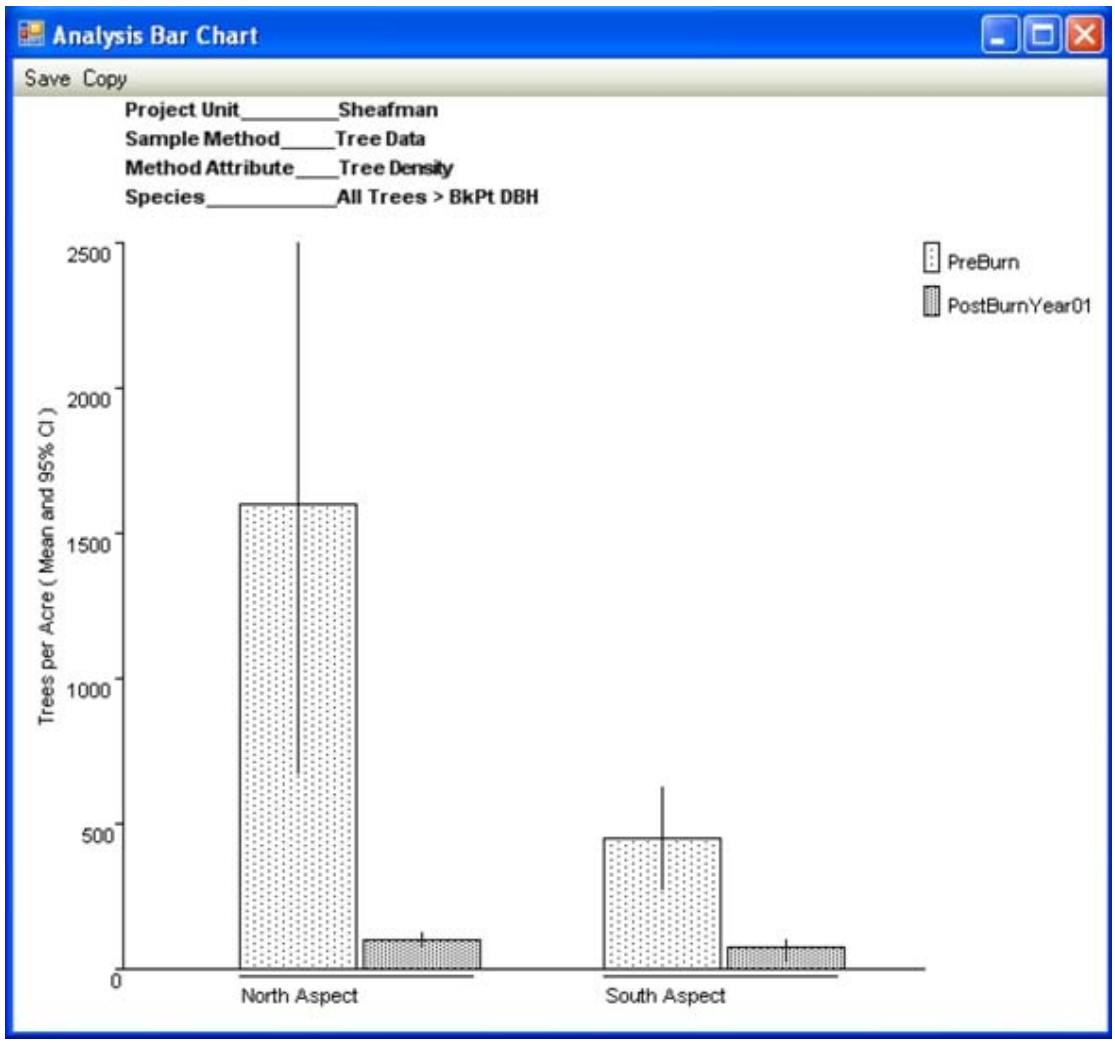
The FFI nonparametric statistic routine uses a Friedman's test for a single attribute by two or more sampling events. Friedman's test is a nonparametric analysis of variance used for randomized block or repeated measures experimental designs. The analysis is performed by using ranks (not the actual data) and is useful with data that do not meet the parametric analysis of variance assumptions. Data is ranked within a block (plot) among treatments (sample events). Friedman's analysis of variance is used to test the hypothesis that several treatments (sample events) are equal. In addition, a nonparametric multiple comparison test based on Friedman rank sums is used to compare a set of treatments against a single control mean. FFI uses the first monitoring status as the control and the subsequent sampling events as the set of treatments.

The FFI analysis report displays the attribute value for each plot and the absolute and percent difference for each value relative to the first monitoring status. The median

values and differences in median values are displayed at the bottom of the plot attribute value table. Confidence intervals are also displayed at the bottom of the plot attribute table. The confidence level for the confidence interval is determined by the user in the main analysis form. For example, an alpha value of 0.05 will generate a 95% confidence interval. However, since distribution-free confidence intervals are based on integer numbers of order statistics (positions of ordered data around the median) the actual confidence level is slightly greater than the user-specified level. FFI displays the actual confidence level along with the upper and lower limits. The Friedman chi-square statistic and associated P-value are displayed below the plot attribute table. The pairwise comparisons between monitoring statuses and the first monitoring status are displayed at the bottom of the report.

Parametric statistics bar chart by strata

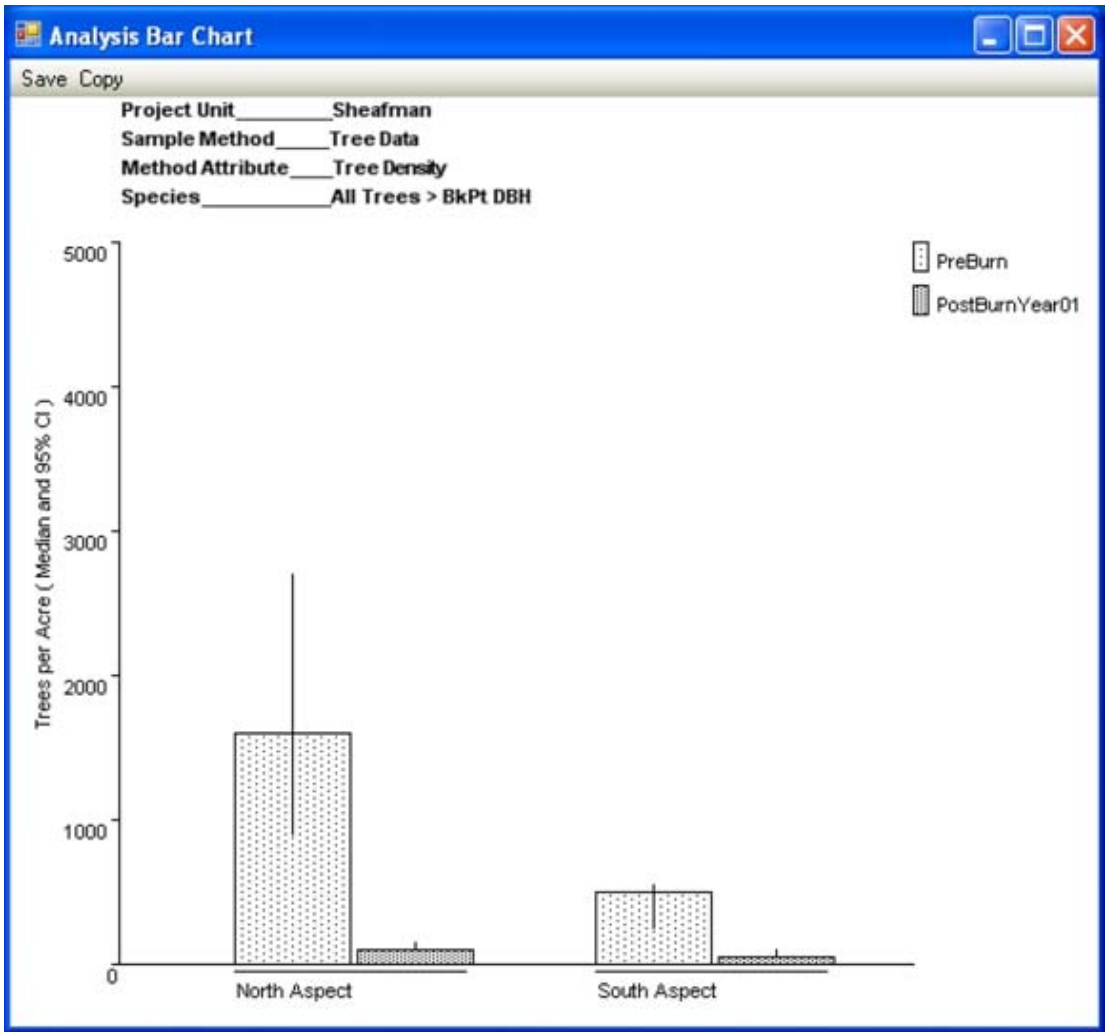
If you choose to stratify macro plots, FFI displays a stratified bar chart. If you select the **Parametric** option under **Statistics Options**, the graph displays the mean value by strata for each monitoring status and the confidence intervals associated with the selected alpha value.



See also Nonparametric bar chart by strata and Non-stratified bar chart.

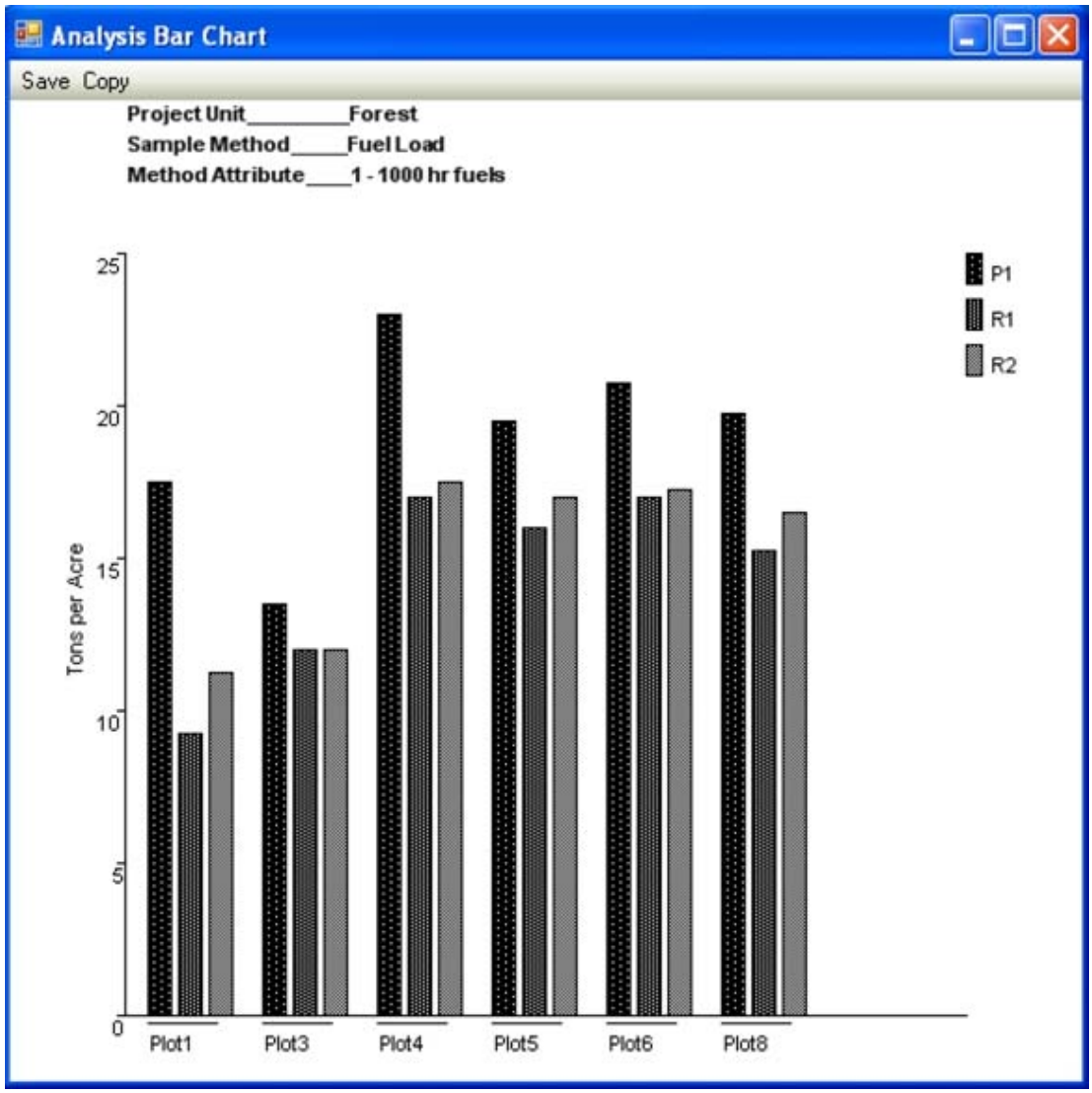
Nonparametric statistics bar chart by strata

If you choose to stratify macro plots, FFI displays a stratified bar chart. If you select the **Nonparametric** option in the main **Analysis** window, the graph displays the median value by strata for each monitoring status and the distribution-free confidence intervals associated with the selected alpha value.



Bar chart using non-stratified data

If you choose to not to stratify macro plots, FFI displays a bar chart of your plot data. The values displayed on the chart are the values for each plot by monitoring status.


Analysis Bar Chart
Save Copy
Project Unit_____Forest
Sample Method_____Fuel Load
Method Attribute____1 - 1000 hr fuels
Tons per Acre
25
20
15
10
5
0
P1
R1
R2
Plot1
Plot3
Plot4
Plot5
Plot6
Plot8

Species management

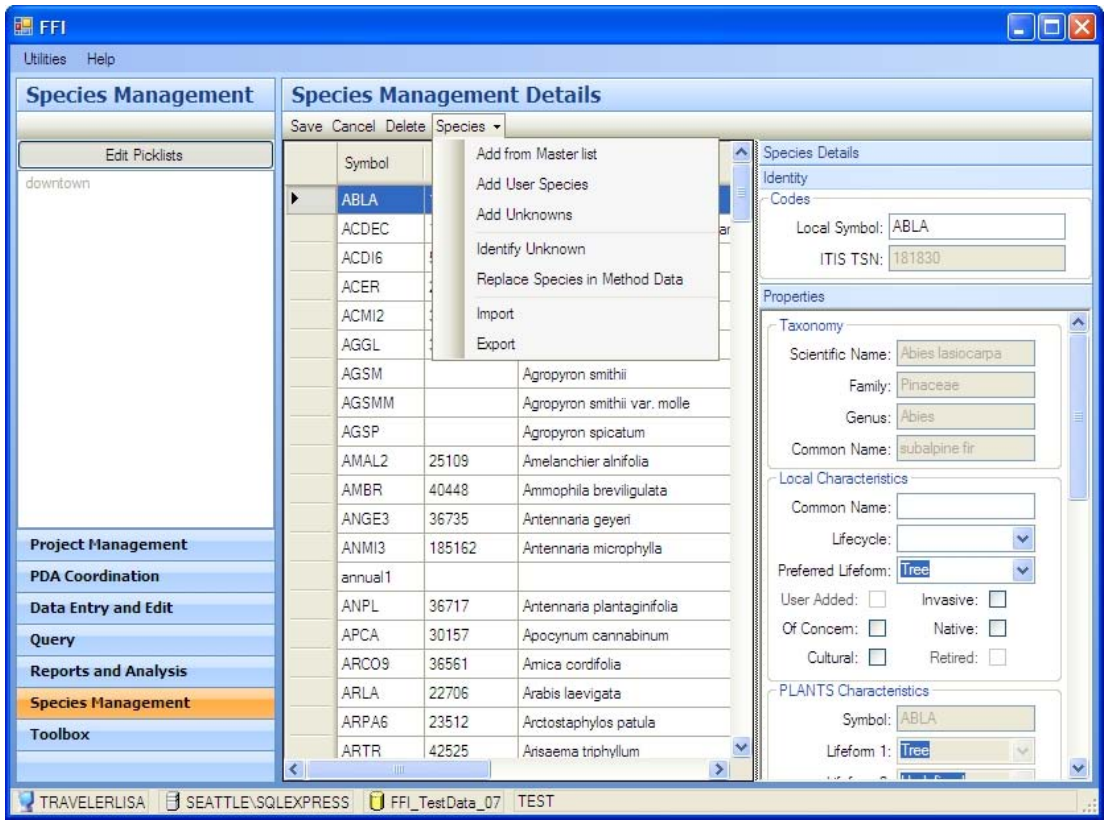
FFI's Species Management component incorporates the Natural Resources Conservation Service (NRCS) PLANTS database, from which you can create a local species list for an administrative unit. The PLANTS database is searchable by symbol, scientific, and common name, and addresses vascular plants, mosses, liverworts, hornworts, and lichens of the U.S. and its territories. For further information, visit http://plants.usda.gov.

In Species Management, you can:

- Add from Master list - create a local species list for an administrative unit by selecting species from the PLANTS database.
- Add User Species - add up to 100 local species not identified in the PLANTS database, which can be used to represent substrates or generic classifications.
- Add Unknowns - add placeholder species for use in the field.
- Identify Unknown - replace an unknown species with a species from the PLANTS database or a known local species.
- Replace Species in Method Data - replace the identifier for either an unknown or a known species after data has been collected for that species in the field without affecting the data.
- Export - export species lists for use by other administrative units.
- Import - import FFI species lists representing other administrative units, or import converted FEAT or FIREMON species lists.
- Work with Picklists - create and manipulate picklists for field projects.

The basic Species Management interface and menu options are shown below. **Save**, **Cancel**, and **Delete** functions are available from the **Species Management Details** window toolbar.

*NOTE: The horizontal button in the left-hand pane is used to toggle between the **Edit Local Species** and **Edit Picklists** functions, which are addressed later in this section.*



Internally, FFI tracks each species with a Globally Unique Identifier (GUId). Any species that you add to your local species list, including user-defined species that you enter by hand, will have the same GUId across all of your FFI databases. As you record field data, species observations will be tied to the species list using the GUId. This means that edits in the species list will carry over to all existing data.

Return to Using FFI main page.

Creating a local species list

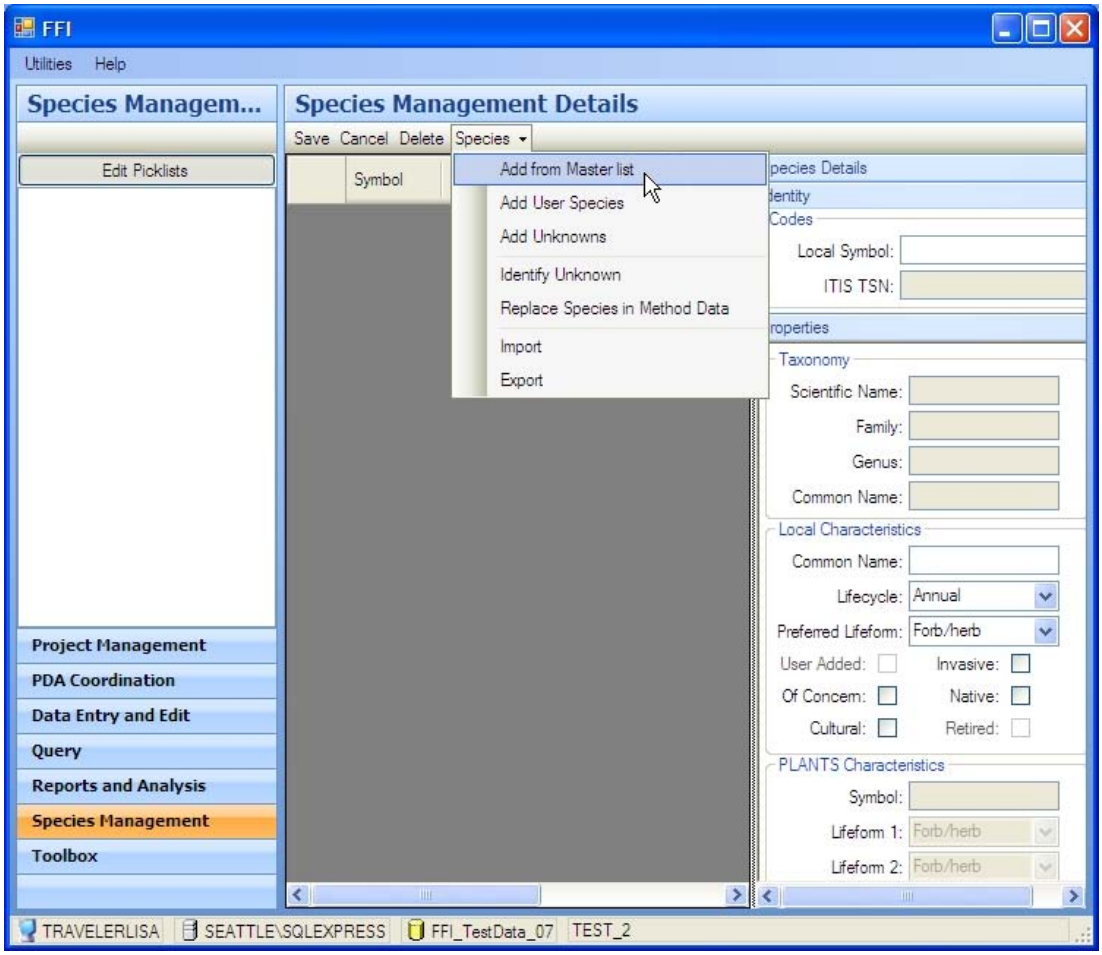
You can create a new local species list for your administrative unit by:

- Adding individual species from the NRCS PLANTS database (the master list).
- Entering user species from scratch.
- Converting and importing existing species lists from FEAT or FIREMON.

Adding species from the master list

To build a local species list by selecting entries from the NRCS PLANTS database:

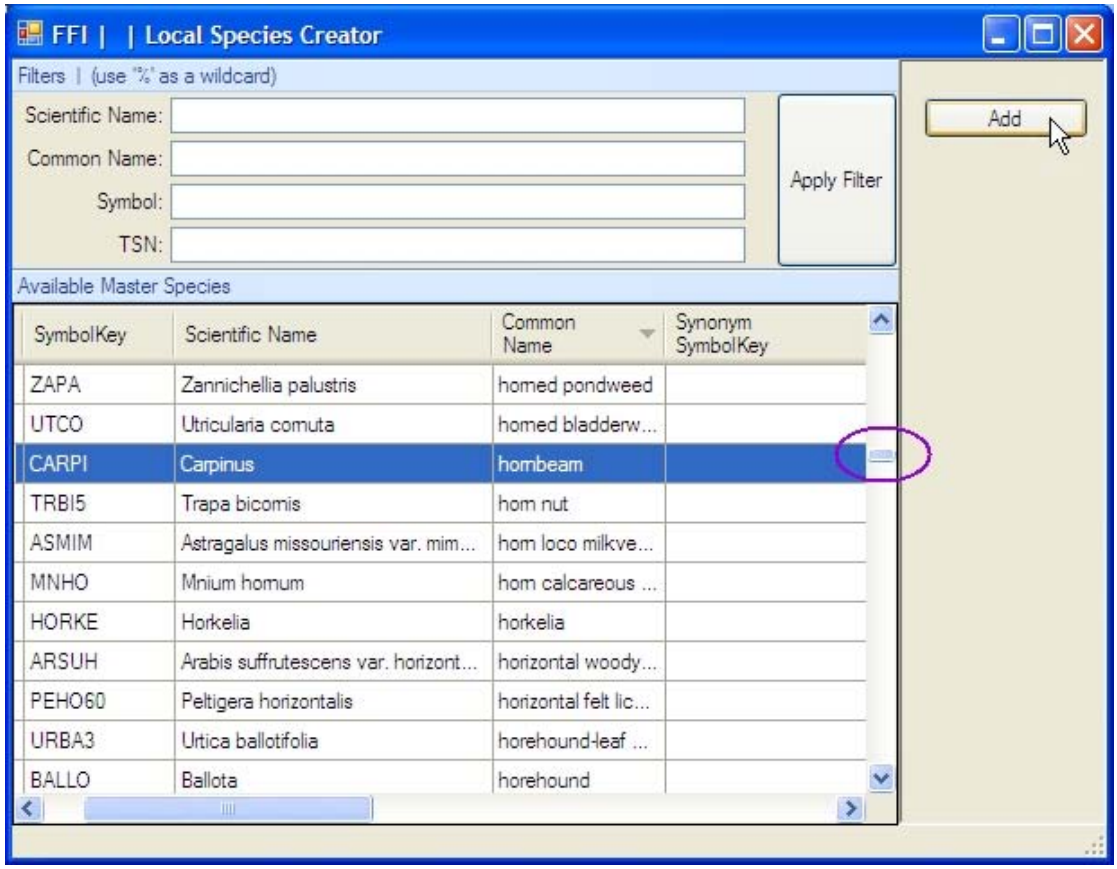
1. Open the **Species Management** window. The **Species Management Details** window opens.
2. Select **Add from Master list** in the **Species** pull-down menu.



continued

Adding species from the master list (continued)

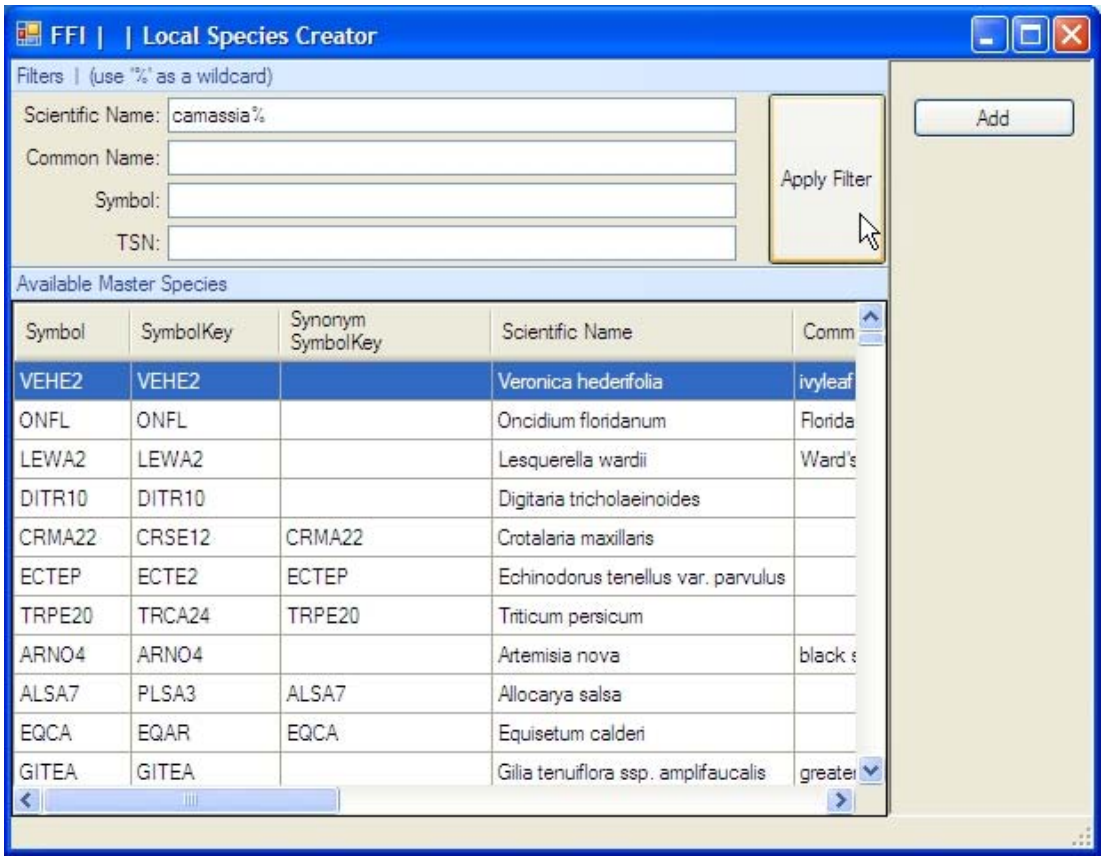
3. The **Local Species Creator** form opens. You can select species either by *scrolling through* the complete PLANTS list or by *filtering* the complete list.
4. To select species by *scrolling*, scroll through the list and select plants of interest. Use the CTRL key to select more than one species. When you are done, click **Add** to add the selected species to your species list.



NOTE: Click on any column heading to order that column alphabetically. Drag and drop column headings to change the order in which the columns appear.

5. To add species by *filtering*, enter your filter criteria - scientific or common name, plant symbol, or TSN. In this example, `camassia` is used with the wildcard `%`. When you are ready, click **Apply Filter**.

NOTE: The PLANTS database contains a series of codes, prefaced with the number 2, for generic species and substrates. To locate and add a generic or substrate, see

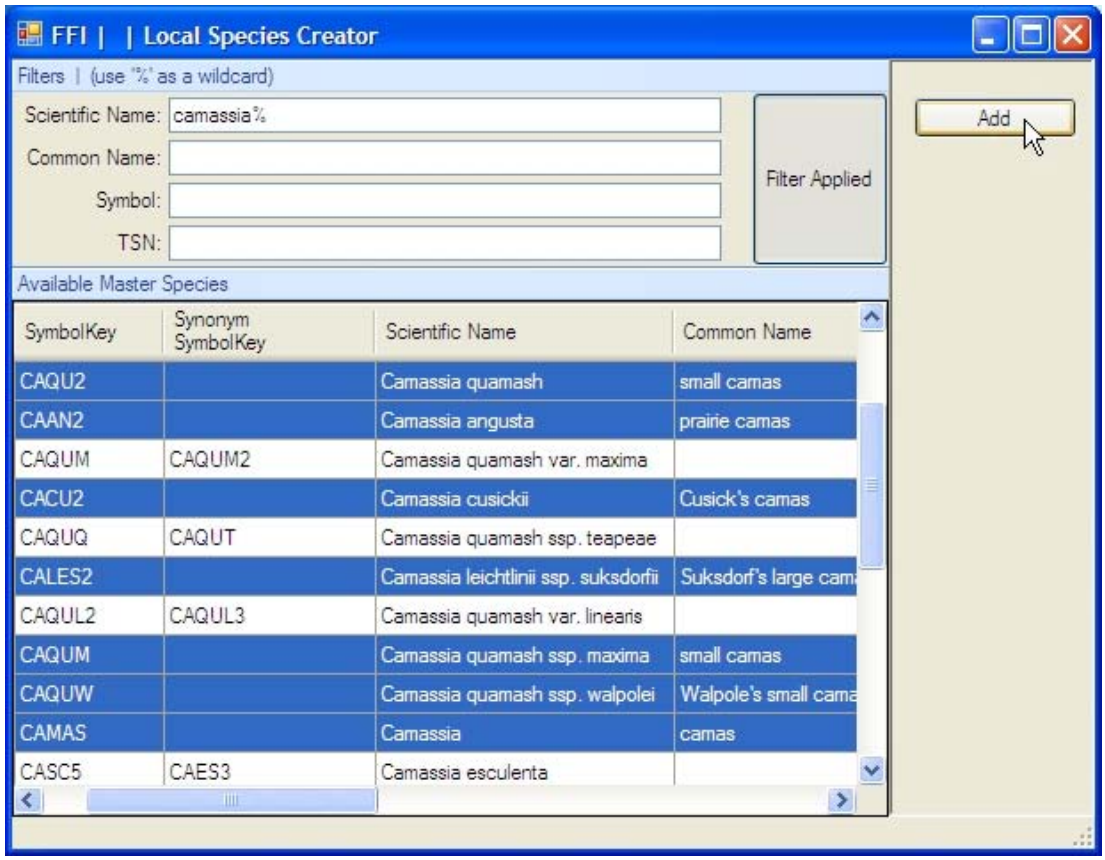


NOTE: The PLANTS database contains approximately 90,000 records. Pick your filter criteria with care, and be prepared to wait a moment or two for the command to be executed.

continued

Adding species from the master list (continued)

6. The resulting filtered list, shown below, contains all of the `camassia` species in the PLANTS database. Make your selections by scrolling through the filtered list. Use the CTRL key to select more than one entry.
7. Click **Add** to add your selections to the local list.

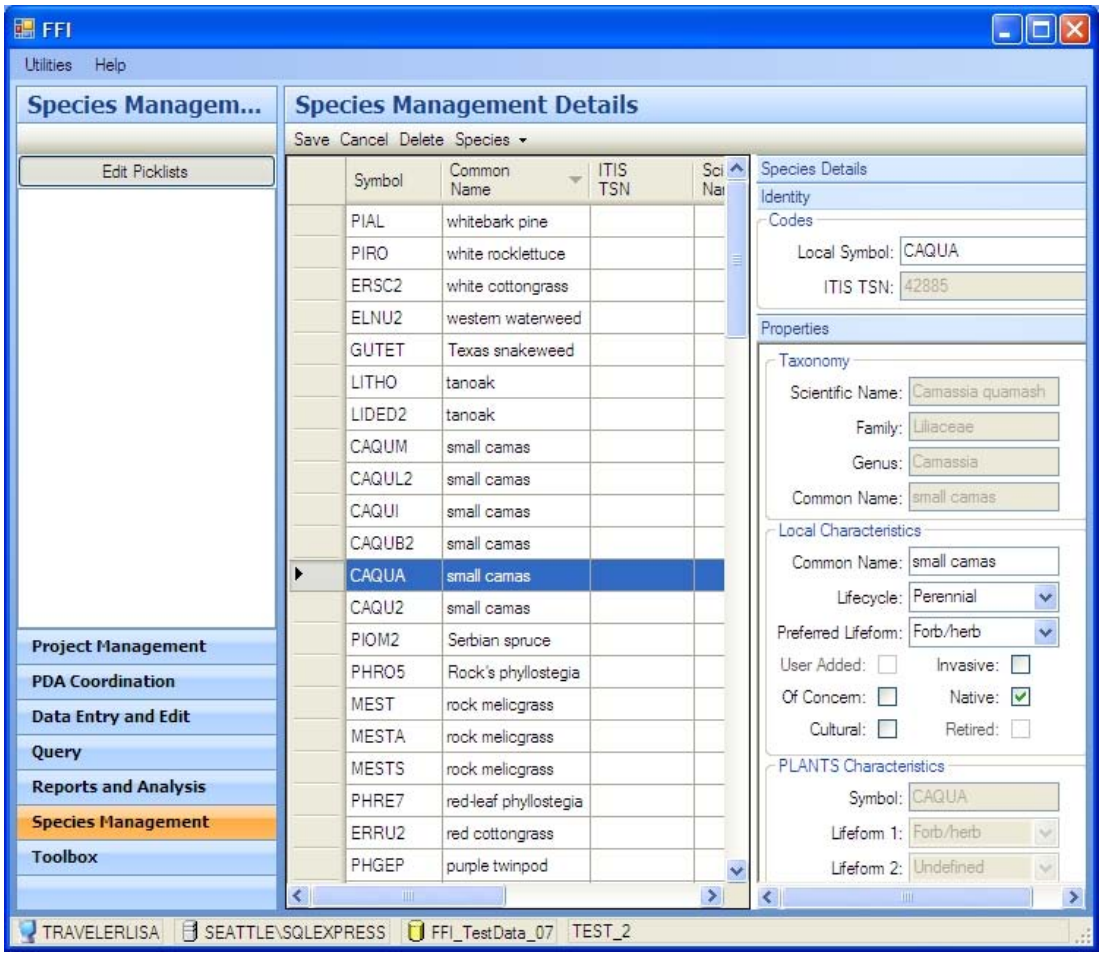


continued

Adding species from the master list (continued)

The resulting local species list appears in the central pane of the **Species Management** window, as shown here. You can:

- Scroll horizontally through the list to view all fields.
- Drag and drop column headings to rearrange the list to suit your needs.
- Click any entry to display **Identity** and **Properties** data for that species.



*NOTE: The **Local Characteristics** data can be edited. Make any necessary changes to the data to reflect local conditions, and click **Save**.*

See also Editing a species list.

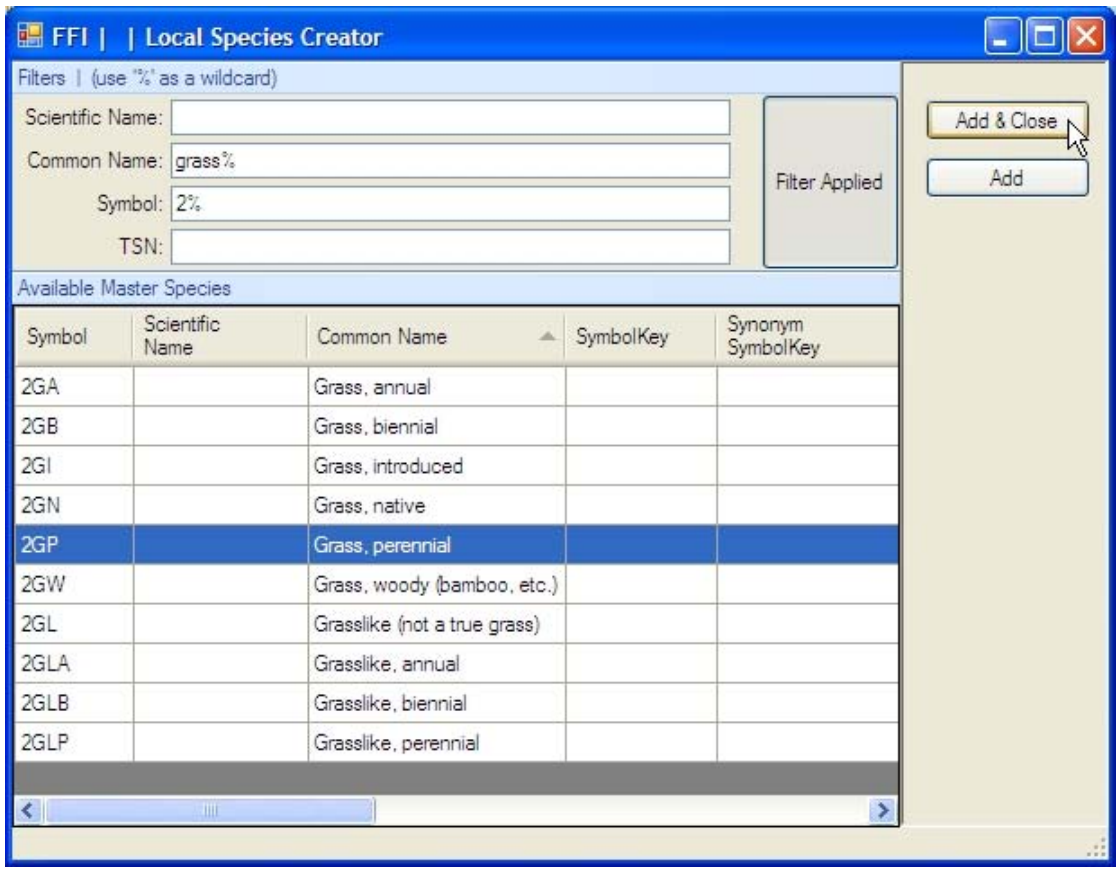
Locating and adding generics and substrates

The PLANTS database contains a set of symbols and descriptive common names for generic substrates and plant categories such as 'deciduous tree' or 'herbaceous vine' that are useful in survey, monitoring, and inventory work. These symbols and categories are widely used by a number of federal agencies.

NOTE: See Adding user species for incorporating your own generic substrates and plants to the species list.

To locate and add a generic species or substrate from the PLANTS database to your species list:

1. Enter `2%` as the **Symbol** search criterion.
2. Enter any other search criteria to focus the search. In this example, `grass%` is being used as a search criteria.
3. Scroll through the resulting list to select the desired symbol.
4. Click **Add & Close** to add the selected symbol to the local species list.



Converting and importing species lists

Your existing FEAT and FIREMON databases must be converted and imported in order to work with FFI. Please contact your FEAT or FIREMON administrator or request help on the FFI Google Discussion Group to make arrangements for your databases to be converted.

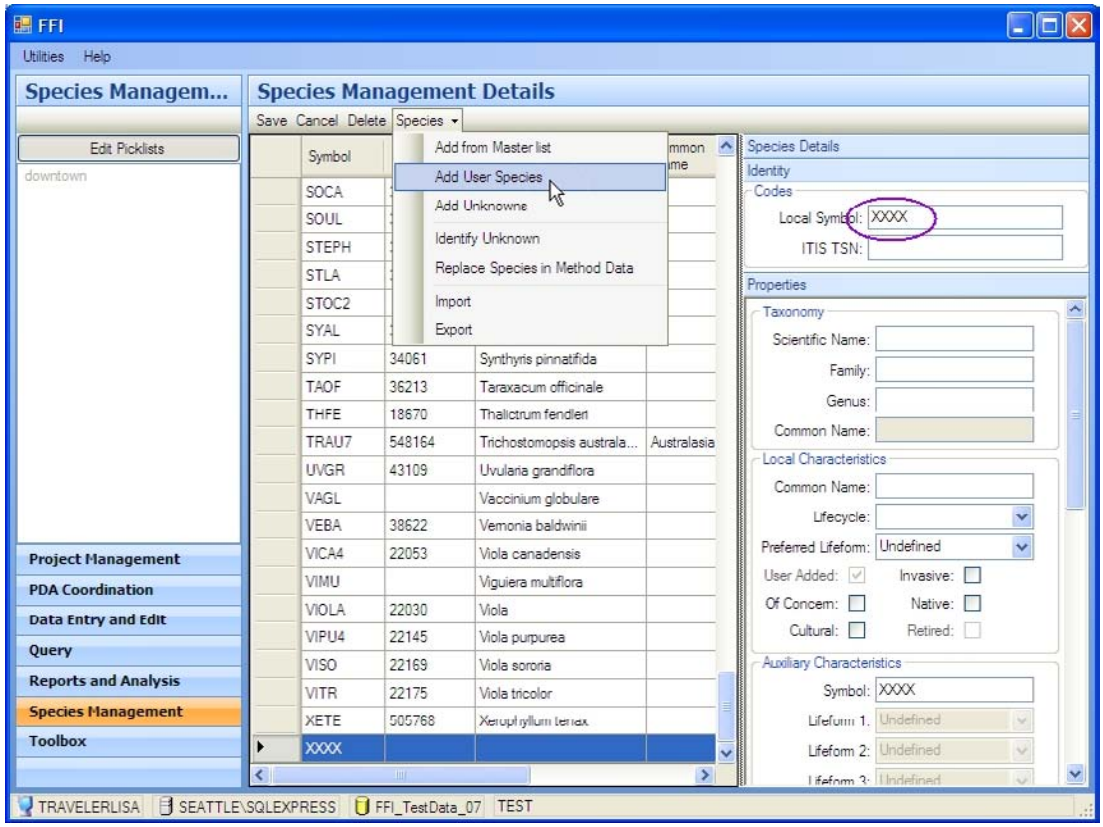
Adding user species

You can easily add species that occur locally but that are not found in the PLANTS master list. Also, you can create species that represent substrates, such as rocky soils, or you can create generic, non-taxonomic identifiers, like "fern".

NOTE: The PLANTS database contains a comprehensive catalog of generic substrates and plants that may be useful to you. See [Locating and adding generics and substrates](#) for incorporating PLANTS database generics to the species list.

To add a user species to your local species list:

1. Open the **Species Management** window.
2. Select **Add User Species** in the **Species** pull-down menu. A new blank row is added at the end of the local list.



3. In the **Species Details - Identity** box, replace the default XXXX code with a code that is meaningful to you.

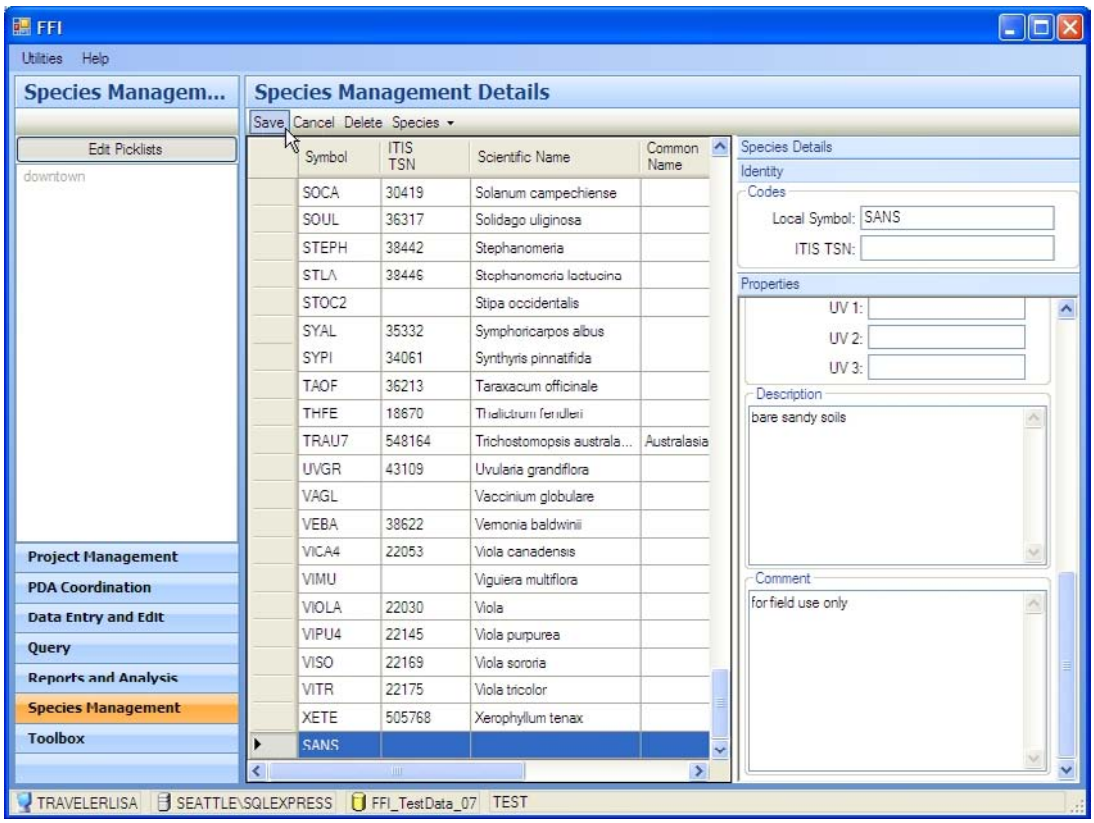
NOTE: Check the new code that you want to assign against the codes in the PLANTS database to ensure that, for example, a code you assign does not already represent a known plant in the database.

[continued](#)

Adding user species (continued)

4. In the right-hand pane of the **Species Management** window, add as much information as possible to describe the species or identifier. (Be sure to scroll all the way down the pane to complete the **Description** and **Comment** text fields.)

In this example, the code SANS, representing bare sandy soils, does not occur in the PLANTS database.



5. Click **Save** in the **Species Management Details** window toolbar. In this example, the new species SANS appears at the bottom of the species list.

NOTE: Click any column heading to order that column alphabetically. Drag and drop column headings to change the order in which the columns appear.

Return to Species management

Working with unknowns

An **unknown** is a placeholder that can be used to represent a species that you did not expect to encounter or cannot identify, and that is therefore not included in your species list. FFI lets you easily create and then replace unknowns.

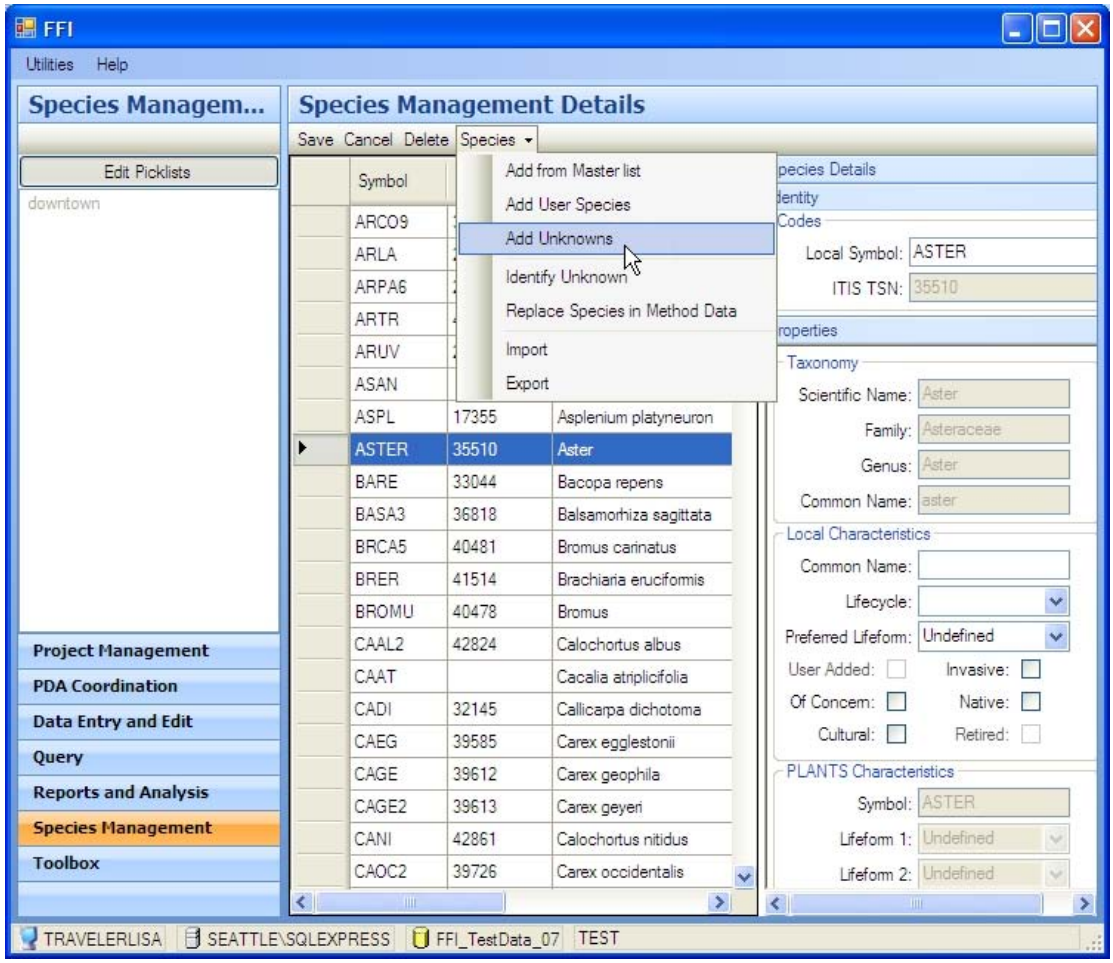
This section addresses:

- Adding unknowns to the local species list.
- Identifying unknowns.
- Replacing unknowns in method data.

Adding unknowns to the local species list

You can add up to 999 unknown species to your species list to accommodate the needs of your field work. To add unknowns to the local species list:

1. In the **Species Management** window, select **Add Unknowns** in the **Species** pull-down menu.



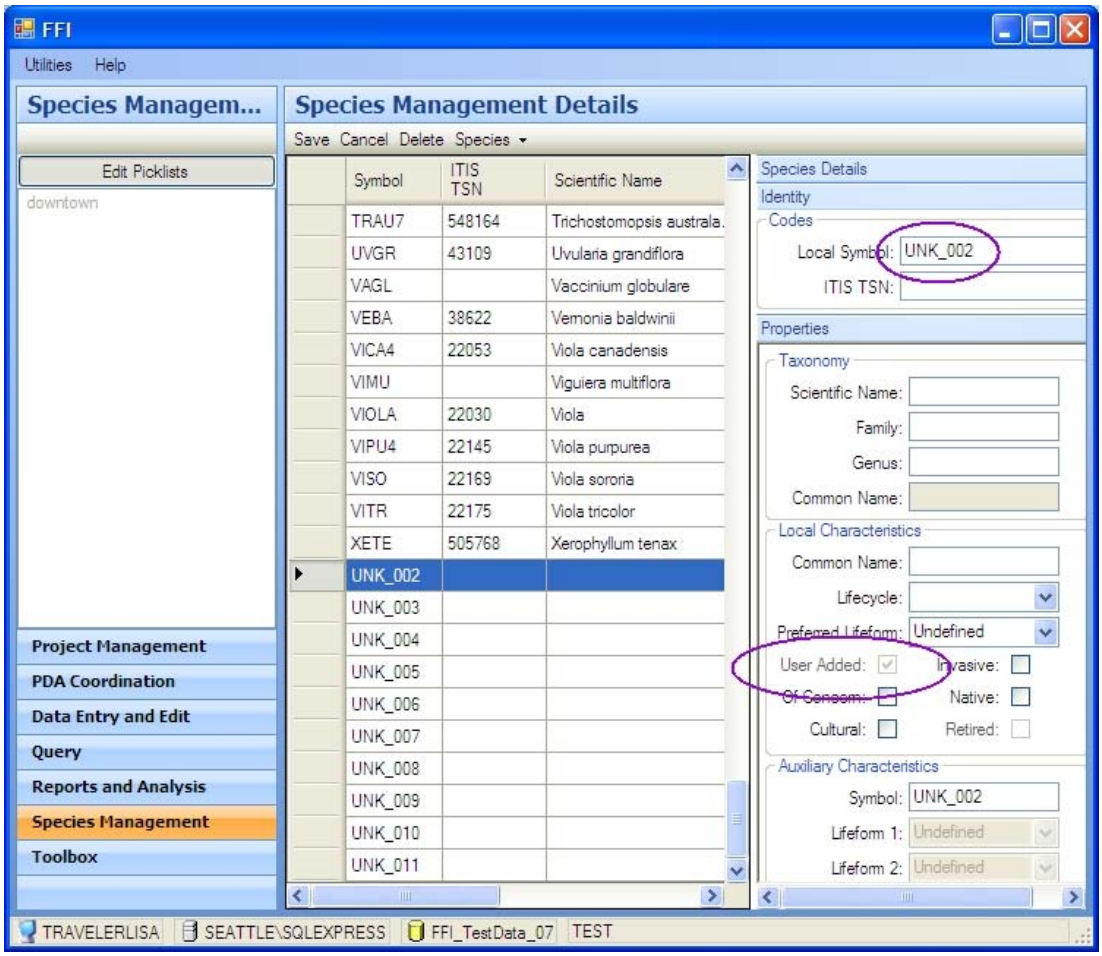
2. The **Add Unknowns** box opens. In the box, stipulate the first number to be used, and stipulate how many unknowns you wish to add to the local list. In this example, 10 unknowns will be added, and the first one will be numbered 2. Click **OK**.

continued

Adding unknowns (continued)

3. Ten unknown species are added to the local species list, as shown below. The first unknown is coded in the default numbering format as UNK_002. UNK_002 is shown as the **Local Symbol** in the **Codes** box in **Species Details**, and refers to the local plant code.

*NOTE: The **User Added** box is automatically checked.*



NOTE: You can either accept the default numbering format or use your own identification code for unknowns. Be aware that if you accept the default, the symbol may be identical to that of unknowns added to other administrative unit species lists.

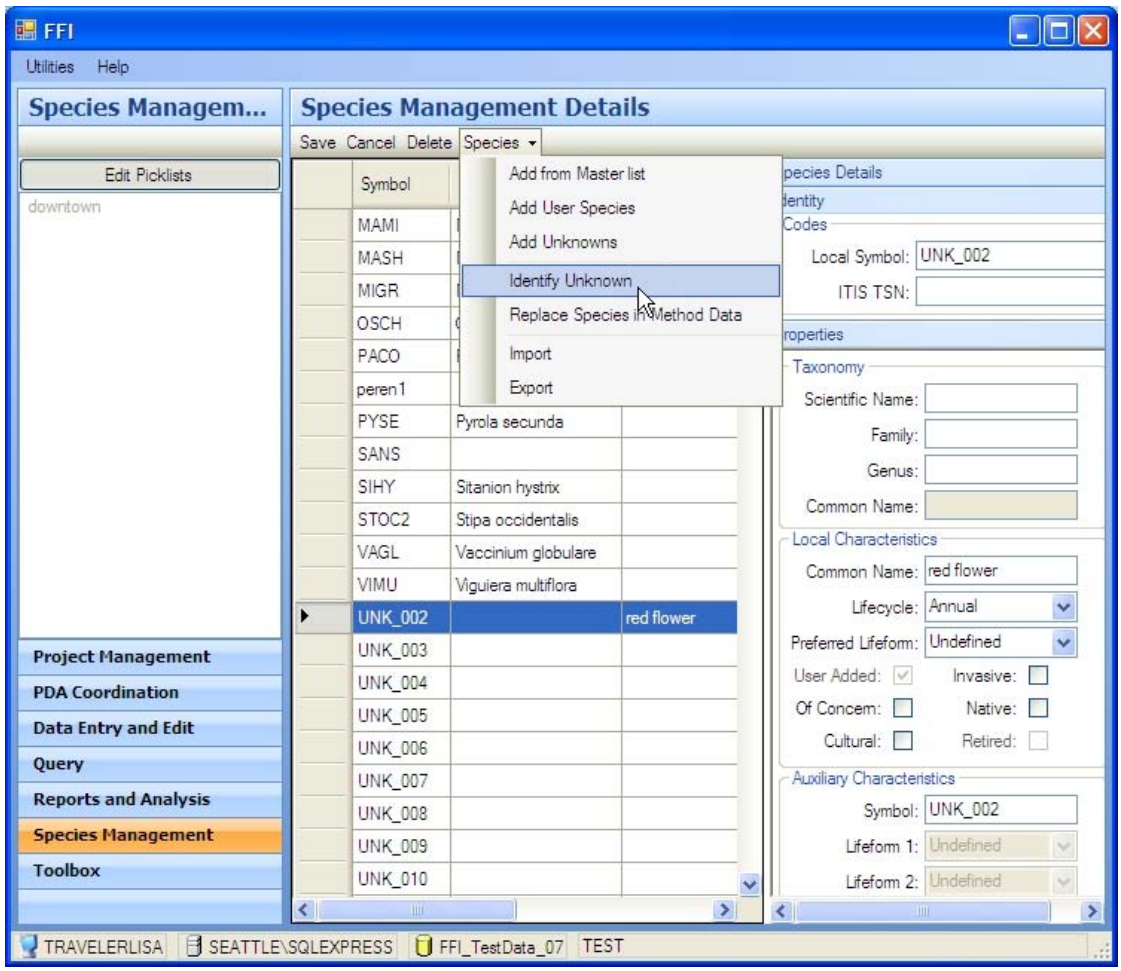
4. Edit the symbol and enter any information you have for the unknown species in the right-hand pane of the **Species Management Details** window. Scroll down through the pane to see all available information fields.
5. When you are done, click **Save** to save your work.

continued

Identifying unknowns

When you are able to identify an unknown species, you can easily replace it with the correct species.

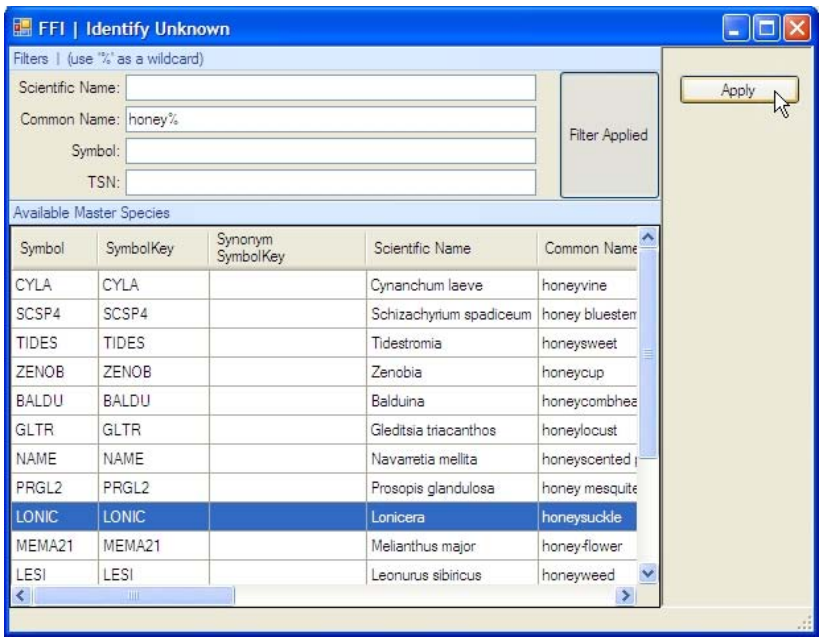
1. In the **Species Management Details** window, highlight the unknown you wish to replace.
2. Select **Identify Unknown** in the **Species** pull-down menu.



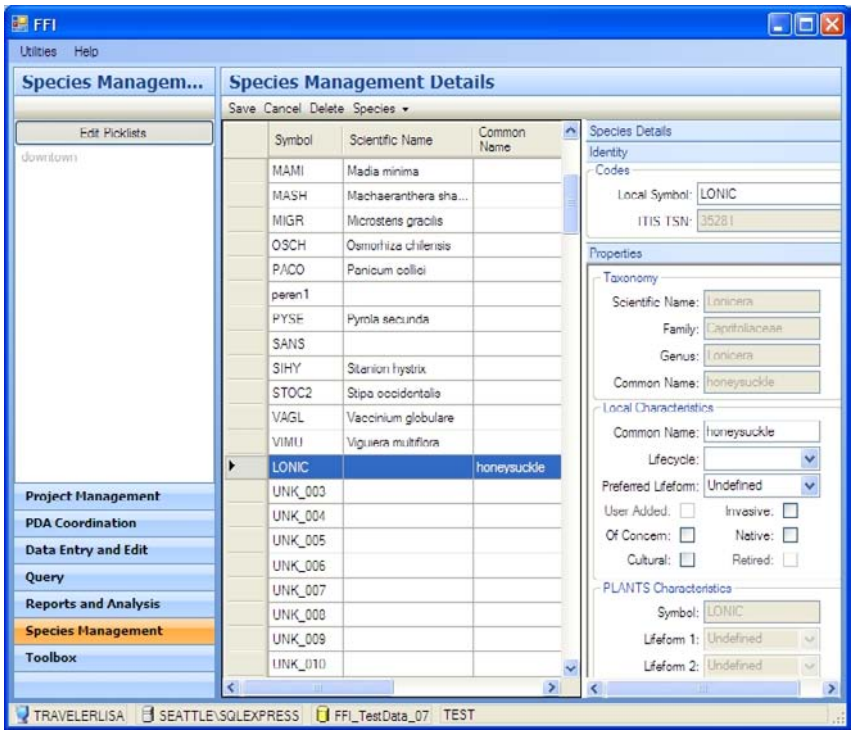
continued

Identifying unknowns (continued)

3. The **Identify Unknown** window opens. By filtering or scrolling, locate and highlight the correct species. Click **Apply**.



4. The unknown is replaced with the correct species. Note that the **Species Details** in the right-hand pane are updated to reflect the correct species.



continued

Replacing species in method data

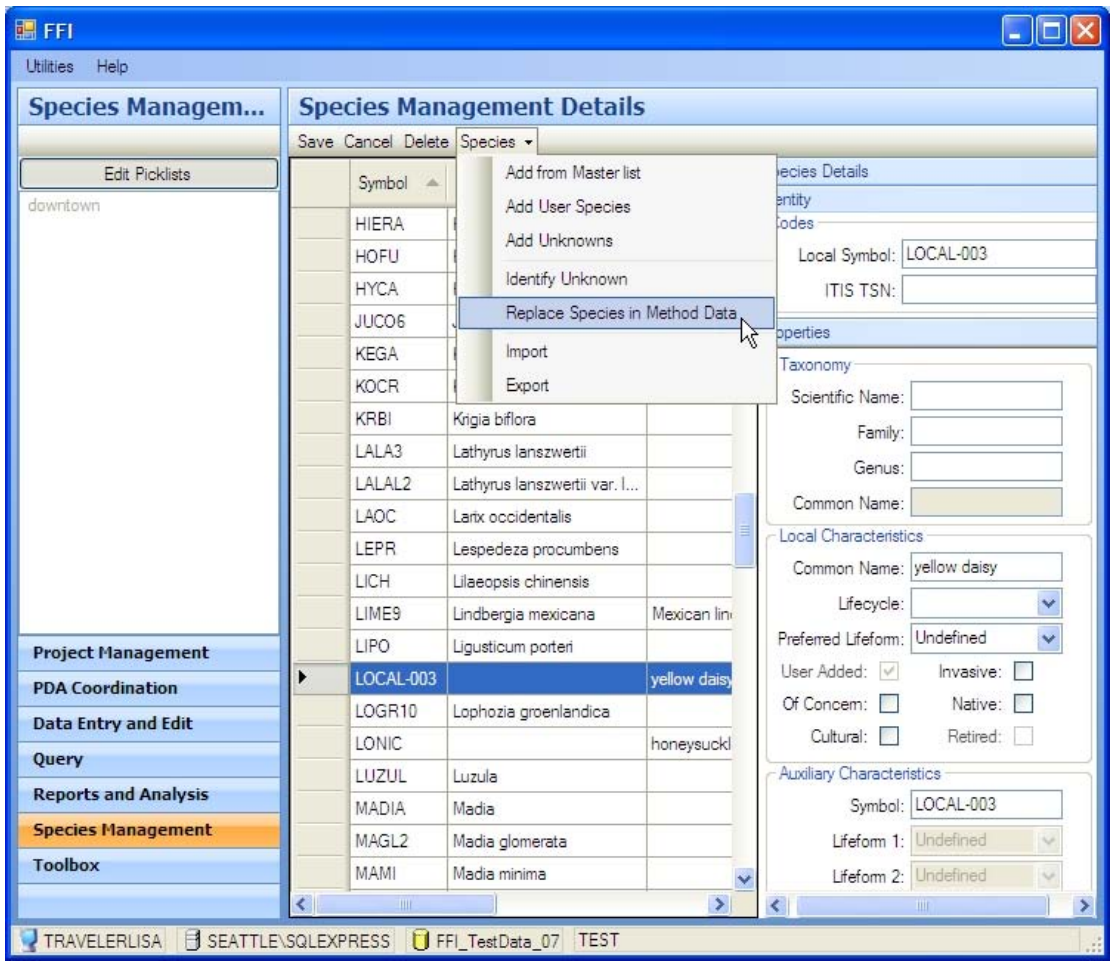
If you collect data for a species in the field but later determine that the species was incorrectly identified, you can replace it with the correct species from your local species list. However, note that this procedure involves risk to existing data. Try to use the Identifying Unknowns function if possible. If you must use the Replace Species in Method Data procedure, be sure to carefully limit the scope of the replacement.

The following procedure will replace the name of the misidentified species only. All data collected during sampling remains intact.

NOTE: If the correct species is not already on your local species list, add it before you follow this procedure.

To replace an unknown for which you have collected field data:

1. Back up your database.
2. In the **Species Management Details** window, select the species to be replaced.
3. Select **Replace Species in Method Data** from the **Species** pull-down menu.



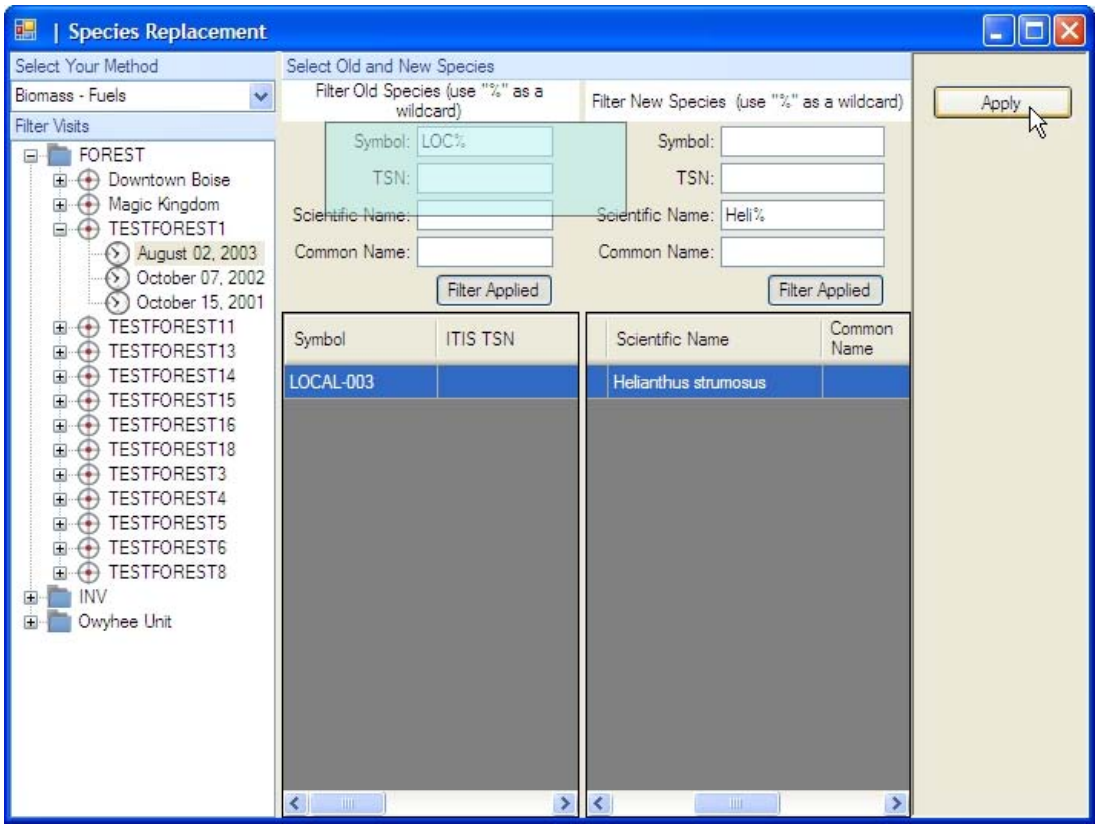
continued

Replacing species in method data (continued)

3. The **Species Replacement** window opens. Enter the appropriate criteria:
    - In the **Select Your Method** pull-down list, select the method for which data needs to be replaced.
    - In the **Filter Visits** tree view, select the applicable project unit, macro plot, and sample event.

    NOTE: If you select the project unit, all sample events within that unit will be changed. If you select the macro plot, all sample events in that plot will be updated. To update several, but not all, sample events within a macro plot, you will need to update each sample event individually.

    - By scrolling or filtering, select the species to be replaced (the **Old Species**; LOCAL-003 in this example) and the correct species (the **New Species**; in this example, a member of the `helianthus` family).



4. Click **Apply**.

Exporting and importing species lists

FFI species lists and their associated picklists can be exported and imported as *.xml files for use by other administrative units. During export and import, species are matched by PLANTS database symbol.

NOTE: Species lists and their picklists are exported and imported in a single operation.

- You can import a species list from another administrative unit to apply to your own administrative unit, even if your own species list already exists.
- If another administrative unit contains similar species to your administrative unit, you can save time and effort by importing that unit's existing local species list instead of creating a new list from scratch. After import, you can edit the list as needed.
- When you import a species list, all picklists associated with the administrative unit are also imported. You can edit or delete the imported picklists.
- If you already have a local species list that contains a species from the PLANTS list, FFI will not import that particular species, thereby preventing duplication.
- Picklists are also matched by species symbol, so if your local list already includes a particular species that is included in an imported picklist, the species will appear.
- If you already have a picklist that has the same name as a picklist in the export file that you are importing, your existing list will be retained and not replaced.

For information, see:

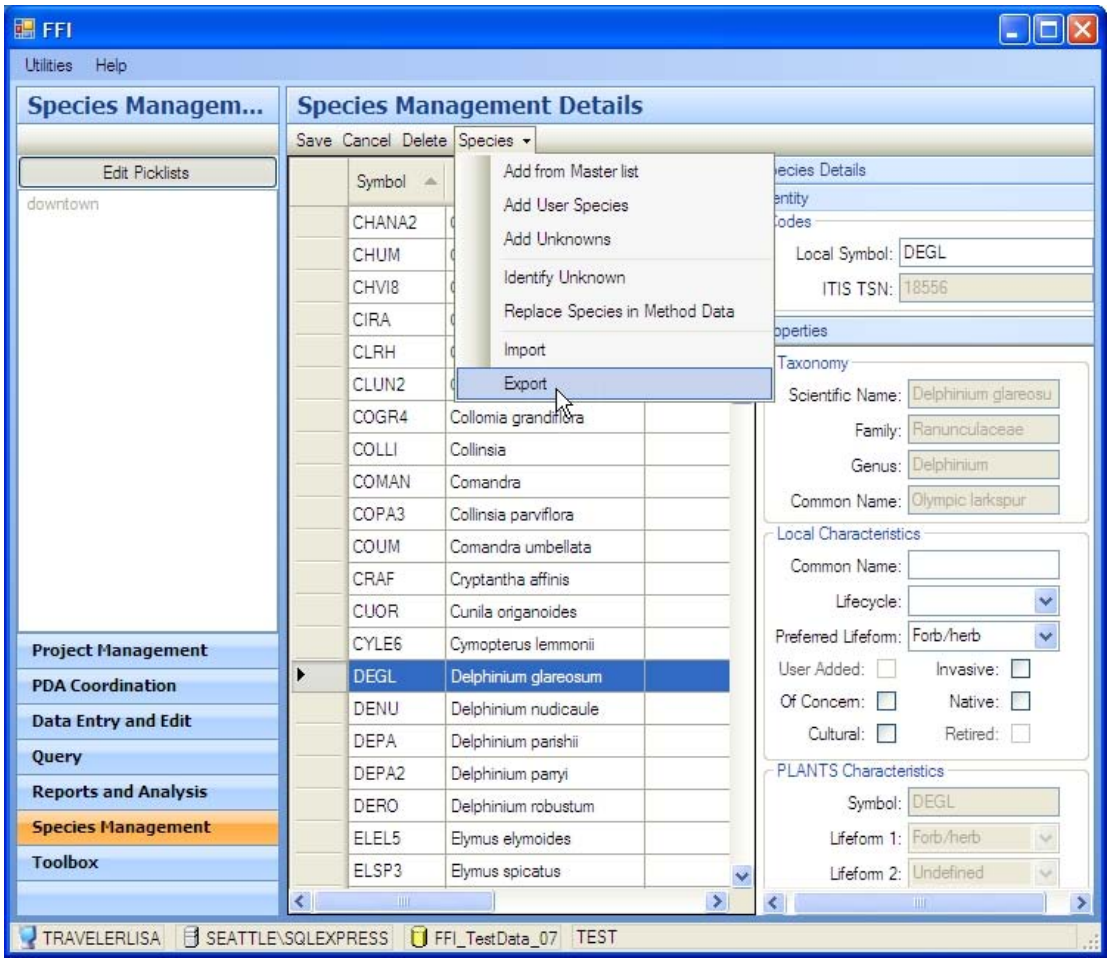
- Exporting a species list.
- Importing a species list.

Exporting a species list

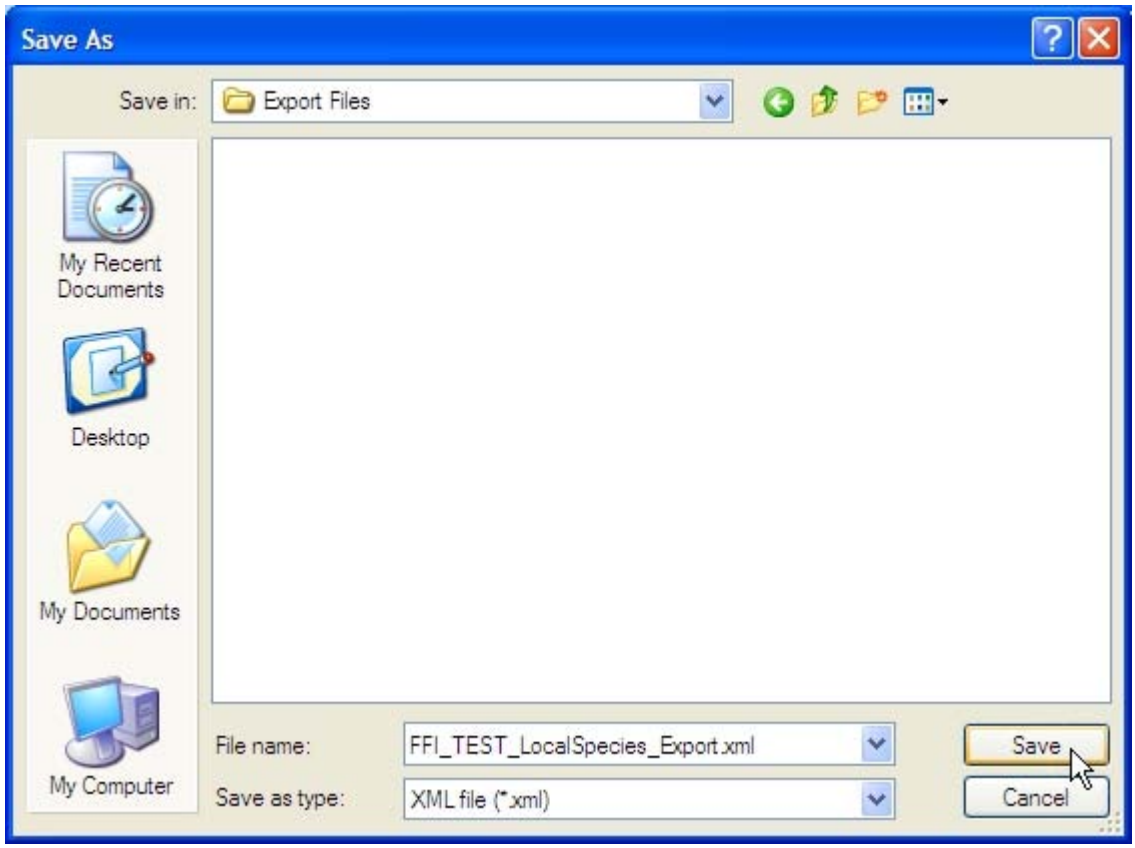
You can export your local species list as an *.xml file for use by another administrative unit. The species list will be exported along with all associated picklists.

To export a species list:

1. In the main **Species Management** window, select **Export** in the **Species** pull-down menu.



2. In the **Save As** window, assign a name for the export file, or accept the default name. Click **OK**.



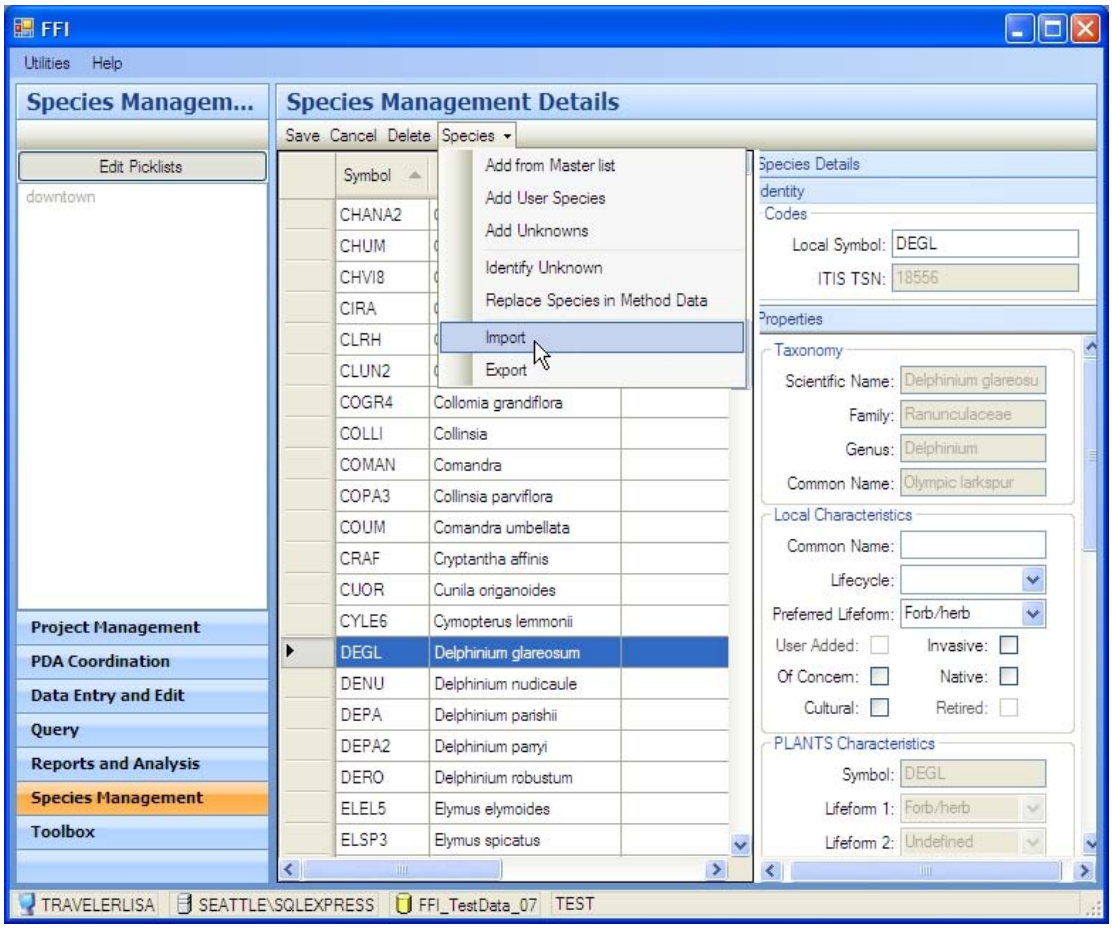
3. In the **Export Species** window, click **OK**.

See also Importing a species list.

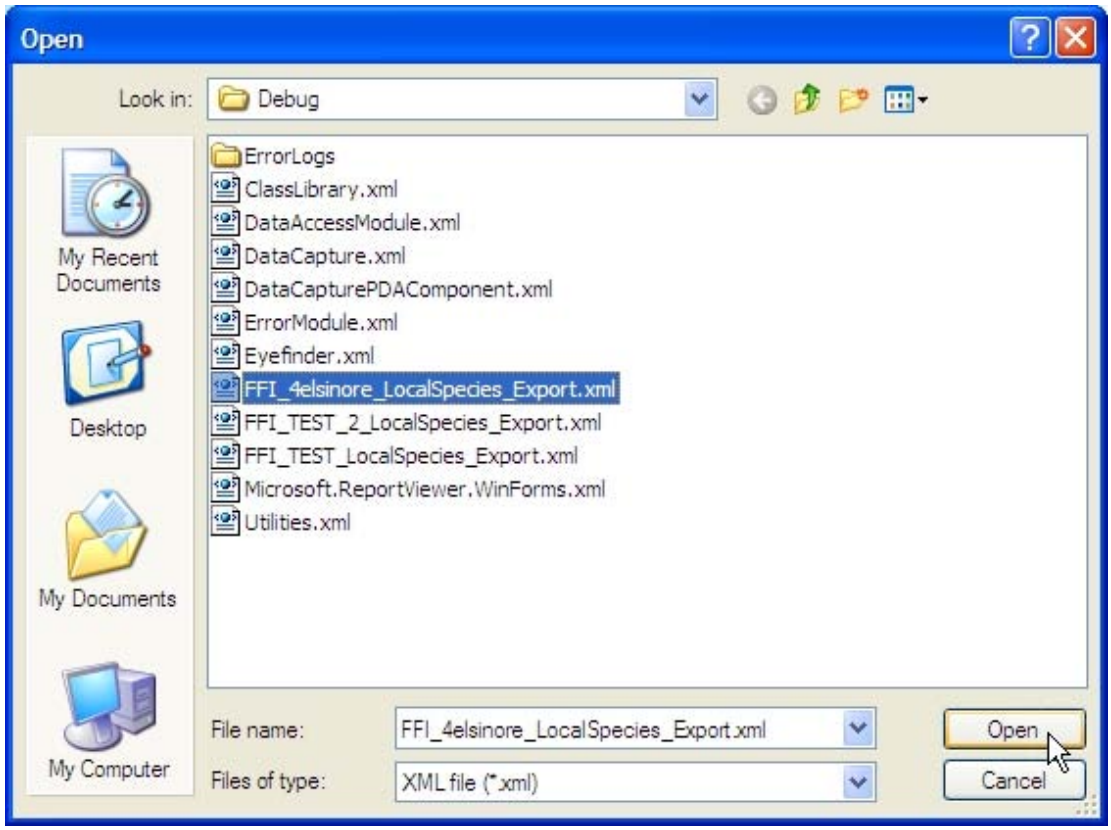
Importing a species list

An administrative unit's species lists and picklists can be imported by another administrative unit. To import a species list with its associated picklists:

1. In the main **Species Management** window, select **Import** in the **Species** pull-down menu.

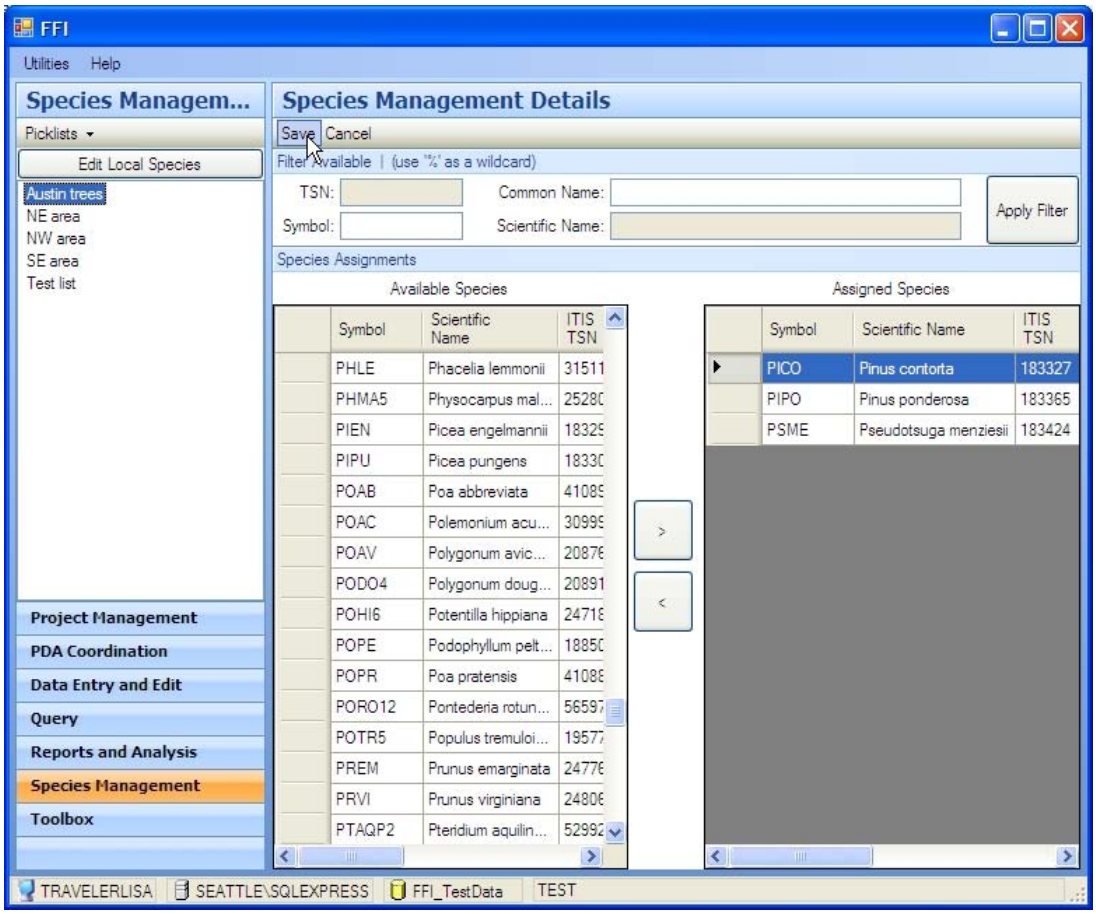


2. In the Open file window, select the *.xml file to be imported and click **Open** to import the file.



3. FFI adds the associated picklists and any unique species on the list being imported to the existing local species list. In this example, 172 species from the PLANTS database and 13 user-added species were added to the local species list. Five picklists were added. Further user action is required before the additions are finalized. Click **OK** in the **Species Import Results** window to confirm this information.

4. When you click **OK** in the **Results** window, the first imported picklist opens in the **Species Management Details** pane of the **Species Management** window. This is to allow you to make any necessary edits to the imported picklist to reflect local conditions before you save them. Make any necessary changes to the picklists and click **Save**.



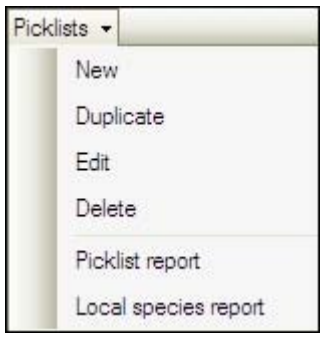
See also Exporting a species list.

Using picklists

A picklist is a subset of the local species list that represents species specifically known to inhabit a project unit. You can develop picklists for specific sample events that you can download onto a PDA or print and use in the field. FFI lets you easily create, manipulate, and delete picklists.

To reach the picklist functions, click the **Edit Picklists** toggle in the **Species Management** window. The **Picklists** pull-down menu becomes available.

The available picklist functions are:



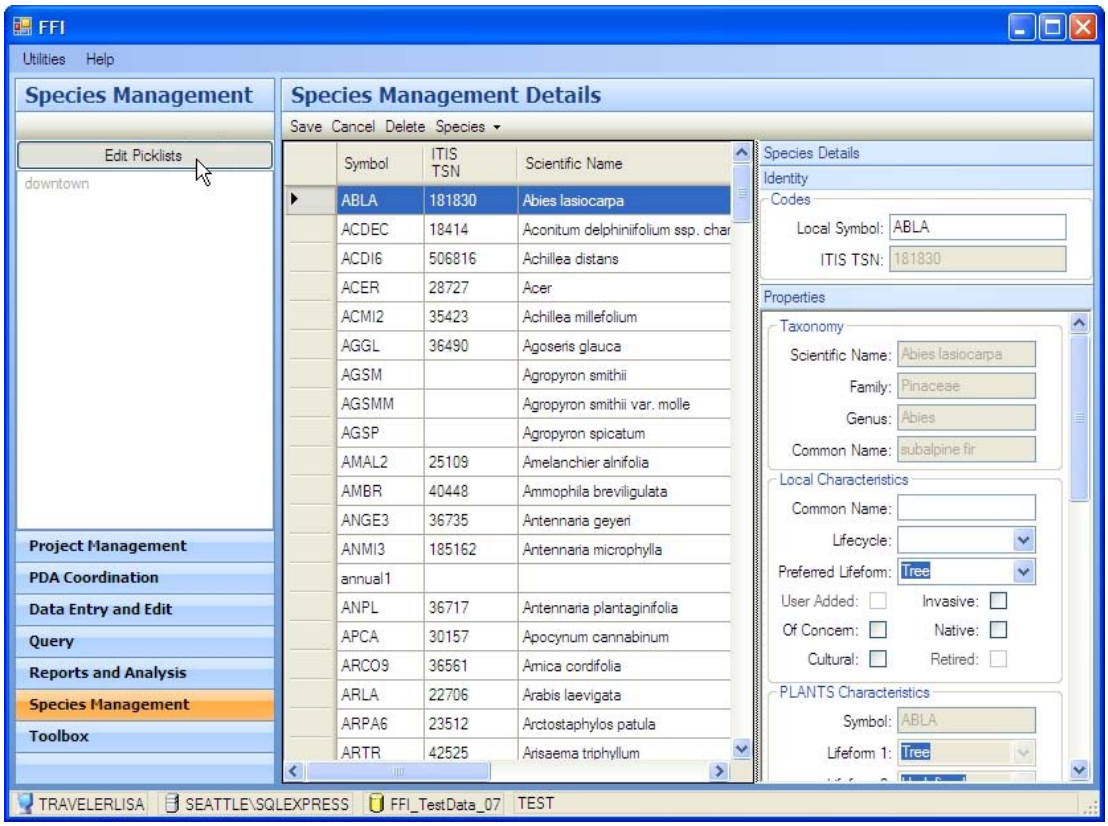
- Creating a new picklist
- Duplicating a picklist
- Editing a picklist
- Deleting a picklist
- Printing picklists or species reports

Creating a new picklist

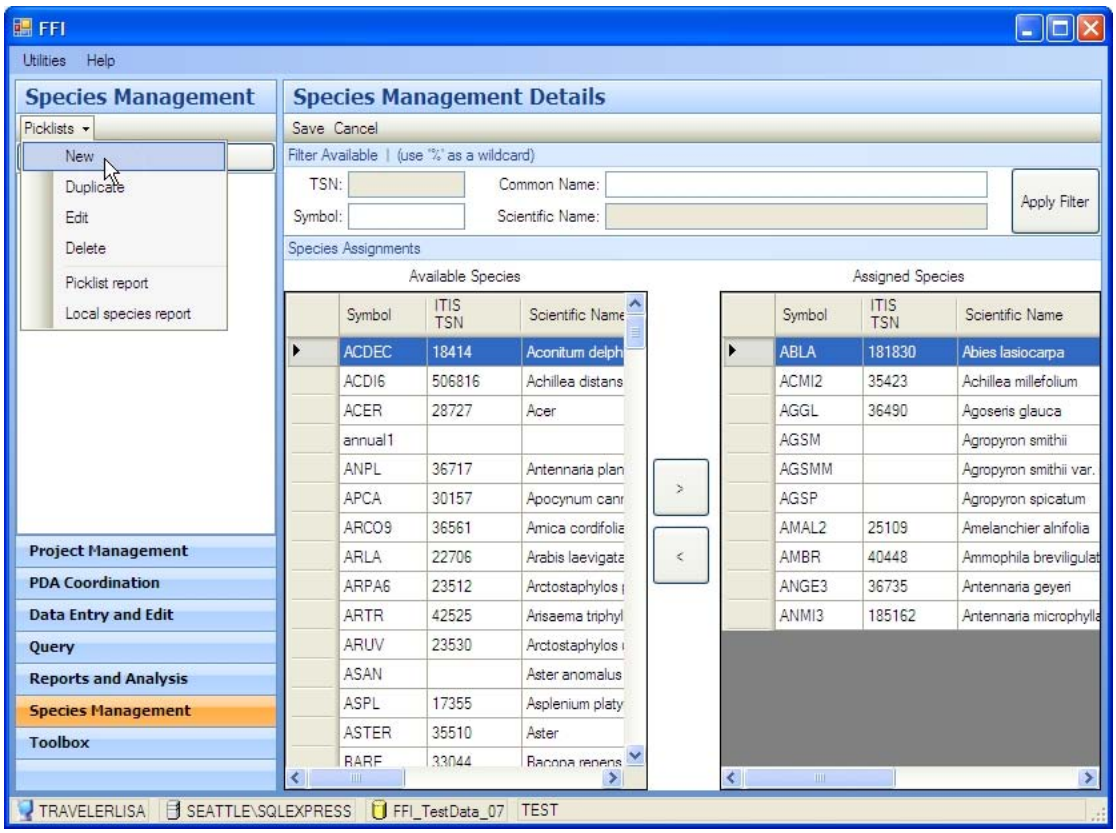
Once you have created your local species list, you can create picklists to more specifically describe the species present in a project unit to support specific sample events.

To create a new picklist:

1. In the **Species Management** window, click the **Edit Picklists** toggle, as shown. The **Picklists** pull-down menu will become available.



2. Select **New** in the **Picklists** pull-down menu.



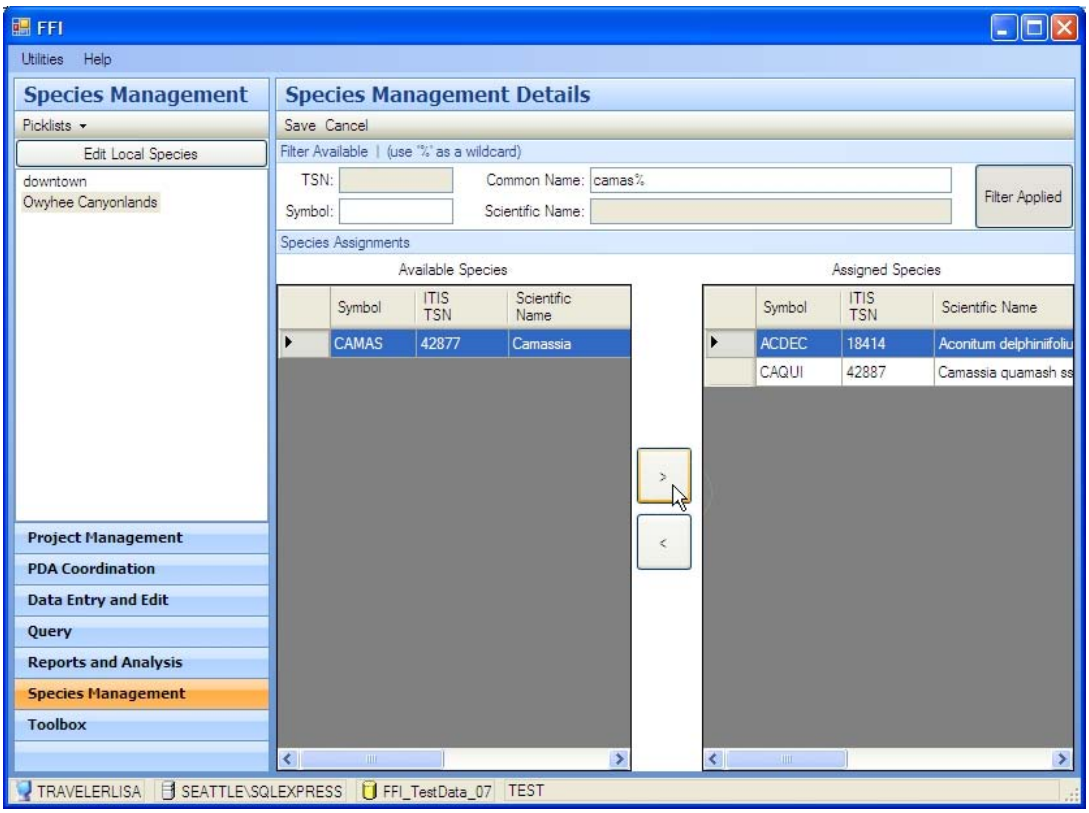
3. The **Picklist properties** form opens. Add a **Name** and **Description** for the new pick-list. If you wish, add any user variables to further describe the list or the area to which the list pertains. Click **Save & Close**.

continued

Populating a new picklist

After you have created the new picklist, the **Species Assignments** window opens. To populate the list:

1. Select, by filtering or scrolling through the **Available Species** list, the plants to be added to the new picklist. In this example, the **Available Species** list was filtered with the wildcard `camas%`.
2. Click the right-arrow button to add the species to the **Assigned Species** list.



3. Continue selecting and adding species until the new picklist is complete.
4. Click **Save**.

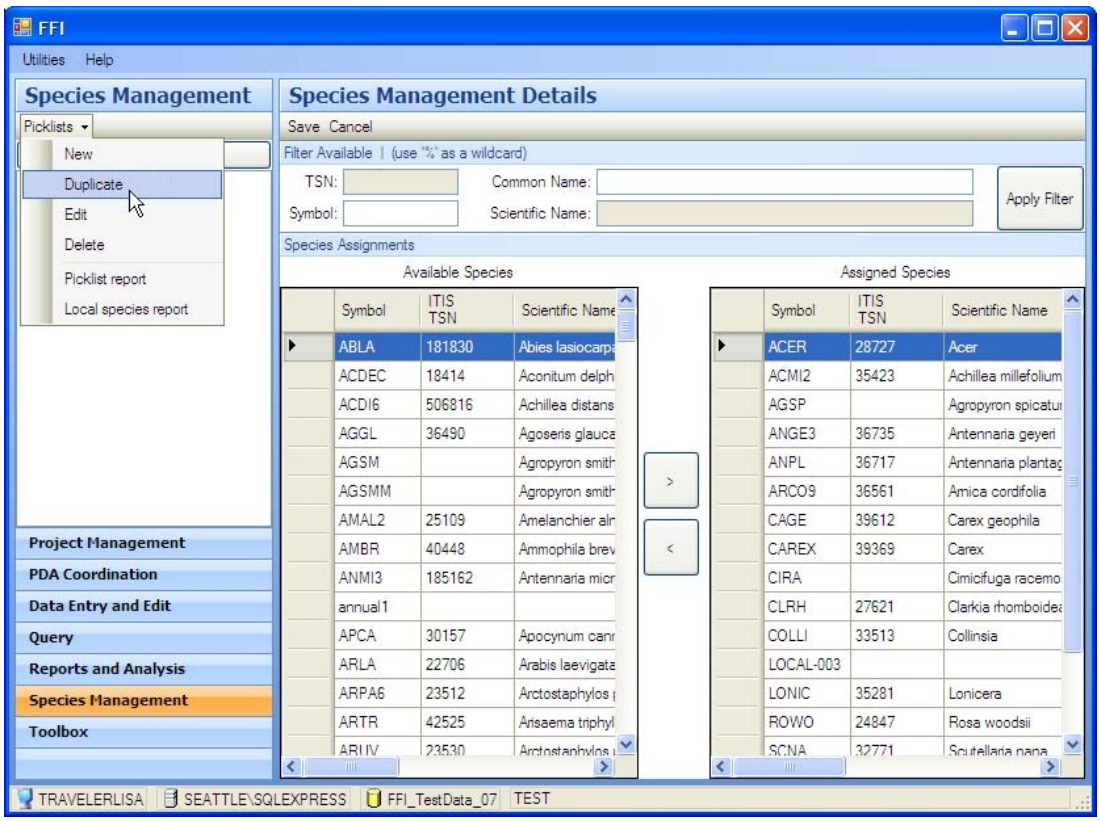
NOTE: The new picklist will be associated only with the administrative unit in which it was created. To use a picklist in another administrative unit, see Importing or exporting lists.

*NOTE: Click the **Edit Local Species** bar to toggle back to your local species list.*

Duplicating a picklist

In some cases, it may be more practical to duplicate and modify an existing picklist than create a new one for a sample event. To duplicate a picklist:

1. In the **Species Management** window, click the **Edit Picklists** toggle.
2. Select the picklist to be duplicated.
3. In the **Picklists** pull-down menu, select **Duplicate**. Note that the pull-down menu obscures the list of available picklists.



4. The **Picklist properties** form opens. Add a new **Name** and **Description** for the duplicate picklist. If you wish, add any user variables to further describe the list or the area to which the list pertains. Click **Save & Close**.

5. In the **Unsaved Changes** box, click **Yes**.
6. In the **Species Assignment** window, modify the list to meet your requirements. Delete assigned species or add additional species using the right or left arrow buttons.
7. Click **Save** when finished.

Editing picklists

Editing picklist properties

To edit the name and description for a picklist:

1. In the **Species Management** window, click the **Edit Picklists** toggle.
2. Select the picklist to be edited.
3. In the **Picklists** pull-down menu, select **Edit**. The **Picklist Properties** window opens.

4. Make any necessary changes. Click **Save & Close** when finished.

Updating a picklist

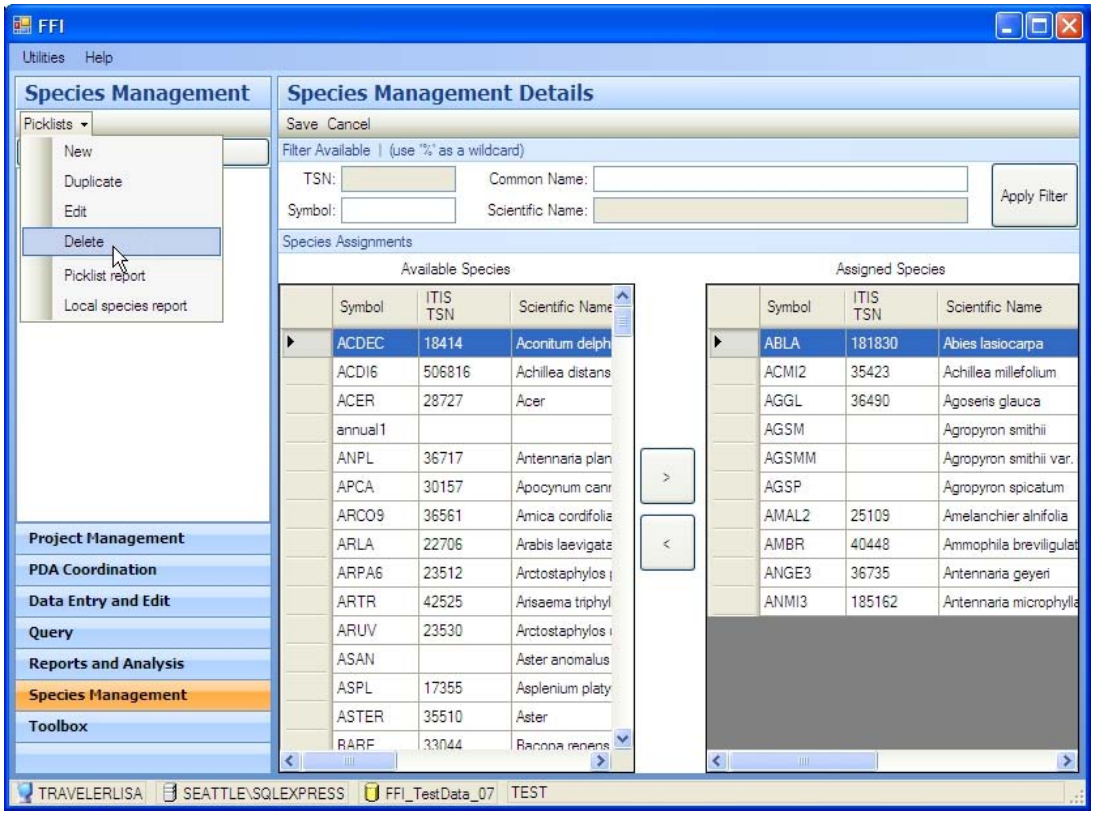
If necessary, you can add or delete species from a picklist. To update a picklist:

1. In the **Species Management** window, click the **Edit Picklists** toggle.
2. Select the picklist to be updated.
3. In the **Species Assignment** window, delete assigned species or add additional species using the right or left arrow buttons.
4. Click **Save** when finished.

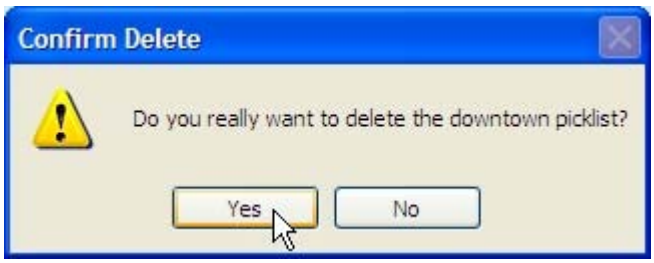
Deleting a picklist

Picklists can be deleted once they are no longer needed. To delete a picklist:

1. In the **Species Management** window, click the **Edit Picklists** toggle.
2. Select the picklist to be deleted.
3. In the **Picklists** pull-down menu, select **Delete**. Note that the pull-down menu obscures the list of available picklists.



4. In the **Confirm Delete** window, click **Yes**.



Editing a species list

Updating local information

To update local information for a species:

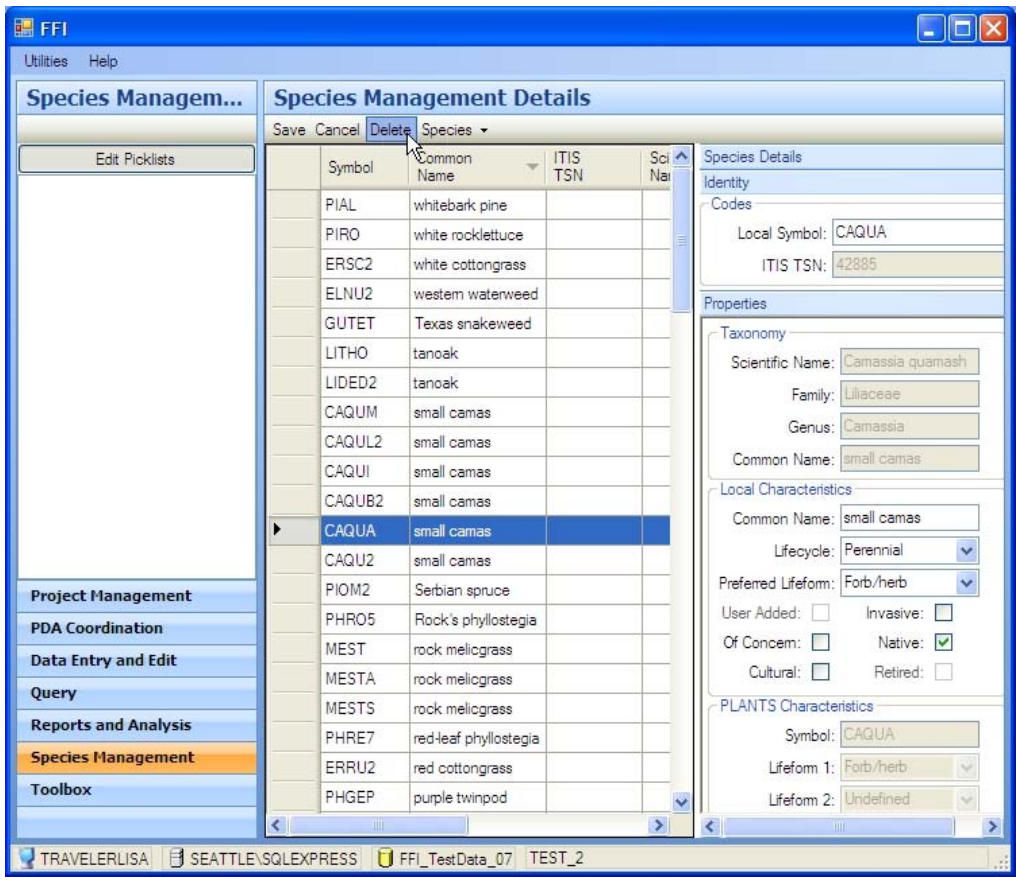
1. In the **Species Management** window, select the species to be edited.
2. Edit the **Local Characteristics** information as appropriate.
3. Click **Save**.

Removing a species from the species list

To remove a species from the species list:

1. In the **Species Management Details** window, select the species to be deleted.

Caution: once monitoring data has been collected for a species, that species cannot be deleted from the species list.



2. Click **Delete** to remove the entry from the list. Confirm the deletion in the pop-up window.
3. Click **Save**.

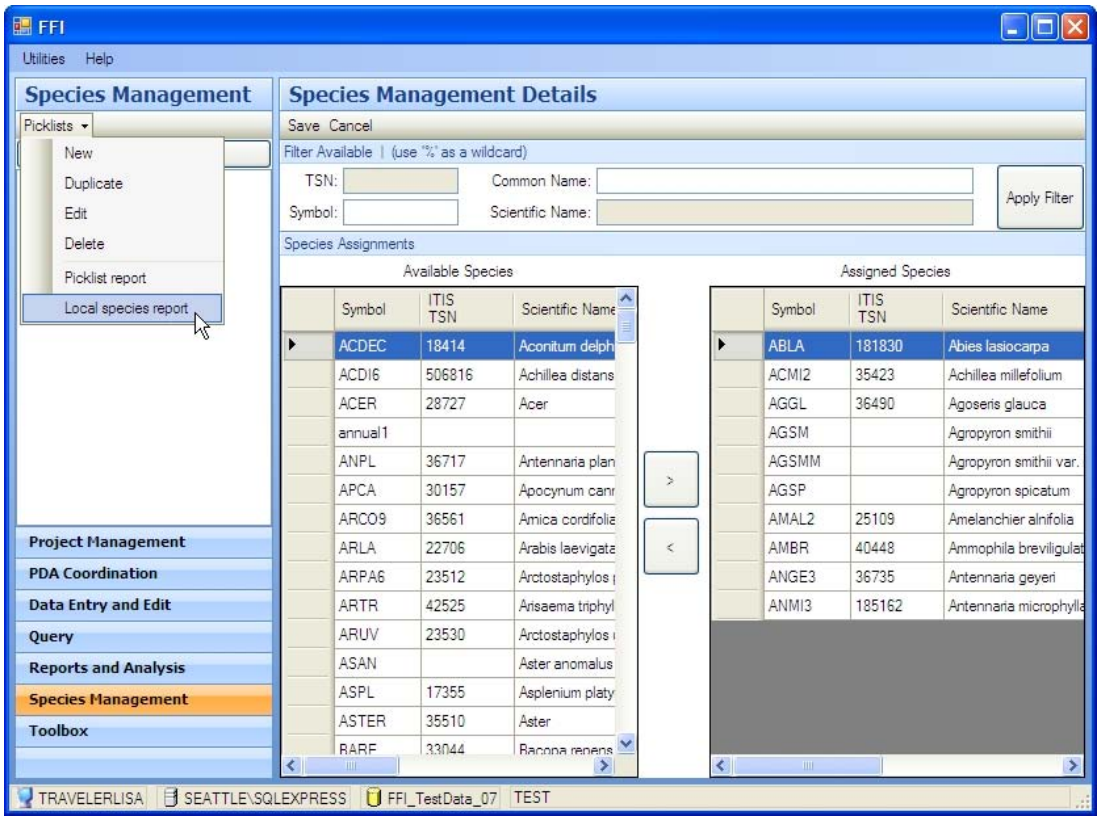
Printing species reports

You can print your complete local species report or print an individual picklist report. All report printing is done through the **Picklists** menu.

To print either kind of report:

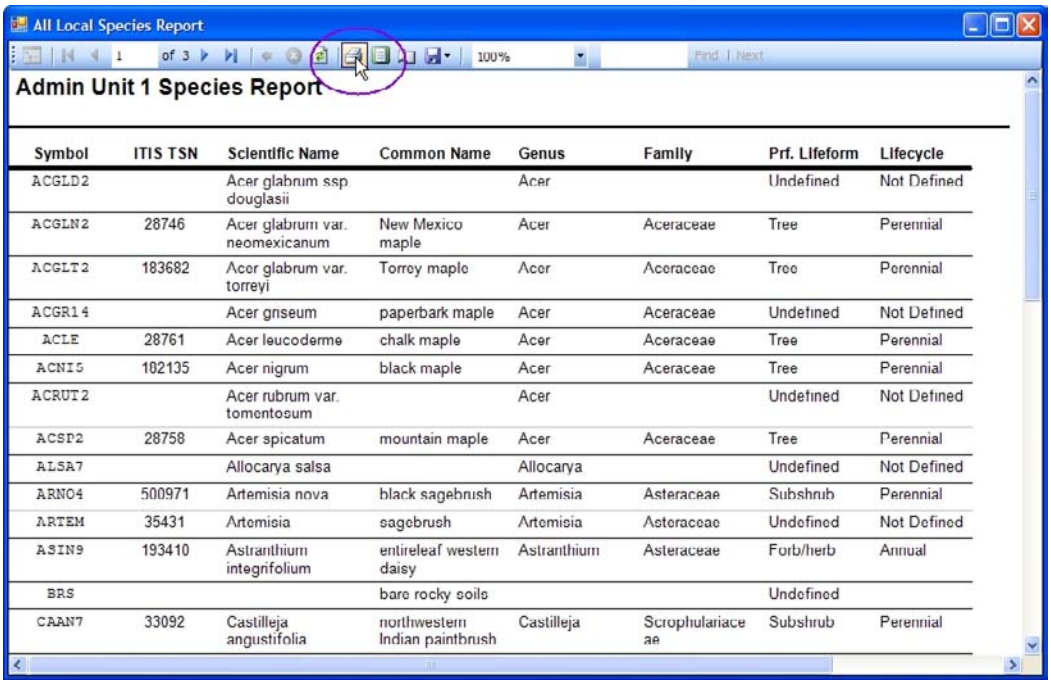
1. In the **Species Management** window, click the **Edit Picklists** toggle.

2. If desired, select a picklist to be printed. If you wish to print the entire species list, you need not select an individual picklist.
3. In the **Picklists** pull-down menu, select **Picklist report** or **Local species report**. Note that the pull-down menu obscures the list of available picklists. The report will be generated and displayed.



4. To print the report, click the **Print** icon in the report toolbar.

NOTE: You can format the report for printing, or save the report as an Excel file or Acrobat PDF.



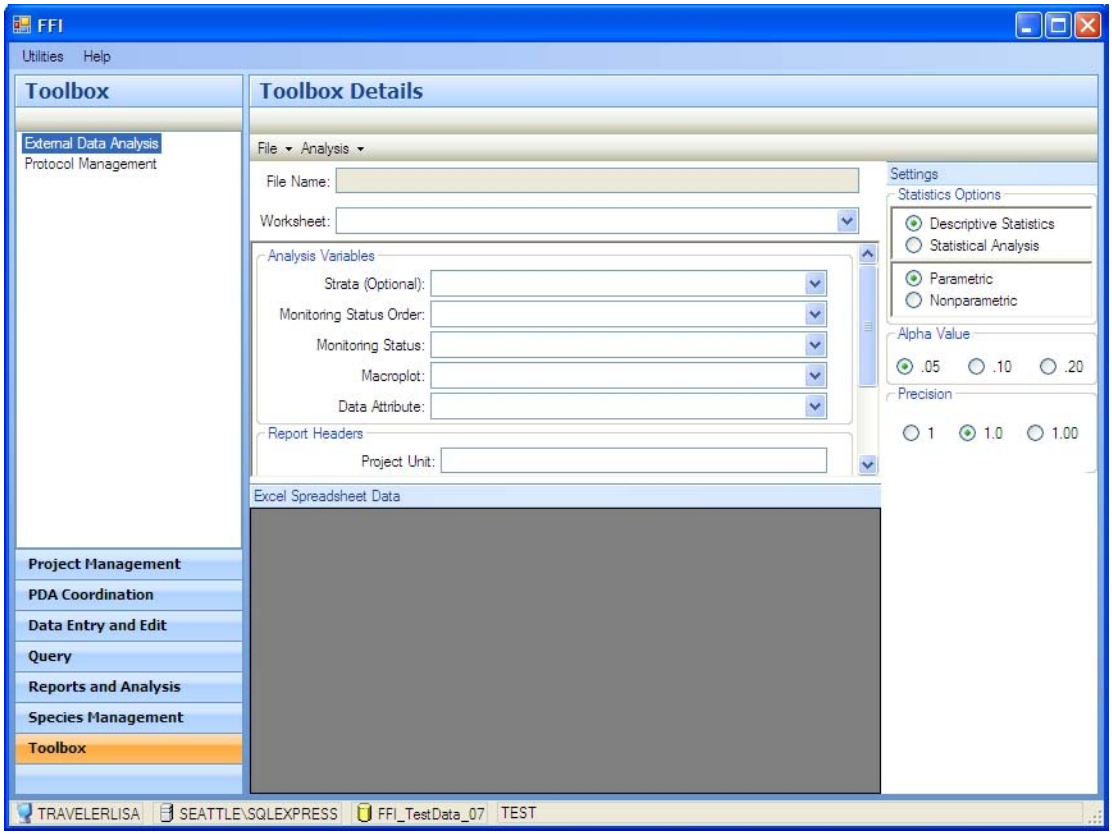
Admin Unit 1 Species Report

Symbol	ITIS TSN	Scientific Name	Common Name	Genus	Family	Prf. Lifeform	Lifecycle
ACGLD2		Acer glabrum ssp. douglasii		Acer		Undefined	Not Defined
ACGLN2	28746	Acer glabrum var. neomexicanum	New Mexico maple	Acer	Aceraceae	Tree	Perennial
ACGLT2	183682	Acer glabrum var. torreyi	Torrey maple	Acer	Aceraceae	Tree	Perennial
ACGR14		Acer grseum	paperbark maple	Acer	Aceraceae	Undefined	Not Defined
ACLE	28761	Acer leucoderme	chalk maple	Acer	Aceraceae	Tree	Perennial
ACNI5	182135	Acer nigrum	black maple	Acer	Aceraceae	Tree	Perennial
ACRUT2		Acer rubrum var. tomentosum		Acer		Undefined	Not Defined
ACSP2	28758	Acer spicatum	mountain maple	Acer	Aceraceae	Tree	Perennial
ALSA7		Allocarya salsa		Allocarya		Undefined	Not Defined
ARNO4	500971	Artemisia nova	black sagebrush	Artemisia	Asteraceae	Subshrub	Perennial
ARTEM	35431	Artemisia	sagebrush	Artemisia	Asteraceae	Undefined	Not Defined
ASIN9	193410	Astranthium integrifolium	entireleaf western daisy	Astranthium	Asteraceae	Forb/herb	Annual
BRS			bare rocky soils			Undefined	
CAAN7	33092	Castilleja angustifolia	northwestern Indian paintbrush	Castilleja	Scrophulariaceae	Subshrub	Perennial

Toolbox

The FFI **Toolbox** includes these functions:

- External Data Analysis provides a link between FFI and other analysis programs by supporting import of external files for analysis.
- Protocol Management lets you retire, unretire, or delete protocols that you do not need for your monitoring programs.

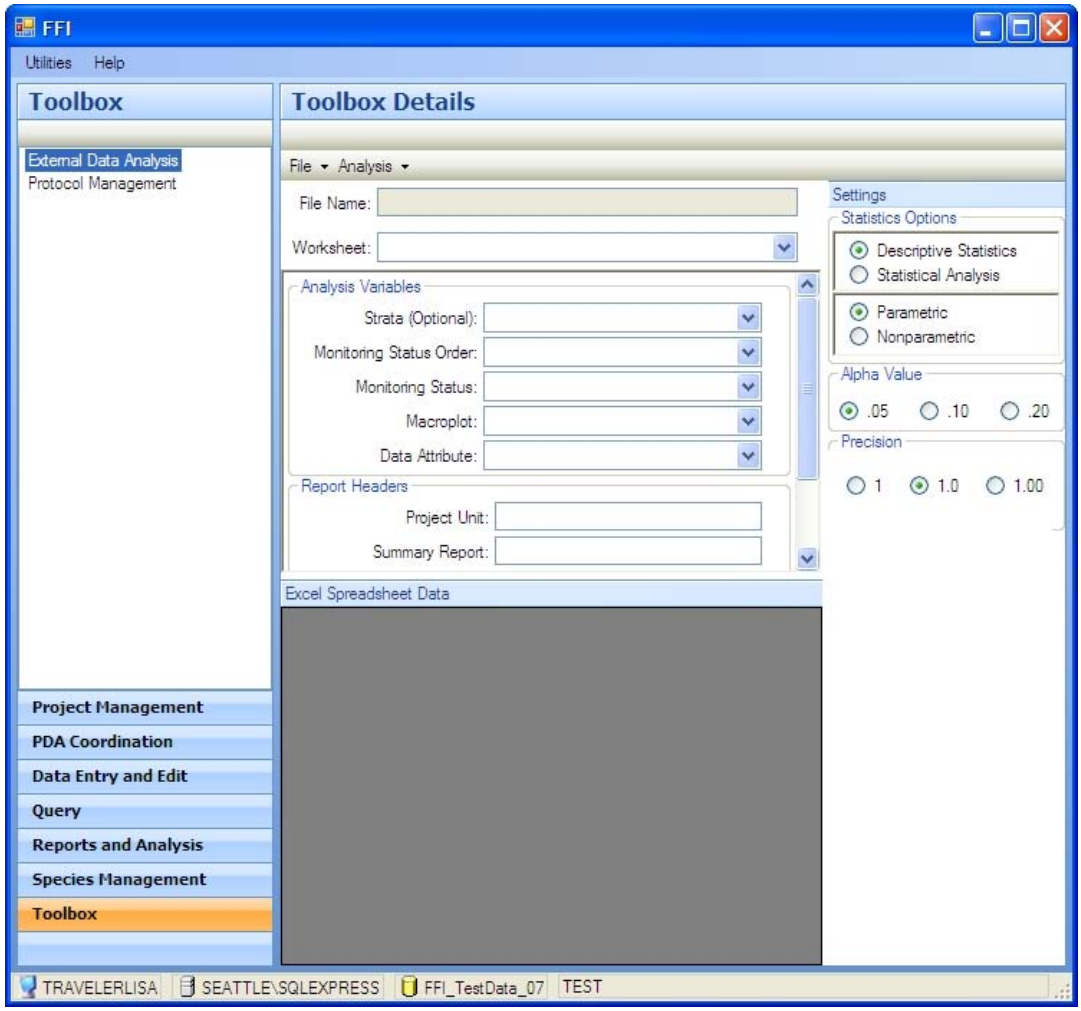


Return to Using FFI main page.

External data analysis

The **External data analysis** function in the **Toolbox** is used to import data contained in Excel spreadsheets for statistical analysis within FFI. The types of analyses that can be run are the same as those that are described in the Data analysis section of the *User's Guide*.

Format requirements for imported spreadsheets are outlined here.

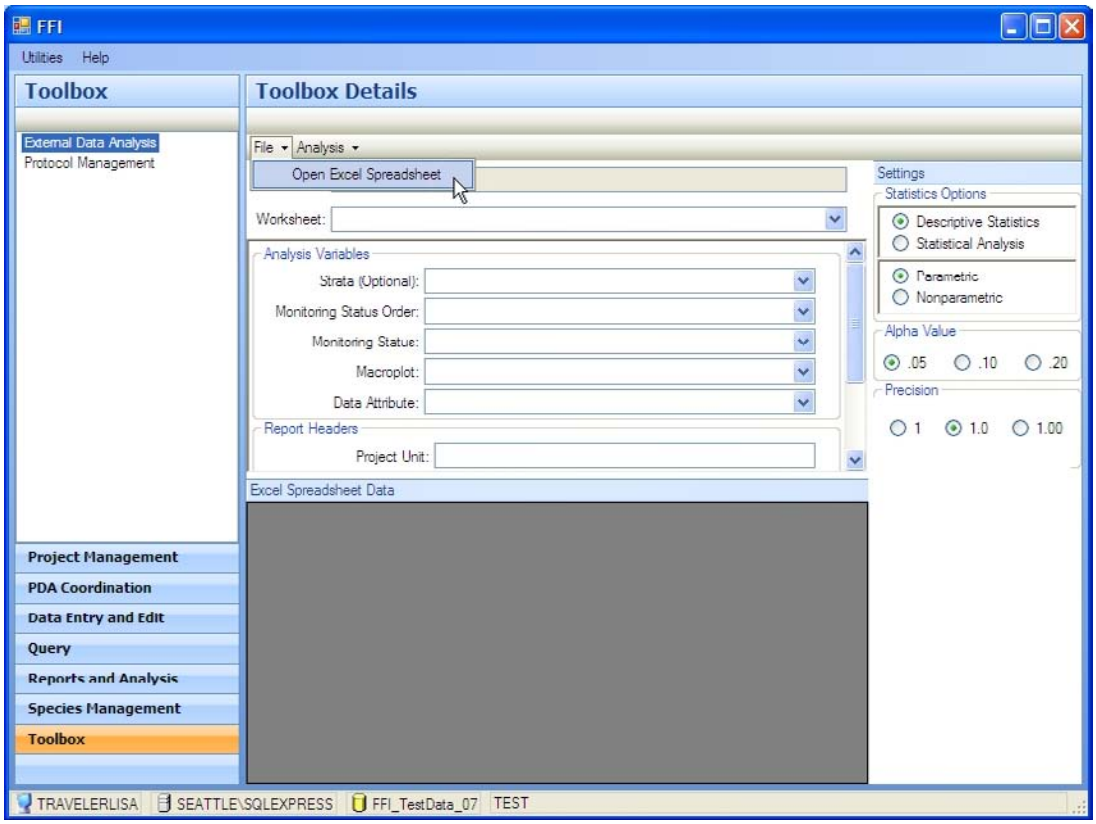


continued

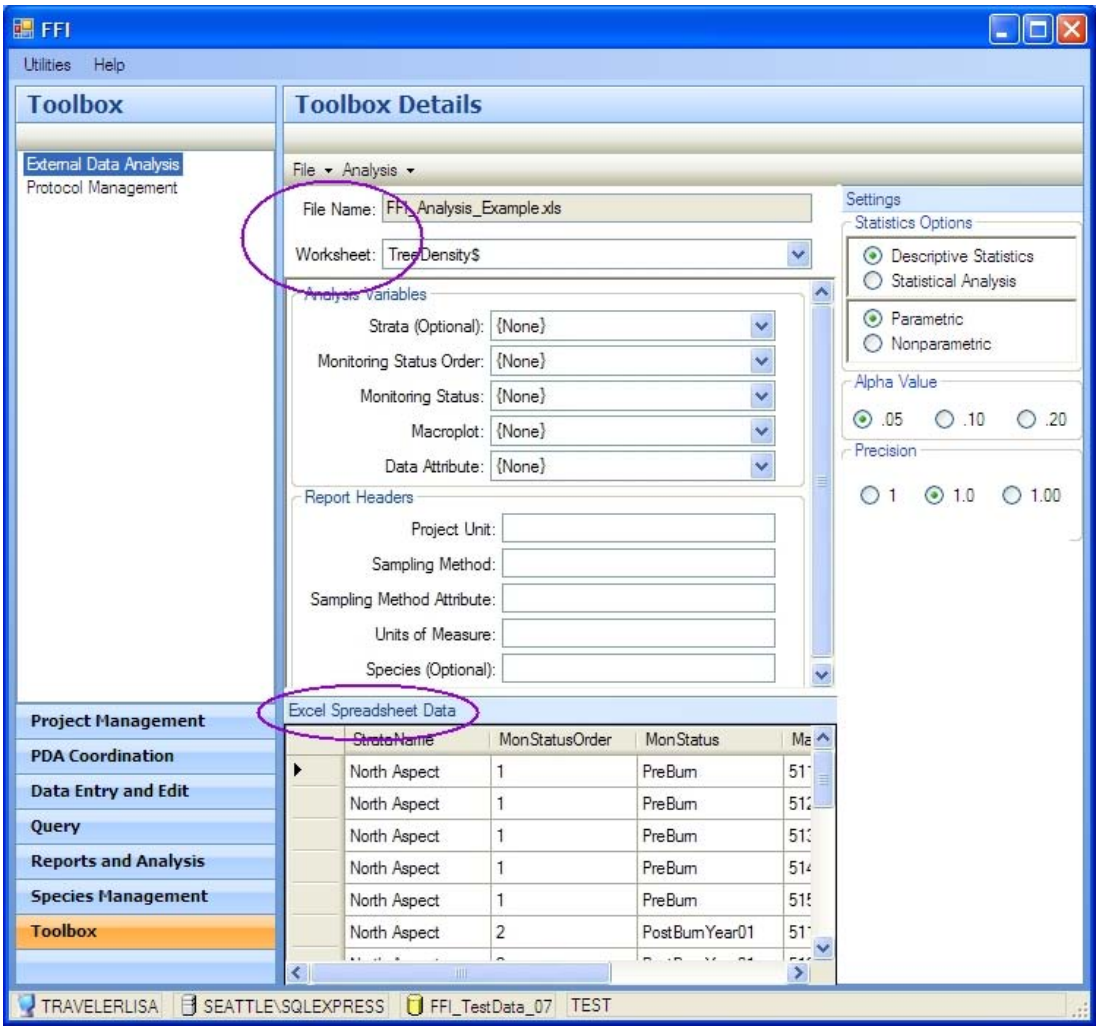
Data import and analysis

To import an Excel spreadsheet and analyze the imported data:

1. In the **Toolbox Details** window, select **Open Excel Spreadsheet** in the **File** pull-down menu.



2. Navigate to the desired Excel file and click **Open**. FFI imports the spreadsheet and displays its name in the **File Name** box. After you select the desired **Worksheet**, FFI populates the **Excel Spreadsheet Data** window.

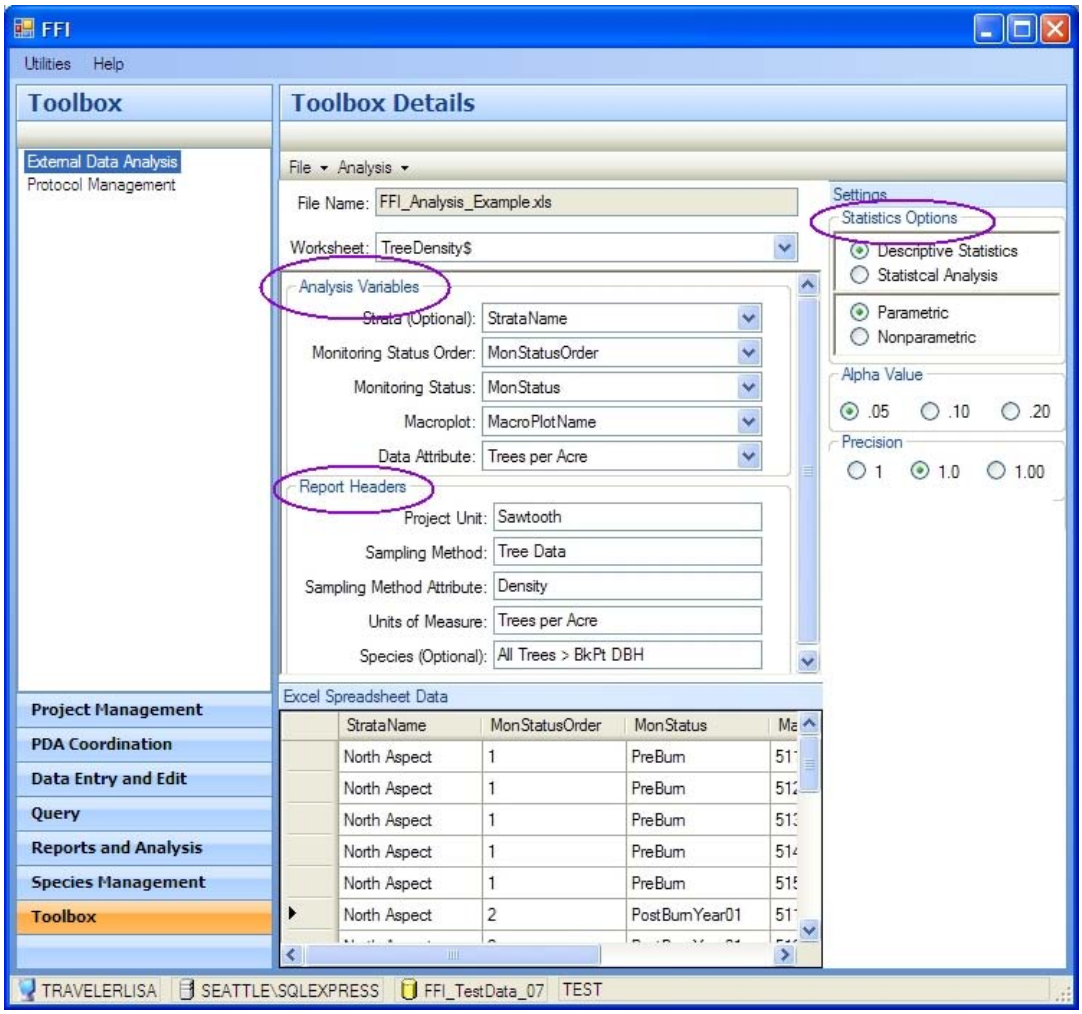


NOTE: Data cannot be edited in this view. To make changes to your data, edit the Excel spreadsheet and then import it again.

continued

Data import and analysis (continued)

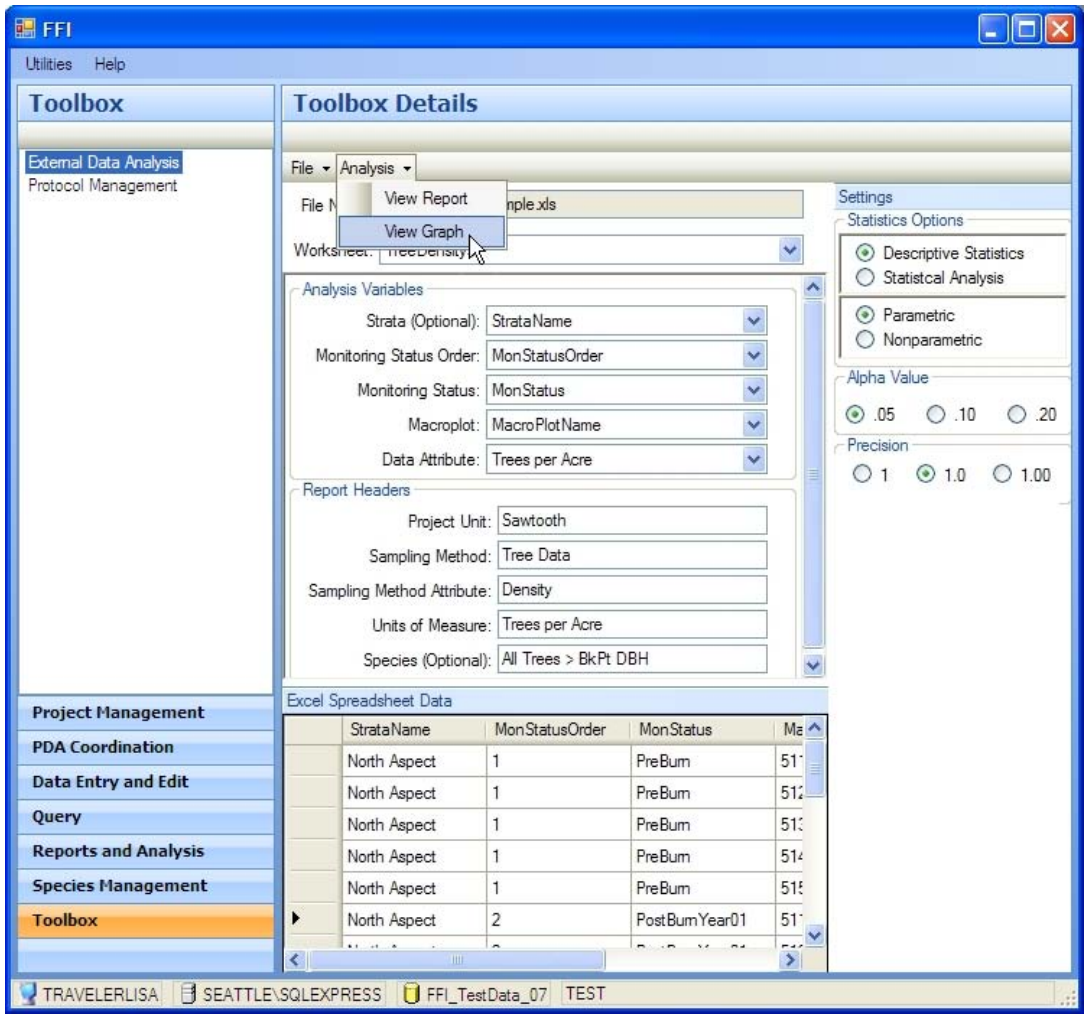
3. Using the pull-down lists, populate each field in the **Analysis Variables** window. The **Strata** field is optional, but all other fields are mandatory.
4. Populate the **Report Headers** text boxes. These fields will be used to fill in the header rows in the analysis report and graphs.
5. Select the desired **Statistics Options**. For information about these options, see Performing analyses.



continued

Data import and analysis (continued)

6. To run the analysis and view the resulting report or graph, select **View Report** or **View Graph** in the **Analysis** pull-down menu.



To see the report and graph resulting from this analysis, see Analysis output. Reports and graphs can be saved and copied.

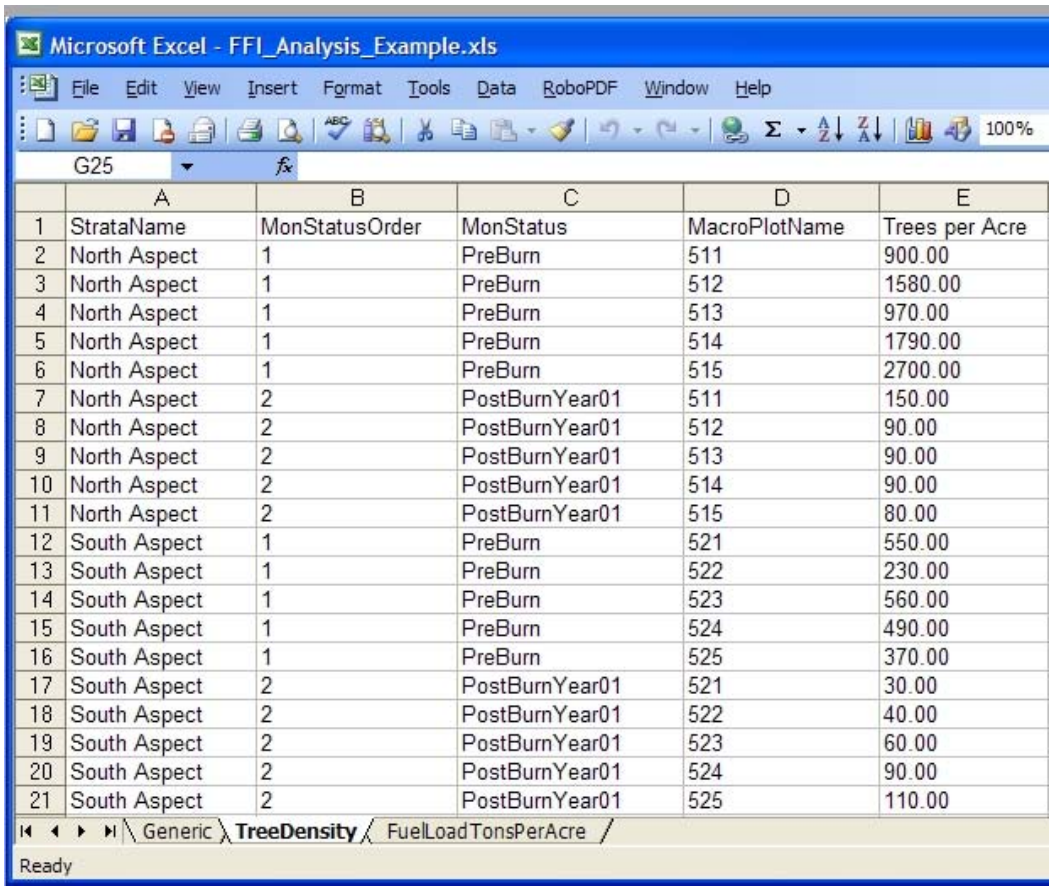
Spreadsheet requirements

The sample spreadsheet below identifies the minimum requirements for an Excel spreadsheet to be imported into the FFI analysis tool. Each row in the spreadsheet must contain:

- Monitoring status order (column B), as an integer.
- Monitoring status label (column C).
- Macro plot name (column D).
- At least one data attribute of numeric data (column E).

As shown, a strata name (column A) can also be included.

Each individual worksheet in the spreadsheet should be named to reflect the name of the protocol for which data is being analyzed. The name of the worksheet in the sample below is **TreeDensity**; the data attribute (column E) is **Trees per Acre**.



	A	B	C	D	E
1	StrataName	MonStatusOrder	MonStatus	MacroPlotName	Trees per Acre
2	North Aspect	1	PreBurn	511	900.00
3	North Aspect	1	PreBurn	512	1580.00
4	North Aspect	1	PreBurn	513	970.00
5	North Aspect	1	PreBurn	514	1790.00
6	North Aspect	1	PreBurn	515	2700.00
7	North Aspect	2	PostBurnYear01	511	150.00
8	North Aspect	2	PostBurnYear01	512	90.00
9	North Aspect	2	PostBurnYear01	513	90.00
10	North Aspect	2	PostBurnYear01	514	90.00
11	North Aspect	2	PostBurnYear01	515	80.00
12	South Aspect	1	PreBurn	521	550.00
13	South Aspect	1	PreBurn	522	230.00
14	South Aspect	1	PreBurn	523	560.00
15	South Aspect	1	PreBurn	524	490.00
16	South Aspect	1	PreBurn	525	370.00
17	South Aspect	2	PostBurnYear01	521	30.00
18	South Aspect	2	PostBurnYear01	522	40.00
19	South Aspect	2	PostBurnYear01	523	60.00
20	South Aspect	2	PostBurnYear01	524	90.00
21	South Aspect	2	PostBurnYear01	525	110.00

The FFI installation package contains a sample Excel spreadsheet with three worksheets that you can use as a guide for building spreadsheets for import.

See also Data import and analysis.

Analysis output

The sample report and graph shown here were generated using the data described in Data import and analysis. Note that reports and graphs can be saved and copied directly from the **Analysis Report** toolbar.

Analysis Report

Save Copy

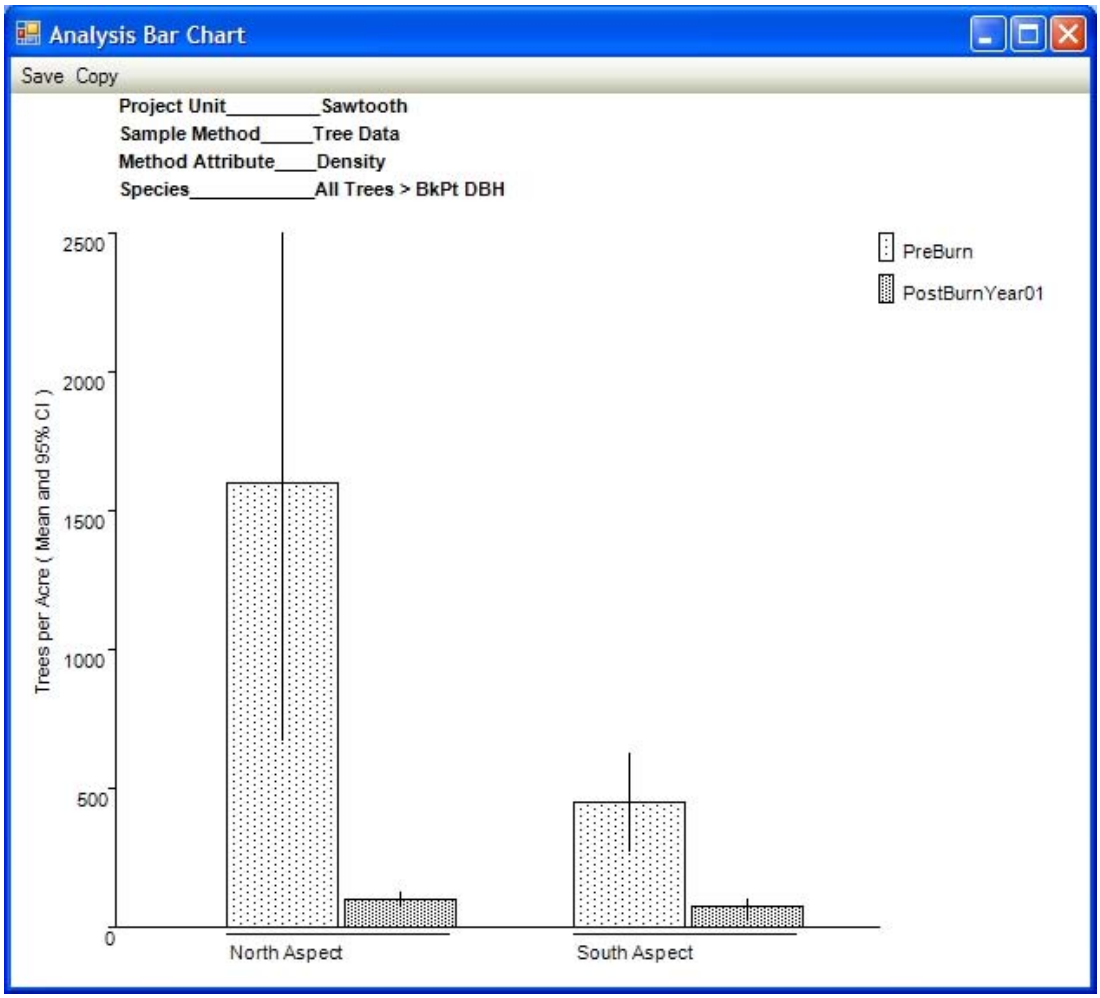
```
Project Unit_____________Sawtooth
Sampling Method__________Tree Data
Method Attribute_________Density
Units____________________Trees per Acre
Species__________________All Trees > BkPt DBH
```

Strata: North Aspect

Plot	PreBurn Attr	PostBurnYear01 Attr	Diff	%Diff
511	900.0	150.0	-750.0	-500.0
512	1580.0	90.0	-1490.0	-1655.6
513	970.0	90.0	-880.0	-977.8
514	1790.0	90.0	-1700.0	-1888.9
515	2700.0	80.0	-2620.0	-3275.0
Mean	1588.0	100.0		
SDev	730.2	28.3		
N	5.0	5.0		
CI-Lower	681.5	64.9		
CI-Upper	2494.5	135.1		

Strata: South Aspect

Plot	PreBurn Attr	PostBurnYear01 Attr	Diff	%Diff
521	550.0	30.0	-520.0	-1733.3
522	230.0	40.0	-190.0	-475.0
523	560.0	60.0	-500.0	-833.3
524	490.0	90.0	-400.0	-444.4
525	370.0	110.0	-260.0	-236.4
Mean	440.0	66.0		
SDev	139.6	33.6		
N	5.0	5.0		
CI-Lower	266.6	24.3		
CI-Upper	613.4	107.7		

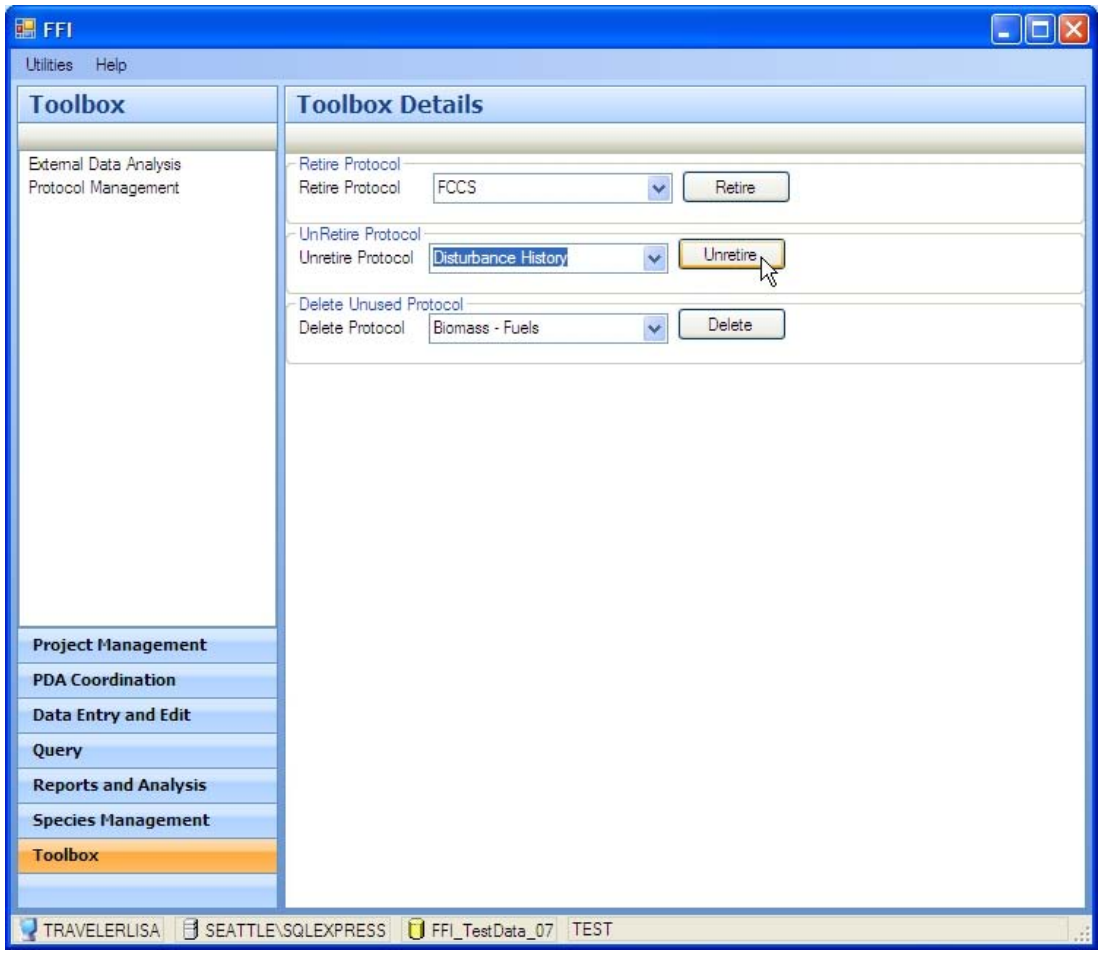

Analysis Bar Chart
Save Copy
Project Unit_____Sawtooth
Sample Method_____Tree Data
Method Attribute____Density
Species_____All Trees > BkPt DBH
PreBurn
PostBurnYear01
Trees per Acre (Mean and 95% CI)
2500
2000
1500
1000
500
0
North Aspect
South Aspect

Protocol management

The **Toolbox Protocol Management** function allows you to retire or delete protocols that are not needed for your programs.

- **Retire** a protocol for which data exists, but which you do not plan to use again. All data attached to the protocol will be maintained safely. The protocol can be **Unretired** should it be needed again in the future. All protocols that are retired are automatically listed in the **Unretire Protocol** window.
- **Delete** a protocol that is not required for your monitoring program. Should you need it in the future, you can re-import it into FFI.

NOTE: When you retire or delete a protocol, all methods attached to it will be unavailable until you un-retire or re-import the protocol into FFI.

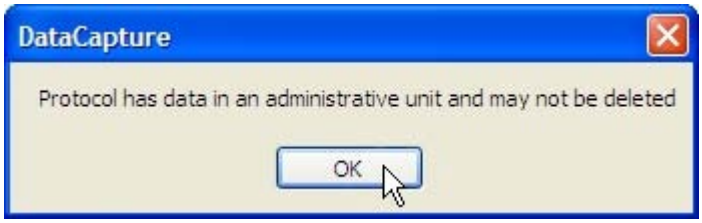


In the example above, the protocol *Disturbance History* was retired. It is longer available for assignment in the **Sample Event** creator in **Project Management**, but all data attached to it is retained. To un-retire *Disturbance History*, click **Unretire**.

Using Protocol Management

To use **Protocol Management**:

1. Using the pull-down lists, select the protocol to be retired, un-retired, or deleted.
2. Click the appropriate button.
3. If data is attached to the protocol, it cannot be deleted, as indicated here. Click **OK** to acknowledge the message.



Return to Toolbox

Return to Using FFI

Additional information

This section contains supplemental information, tables, and links that may be helpful for FEAT and FIREMON users.

- Information on administrative units, project units, and macro plots.
- Comparison of FFI, FEAT, FIREMON, and FMH program elements.
- Comparison of FFI, FEAT, FIREMON, and FMH sampling protocols.
- Description of FFI protocols.

Administrative units, project units, and macro plots

FFI uses a unique set of terms derived from FEAT and FIREMON to describe land areas and monitoring events. The basic units are:

- Administrative unit – An *administrative unit* is an area that is managed as an individual entity, such as a park, forested area, county or city, hunting unit, watershed study area, or other discrete land area. In FFI, an administrative unit corresponds to an SQL Server database. Although multiple administrative units can reside on a computer, there is no communication between them. All analysis takes place within an individual administrative unit, and GIS data is managed and analyzed at the administrative unit level. An administrative unit is comparable to the *landunit* used in FEAT.
- Project unit – a *project unit* (equivalent to the FEAT *monitoring unit*) is a division of the entire sample population of an administrative unit. Project units are usually defined to represent an area on the ground. For example, a project unit could consist of "all areas in the Ponderosa vegetation type between 1500 and 2000 meters above sea level, more than 500 meters from the nearest road, and more than 1000 meters from the nearest stream." However, project units are not required to have any spatial meaning, but can be defined for temporary administrative or analysis purposes. They provide a means to functionally group macro plots for management and analysis. Project units can be defined so that they overlap spatially, and macro plots can be associated with multiple project units. Use FFI Spatial module to spatially define a project unit.
- Macro plot – a macro plot is a distinct place on the face of the earth that can be sampled one or more times. A macro plot established within an administrative unit defines the location of the primary sample. The plot is used to establish and define permanent sampling sites as well as sites that contain multiple subsamples and sample types. Examples of macro plots might include:
    - A forest plot with four quadrants, two veg lines, ten herb frames, and four fuels lines.
    - A CBI plot with an understory circle and an overstory circle.
- Candidate site – A geographic point within a project unit that has been identified as a potential macro plot.
- Sample event -

To understand other differences between terms used in FFI and terminology used in FEAT and FIREMON, see the nomenclature table.

About the FFI protocols

Each FFI protocol is based on FIREMON and/or FEAT/FMH sampling procedures and created within Protocol Manager. A description of the FIREMON procedures can be found on the FIREMON pages at http://frames.nbii.gov/firemon. A description of the FEAT and FMH procedures can be found at http://www.nps.gov/fire/fire/fir_eco_mon_fmh.cfm.

Most FFI protocols consist of only one sampling method. Some, like the *Tree Data* protocol, however, combine three distinct sample methods within a single protocol. For quick reference, all FFI protocols are briefly summarized below.

Biomass - Fuels

The Biomass-Fuels protocol is used to record actual measured weights of fuel on a macro plot using laboratory analysis. Biomass may also be available from legacy data or from photographic guides that incorporate biomass data as part of their fuel load calculations. Examples of photographic guides developed using biomass data are the Photo Series, Photoload, and Photo Guides published by the U.S. Forest Service. These photographic guides cover many ecosystems and are available for many parts of the U.S. Newer versions published by the USFS. Pacific Northwest Research Station includes biomass data for several different fuel attributes. Attribute biomass estimates from photographic publications are entered into the FFI biomass form in the same way as actual measured weights. Biomass using measured weights is obtained from field plots using a three-step process that includes collecting and separating all fuels from a macro plot, drying the collected samples in an oven, and weighing the dried samples with an analytical scale. The fuels are usually separated into size classes as they are gathered in the field, then dried and weighed by the same sampled size classes. The resulting weights for each size class are stored in the Fuel Biomass protocol in FFI. If desired, the biomass data may be combined with other plot-level fuels data to provide an extensive description of the fuelbed at the macro plot scale.

Biomass - Plants

The Biomass-Plants protocol is used to record actual measured weights of each type of plant material on a macro plot. Biomass is a very accurate measure of plant cover, but it is also a destructive and time consuming sampling method. Biomass is obtained by clipping all plant material from each plot and separating it into the groups of interest, such as lifeform, family, species, or any other grouping appropriate to study objectives. The material for each group is separated into bags in the field. It is then taken back to a laboratory, dried in ovens, and the dry material is weighed by sampling group using an analytical scale. The Plant Biomass protocol in FFI is used to enter the weights of each sampled group. If the samples are weighed prior to drying, the pre-drying weight is entered under "Green Wt" in FFI. The weight after drying should be recorded under "Dry Wt."

CBI

CBI is the Composite Burn Index sample protocol. The CBI protocol is used to quantify, rate, and track the burn effects on the substrate or each vegetation layer after a fire and to correlate those effects with changes observed in the moderate-resolution Landsat Thematic Mapper. Plot sampling is used to calibrate and validate remote sensing results and to relate radiometric change to actual fire effects on the ground. Because the fire effects are correlated with Landsat images, CBI plots can be rather large (>100 ft or 30 m wide). CBI is most effective when all vegetation layers are sampled in the field and then compared with the Landsat Imagery. However, the protocol can also be used as a stand-alone tool without remote sensing data to describe and evaluate localized burn sites for a variety of purposes.

For CBI, burned percentages are visually estimated for the substrate elements and for the different size classes (layers) of vegetation and recorded on the CBI protocol form. The substrate and vegetation layers are evaluated by attribute (litter, duff, richness cover, etc.). Each attribute has an associated burn effect that the observer evaluates (e.g., unchanged, 50% loss, etc). The loss percentages recorded on the form are used to calculate a burn severity rating within FFI for each vegetation layer and for the entire plot. The greater the CBI number, the greater the burn severity on the macro plot. For more information on this protocol and what the ratings mean, see the online FIREMON user manual (Landscape Assessment) at FRAMES (http://frames.nbii.gov-/firemon).

Cover - Line Intercept

The Line Intercept protocol is used to assess changes in plant species cover over time on a macro plot. It uses a permanently-marked base line for sampling the within-stand variation and quantifying statistically valid changes in plant species cover and height over time. The protocol is applicable for most forest and rangeland communities and is one of the fastest ways to estimate percent cover in areas with dense cover or tall trees. It is especially useful when users need to quantify shrub cover greater than 3 feet (1 m) tall because ocular estimation of cover for large shrubs or dense vegetation is difficult using most other methods. The Line Intercept protocol can also be used in conjunction with cover-frequency transects when vegetation over 3 feet (1 m) exists or to calibrate ocular estimates of shrub cover with the Species Composition protocol (see description).

The Line Intercept protocol uses a tape measure stretched between two permanently-marked end points either on the ground or at a specified height above the vegetation canopy, depending on the purpose of the sampling. Vegetation cover is determined by calculating how much of the measuring tape is covered with plant material. To use this protocol, the stop and start points for each species' foliage or substrate attributes are recorded along the measuring tape. For example, if a small tree starts at 10.0 ft along the tape and ends at 15.0 ft, it covers an interval of 5 ft. If a single grass species starts at 25 ft and ends at 27.5 ft, it covers an interval of 2.5 ft. The start and stop points are recorded in the cover- line intercept form. The amount of tape that a specimen covers is referred to as the interval or intercept and is also recorded on the line intercept form. The percent cover of each species is the total of all intercepts for the species divided by the line length. In addition to cover intervals, a size class is recorded on the form to indicate how tall the particular plant is. Height estimates should only be made for the part of the plant that is intercepted by the tape, not the whole plant.

Cover - Ocular Macro Plot (Species Composition)

The Species Composition protocol uses a combination of ocular estimates for canopy cover and actual measurements of height to sample each plant species on a macro plot. It is relatively fast and efficient to conduct in the field and is suited for sampling a wide variety of vegetation types. It is especially useful in plant communities with tall shrubs or trees to inventory large areas when there are few examiners available to help with sampling. Like other sampling methods, this protocol is useful for describing a stand or plant community and documenting important changes over time. However, it does not quantify the variability within a stand and can not be used to detect

statistically significant changes over time. The data that are required for this protocol are species name, status, canopy cover, and height. Canopy cover is an ocular estimate of the area of ground covered by the vertical projection of the outermost perimeter of the natural spread of the plant's foliage. Height measurements are made either by using a size class or by measuring each specimen.

Cover - Points

The Point Cover protocol is used to assess changes in plant species cover or ground cover for a macro plot. It is primarily suited for vegetation types less than 3 feet (1 m) in height and particularly useful for recording or tracking changes in ground cover. The protocol uses a narrow diameter pole that is lowered to the ground at systematic intervals (usually every foot or meter) along a measuring tape. Plant species or groundcover that touches the pole are recorded as 'hits' along the measuring tape/transect. The "hits" are the samples in this protocol and they are recorded by tape location, species, and height. The samples are statistically valid representations of the stand variation and of the amount of change in cover and height over time when they are reassessed on permanently-marked transects. Canopy cover is calculated by dividing the number of 'hits' for each plant species or ground cover class by the total number of points along a transect.

Cover - Points by Transect

Point Cover transect data is collected in exactly the same way as the Cover-Points data and it is used for the same types of sampling (see section above). The only difference is that the points are not recorded individually in Cover – Points by Transect. The "hits" on each species are summarized in the field and each species is entered only once on the form. If there are different size classes for the species, they may be entered multiple times; but, in general, this protocol uses a summary approach to record and analyze the hits.

Cover/Frequency (FIREMON and Daubenmire cover classes)

The Cover / Frequency protocol is used to assess changes in plant species cover and frequency for a macro plot. This protocol uses quadrats (small sample frames) to sample within-stand variation and to statistically quantify changes in plant species cover, height, and frequency over time. Frame sizes may vary depending on the objectives of the study and the method used. Since it is difficult to estimate cover in quadrats for larger plants, this protocol is primarily suited for grasses, forbs, and shrubs less than 3 feet (1 m) in height.

For this protocol, quadrats are placed systematically along randomly located transects. Canopy cover is assessed within each quadrat by visually estimating the percent of the quadrat that is occupied by the vertical projection of each species (or each substrate element) onto the ground. Species frequency is recorded as the number of times that it occurs within a given number of quadrats. Frequency is typically recorded for plant species that are rooted within the quadrat.

Within the cover frequency protocol, there are two different scales available for visually estimating plant cover. The first is the FIREMON scale, which uses 13 intervals to span cover estimates of 0 to 100%. The second is the Daubenmire scale (from R. Daubenmire, 1959, A canopy coverage method. Northwest Science 33: 43-64), which uses

6 intervals. Do not mix scales. Rather select the one set that meets your study objectives most closely and use it exclusively within a sample event.

Density - Belts

The Density– Belts protocol is used to assess changes in plant species density and height for a macro plot. The protocol is most commonly used to sample shrubs and trees. Belt transects have a length and a width and are usually much larger than the density-quadrat frames. Like the quadrat frames, belt transects need to be randomly located on the landscape to give statistically valid results for cover or frequency over time. Sampling within the belt boundaries is done by counting the number of individual plants within each species. The total number of individuals for each species is recorded along with a height class. Density is calculated as the number of individuals per unit area. The accuracy of the density estimate depends largely on the size and shape of the belt, and the optimum belt size and shape depends on the plant species distribution (see discussion on shape and boundary problems associated with belts and quadrats in the FIREMON users guide at http://frames.nbii.gov/firemon).

To estimate tree density, we recommend using the Tree sampling protocols in FFI rather than the density-belt approach.

Density - Quadrats

The Density–Quadrats protocol is used to assess changes in species density and plant height for a macro plot. The protocol generally requires a sample frame that is sized appropriately to the lifeform of interest and that is placed randomly on the landscape so that the sampling will be statistically valid. Density - Quadrats is primarily suited for grasses and forbs where individual plants or stems can be distinguished, while longer, wider belt transects are most appropriate for sampling shrubs and trees. The numbers of individuals for each plant species within each quadrat are counted and the count for each quadrat is recorded. Density is calculated as the number of individuals per unit area.

Disturbance History

The Disturbance History protocol provides a means of tracking disturbances on a macro plot. Although the protocol is purely descriptive, it can be extremely useful to relate ecologic effects and disturbance factors during monitoring. The protocol contains 31 causal agents that can be used to describe disturbance on each macro plot. These agents include a range of factors, from the introduction of exotic species to clear-cutting. The duration of each disturbance event can be recorded using start and stop dates if they are known. The effects caused by each agent and the relative amount of damage they cause can be summarized within the protocol by using the "change" field or by using one or more of the three user variables provided.

FCCS

The Fire Characteristic Classification System (FCCS) was developed by the Forest Service Pacific Northwest Research Station as a way to characterize all of the combustible components of a fuelbed. The FCCS fuelbeds are linked to a classification system that

uses seven variables. Directions for sampling the variables are provided in the FCCS user guide.

FFI stores data for the seven FCCS variables in a special table. The values for these variables can be entered directly into FCCS software to classify a fuel bed or used to describe an entirely new FCCS fuelbed. To describe a new fuel bed, the user samples the fuelbed (vegetation, down woody material, trees, etc.) using the FFI sampling protocols and records values for the seven variables. The fuelbed description is then linked to the classification variables in FCCS to define a custom FCCS fuelbed. Biomass of some fuelbed strata can be calculated using FFI summary reports (e.g., down woody material, duff, litter, etc.). Other biomass estimates will need to be calculated outside FFI (e.g., allometric equations to calculate shrub biomass from cover and height measurements).

Fire Behavior

The Fire Behavior protocol is used to describe the behavior of a particular fire and the ambient weather conditions that influence the fire's behavior. This protocol is not plot based. Users collect fire behavior data by fire event and time-date, instead of collecting data at one specific macro plot location. If users want to describe fire characteristics at a particular macro plot, they should use the Plot Description protocol and fill in the information on Flame Length, Spread Rate, and Fire Behavior Picture fields at each specific location (see below). The FireID and Fire Date fields in the Plot Description protocol link a macro plot's specific fire behavior information and physical and biological characteristics to the broader fire-event information described within the Fire Behavior protocol. The data that should be collected for the Fire Behavior protocol includes information on location, burning conditions, fire behavior, and fuel moistures. To adequately describe a fire event, all fields within the protocol form should be completed.

Fuel Load

Fuel Load is a line transect technique that estimates loadings of downed dead woody in a variety of size classes (Brown 1979). Litter and duff depths will be estimated along the transect using methods outlined in Keane (1999). The FL methods are used to sample dead and down woody debris, estimate the depth of the duff/litter profile, and estimate the proportion of litter in the profile. Down woody debris is sampled using the line transect method (Brown, 1974). Pieces are tallied in the standard fire size classes: 1-hour (0-0.635 cm), 10-hour (0.635-2.54 cm), and 100-hour (2.54-7.62 cm). Pieces greater than 7.62 cm are recorded by diameter and decay class. Duff and litter depth are measured at two points along each of 25-meter line transect segments. Litter depth is estimated as a proportion of total duff and litter depth.

Plot Description

The Plot Description protocol is used to describe general macro plot characteristics that provide an ecological context for data analyses. Within this protocol, many of the plot characteristics that are important to analyzing relationships or fire behavior data are described. This protocol provides the general ecological data that can be used to stratify or aggregate fire monitoring results. The data collected in the plot description characterize the topographical setting, geographic reference point, general plant

composition and cover, ground cover, fuels, and soils information for a macro plot. Comment fields also allow for documentation of plot conditions and location using photos and notes. None of the data fields are required in the plot description form, but all should be filled out at least once for each macro plot to give the sampling events ecological context.

Post-Burn Severity

The Post Burn Severity protocol is used to assess changes in vegetation and substrate after a fire and is most useful to determine how much of an area has been lightly burned versus scorched or unburned. Essentially, it is a point-transect method for sampling burn severity. The samples are statistically valid representations of both the stand variation and the effect that the burn has on the vegetation and the substrate.

For the Post Burn Severity protocol, a transect line is laid out for a specified distance. At systematic intervals along the line, the vegetation and substrate are examined. Each point is evaluated for burn severity and assigned a corresponding code value (1= heavily burned, 5 = unburned; 0 = not applicable, -1 = not assessed). The location on the tape and the severity codes for both vegetation and substrate are recorded within this protocol.

Rare Plant Species

The Rare Plant Species protocol is used to assess changes in uncommon, perennial plant species when other monitoring methods are not effective. Individual plants are identified and monitored for statistical changes in plant survivorship, growth, and reproduction over time. This protocol is primarily used for Threatened and Endangered species and uncommon grass, forb, shrub, and tree species of special interest.

In this protocol, individual plants are spatially located using distance measurements along and from a permanent baseline. Each located plant is marked in the field using a permanent tag, which is recorded in the rare plant species form. Data are collected on the plant's status (living or dead), stage (seedling, non-reproductive, or reproductive), size (height and diameter), and reproductive effort (number of flowers and fruits). Extra variables are also available if the observer wants to make observations or comments on each of plant.

Surface Fuels

The Surface Fuels protocol is a planar- and line-transect technique used to assess the downed woody debris, duff, and litter on a macro plot. This protocol consists of three sample methods. Data is required in all fields for each method so that total fuel load can be computed for the macro plot.

Down woody debris is sampled using the planar transect method (Brown, 1974). Counts of the pieces are tallied for the standard fire size classes: 1-hour (0-0.635 cm), 10-hour (0.635-2.54 cm), and 100-hour (2.54-7.62 cm). For 1000 hr fuels, which are greater than 7.62 cm in diameter, the diameter, decay class*, and slope of each log are required. Duff and litter are entered as depths or the entire fuel bed depth can be specified. If duff and litter depth are measured, measurements are taken at specified points along each 25-meter line transect segment. Litter and duff depths can also be estimated along each transect using methods outlined in Keane (1999). Litter depth is estimated

as a proportion of total duff and litter depth. Fuel constants can be entered separately for each fuel type or users can use a default value provided in FFI.

> * "Sound" and "rotten" are not included in the coarse woody debris (CWD) decay class drop-down list. When recording the decay class of CWD, we suggest using the five-decay-class classification instead of the two class system of "sound" and "rotten". The two-class system is useful for fire information, but the five-class system has proven more useful for a number of ecosystem applications and should be used whenever possible. This is especially true if the Fuel Constant Sets (FCS) are used. The FCS lets you modify some fuel attributes that are used to calculate biomass. For example, the specific gravity of CWD in each decay class can be defined in an FCS. In the default FCS, the specific gravity of decay classes 1 through 3 are set to 0.4, and the specific gravity of decay classes 4 and 5 is set to 0.3. If you wish to use the two-class system, we recommend that you use decay class 3 for sound or decay class 4 for rotten. Enter S or R in one of the UV fields as appropriate to remind yourself that the two-class system was used. The characteristics used to identify logs in each of the decay classes are discussed in the FIREMON FL sampling methods. The FIREMON discussion is based on the CWD classification presented in: Maser, C., Anderson, R., Cromack, Jr., K., Williams, J.T., Martin, R.E., 1979. Dead and down woody material. In: Thomas, J.W. (Ed.), Wildlife habitats in managed forests: the Blue Mountains of Oregon and Washington. USDA Agricultural Handbook 553. pp. 78–95.

Surface Fuels - Alaska Duff and Litter

The expanded duff and litter protocol is based on the standard duff and litter sampling method found in the Surface Fuels protocol, but it also includes sampling guidelines for collecting the depth of the live moss, dead moss, upper duff, lower duff, and lichen layers. The protocol was developed primarily for Alaska systems, but it can be used in any ecosystem where assessment of any of these components is important. If desired, the user may build a Fuel Constant Set within FFI, which includes the bulk density of each component. FFI will calculate the biomass of each component of the expanded duff and litter table and provide it in summary reports.

Surface Fuels - Piles

The Surface Fuel – Piles protocol is used to assess the biomass of piled fuels. Piles are generally composed of post-treatment harvest material (slash) and tend to be scattered across a treatment area. In FFI, each pile is considered a plot. In general, the Surface Fuels - Piles protocol should only be applied on the piles on a macro plot. Other sampling protocols should be applied to describe the other coarse-woody debris fuels.

Piles are assessed by measuring the height, width, length, and pile shape. Estimates of the packing ratio, species composition and soil content are entered using Hardy, CC, 1998, Guidelines for Estimating Volume, Biomass, and Smoke Production for Piled Slash, USDA Forest Service Pacific Northwest Research Station General Technical Report PNW-GTR-364, Portland OR, 28p. The FFI summary reports use these attributes to calculate biomass for individual piles and all piles across the sampling site. Emissions can

be calculated using the figures in Hardy (1998) or by using fire-effects simulation models.

Surface Fuels - Vegetation

The Surface Fuels – Vegetation protocol is used to describe the lifeform types on the macro plot that may contribute to fire severity and fire spread. This protocol does not include measures of downed woody debris, which are sampled using the Surface Fuels protocol (see above). This protocol characterizes only the live and dead shrubs and live and dead herbs.

Surface Fuels – Vegetation uses two 6-ft (2-m) cylindrical sample areas located at specific positions along a transect line to describe shrub and herb fuels. Within the cylinder, canopy coverage of live woody species (trees and shrubs), dead woody species, live non-woody species (herbs), and dead non-woody species are estimated. A height is also estimated for each of the four types of fuels. "Cover" is the vertically projected cover contributed by each category estimated within the cylinder. It includes plant parts from plants rooted in the sampling cylinder and plant parts that project into the sampling cylinder from plants rooted outside. Cover is estimated by imagining all of the vegetation in each class pressed to the ground and determining what percentage of the cylinder is covered. "Height" is the average height of each group as it appears within the cylinder. Detailed information on implementing this protocol can be found in the FIREMON user's guide (http://frames.nbii.gov/firemon).

Tree: Trees - Individuals; Trees - Saplings; Trees - Seedlings

The Tree protocols are used to sample individual trees, snags, saplings, poles, and seedlings in a fixed-area plot or to estimate tree density, size, and age class distributions before and after fire so that tree survival and mortality rates can be assessed. These protocols can also be used to sample individual shrubs over 6 ft (2 m) tall. The Trees protocol consists of three distinct methods – single tree, diameter class, and height class. If the user does not wish to record data for all three methods on a macro plot, each method can also be accessed individually by using the (1) Trees – Individuals; (2) Trees – Saplings; or (3) Trees – seedlings protocols.

Each of the tree forms can be used for specific classes of trees, as long as the user defines the diameters or size/height classes of interest. For example, within the single-tree form, all sizes of trees (including saplings or seedlings) that meet user-designated break-point diameters can be recorded by species. The Trees by Diameter Class form can be used to record trees less than diameter class 4 (e.g., saplings) or used to represent some user-defined diameter-based classification as long as it is defined in the metadata, comment or user-variable fields. The Trees by Height Class form can be used to record trees less than 4.5 ft (1.37 m) tall (e.g., seedlings)) or to represent a user-defined height classification.

The three methods within the Tree protocol provide comprehensive descriptions of tree characteristics on a macro plot. The Single-Tree data form allows the user to record measures of diameter, height, age, growth rate, crown length, pathogen evidence, fire damage, and snag information for each tree above a user-specified diameter. The protocol also includes descriptions of how the tree has been affected by burning, where the tree is located on a landscape, and what other types of damage

that the tree has sustained. The Diameter- and Height-Class forms allow users to track changes in status, number of individuals, and amount of crown growth only.

Vegetation - Line Intercept

The Line Intercept method is used to assess changes in plant species cover for a macro plot. This method uses line transects to sample within stand variation and quantify statistically valid changes in plant species cover and height over time. This method is suited for most forest and rangeland communities, but is especially useful for quantification of shrub cover greater than 3 feet (1 m) tall, given that ocular estimation of cover for such species is difficult. The LI method can also be used in conjunction with cover-frequency transects when vegetation over 3 feet (1 m) exists. Line intercept is also used to calibrate ocular estimates of shrub cover when the Species Composition (SC) method is used. Canopy cover is recorded as the number of centimeters intercepted along a transect. Percent canopy cover is calculated by dividing the number of centimeters intercepted by each item by the total length of the transect.

Comparison of program elements

The following table compares FFI program elements with those of its predecessor monitoring programs.

FFI	FIREMON	FEAT	FMH
Administrative Unit	**PD Plot Description** > **Registration Unit**	**Land Unit**	**Park/Unit** [1]
Project management tab > Project Unit (name, agency, objectives, description, monitoring status, candidate plots, metadata)	**PD Plot Description** > **Project ID** (plot ID, organizational information)	**Monitoring Unit** > **Macro plot** **Management Monitoring Unit** > **Assign macro plots** (plot ID, monitoring objectives, metadata, burn prescriptions, creation and retirement dates)	**Park/Unit** [1] **Form FMH-4** **Form FMH-7** (burn and/or treatment status) Also, all information on plot ID, burn status, treatment history required by other FMH forms
Project management tab > Sample Event (name, type, purpose, site characteristics, position/location, PDOP, installation and retire dates. All sampling protocols and timing are assigned here.) Note: all biophysical descriptions are located in separate Plot Description method.	**PD Plot Description** > **Sample Event** (plot ID, georeferenced information, all biophysical characteristics)	**Monitoring Design > Monitoring Event** (biophysical descriptions, locations, etc.) [2]	**Form FMH-4** (choosing sampling protocols and monitoring types) **Form FMH-5** (GIS, location, directions to plot, and metadata) **Form FMH-5a** (history of site visits) [3] **Form FMH-7** (sampling areas)
PDA Coordination tab.	Not available	Need separate module (**FEAT Mobile >**	Not available

FFI	FIREMON	FEAT	FMH
Allows data entry from a PDA		**FEAT for PPC2**) to run FEAT on PDA	
Query tab. Filter, add data. classify, group and calculate, export or print from within FFI	**Simple Query Builder**. Export all queries for printing outside program	**Summary Builder**. Filter, more fields, classify, group and calculate, export - Access query or Excel .xls files	Not available
Reports and analysis tab > Report 1. Summary reports by sample method or attribute or strata 2. Reports by monitoring status 3. Save, print, or export reports	**Reports** 1. Data summary reports by sample method or attribute 2. Sampling event filter 3. Create, clear, save, print, or export reports	**Print Monitoring Unit** [4] **Metadata** **Print Species List** **Summary Builder** (export file, print outside program)	Not available. Entry of records indexed for checking data input
Reports and analysis tab > Analysis 1. Custom reports for user-defined groups 2. Bar charts available by method and attribute 3. Statistical significance calculated where applicable 4. Computes confidence intervals 5. Multiple comparison procedures 6. FVS-FE data export	**Data analysis** - Separate program, **FMAT**, used for analysis and statistics 1. Custom reports for special group analyses 2. Bar charts available by method and attribute 3. Statistical significance calculated where applicable 4. Computes confidence intervals 5. Multiple comparison procedures	**Data analysis** only for: 1. Fuel Load calculations (under Reports and Analysis > Fuel Load) 2. Density, basal area, cover and frequency calculations (in Summary Builder under Group & Calculate tab)	**Analysis** 1. Single status summary, grouped by plots, species, native/non-native, live/dead, size class 2. Change over time, grouped by same as above 3. Confidence intervals computed 4. Bar/line/area graphs available 5. Sample size calculations **Form FMH-26** (data analysis record) [5]
Species Management tab. Create species list that functions with drop-down menu upon data entry (import lists, create new list, add from master USDA NRCS list, make user list, handle unknowns, global replace feature, print species lists. SQL database-driven.	Add species to fields as needed from lookup table; Access database-driven	**Species Management** . Comparable to FFI although screens are different; Access database-driven	**Form FMH-6** (species code list) 6

FFI	FIREMON	FEAT	FMH
Toolbox tab > External data analysis. Import data from Excel for analysis in FFI	Copy and paste Excel data into Access database	Not available	Not available
Toolbox tab > Protocol management. Manage (delete, retire, or reinstate protocols)	Not available	Not available	Not available
FFI GIS spatial analysis module. ArcGIS toolbar	Not available	Need added module (**FEAT Spatial** for ArcGIS) to use GIS with main FEAT program. ArcGIS toolbar	Not available
Protocol Manager module. Create new method definitions for FFI	Not available	Not available	Not available
Photo Management. Make separate photo folder and store photos in it, with link from user variable (UV) fields if desired.	Photo storage within individual method forms (PD form or local code fields)	**Data Entry and Review > Photos** (date, time, status, photo list, actual photos displayed within form)	**Form FMH-23** (photographic record sheet)

Notes:

[1] The Park/Unit in FMH can correspond to either an administrative unit OR a project unit in FFI depending on how a study is set up. For example, if managers wanted to do a study of rare plants in several parks for restoration purposes, an administrative unit might be entitled "Western and Central US rare plant study" and each park would be a project under that umbrella. In this case, non-agency rare plant studies could also be included as separate projects. Each project would be analyzed separately in the reports and analysis but all would be accessible within the same FFI user screen. Alternately, if a park/unit was set up as an administrative unit, only data from that park would be accessible within FFI at any one time. Projects would be specific to the individual park. To view data from another park, you would have to close FFI, reopen, and chose another administrative unit (park).

[2] FFI incorporates several FEAT forms, and parts of forms, into the Sample Event, including several fields under Monitoring Design (i.e., macro plot, subsamples, assign protocols, and plot templates.

[3] FFI maintains a record of each site visit by sampling event. When you revisit a site, you start a new sampling event. After data is entered into a sampling event, the list of sampling events under a macro plot becomes the list created in the FMH-5a form. Note: There is no FFI equivalent for form FMH-25, Plot Maintenance Log.

[4] FEAT printouts are located in various places within the program and accessed individually. The list included here may not be complete.

[5] FFI analyses can be saved and printed or exported to another application and printed to fulfill the requirements of FMH-26.

[6] The standard protocols in FFI do not contain a form for recording information on voucher specimens. Voucher information would have to be stored within the meta-data or within FFI user variables located in the method that was used to collect the sample. If a protocol is needed for collecting voucher specimens, however, it can be created within Protocol Manager and imported into FFI to fulfill sampling needs.

Comparison of sampling protocols

The following table compares available sampling protocols in FFI with those of its predecessor monitoring programs.

FFI	FIREMON	FEAT	FMH
Biomass (Fuels). Weights for all live and dead surface fuel types	Not available	Not available	Not available
Biomass (Plants). Green and dry weights for clipped vegetation	Not available	**Biomass.** Herbaceous wet and dry weight	Not available
Composite Burn Index (CBI) 1. Plot information 2. Substrate 3. Herbs - low shrubs <1 m tall 4. Tall shrubs 1 - 5 m tall 5. Intermediate trees 6. Big trees 7. Summary values (plot mean)	**CBI** 1. Plot information 2. Substrate 3. Herbs, low shrubs, tree seedlings 4. Tall shrubs, saplings 5. Intermediate trees 6. Big trees 7. Composite burn index calculation	**CBI** 1. Plot information 2. CBI A Substrates 3. CBI B Herbs 4. CBI C Tall shrubs 5. CBI D Intermediate trees 6. CBI E Big trees 7. CBI Summation	Not available
Cover - Line intercept . Transect, species, status, size and age class, start point, stop point, intercept, height	**LI - Line intercept**	**Line Intercept.** Line intercept, basal and aerial	Not available
Cover - Species composition. Species, status, NRF, type code, cover, height	**SC - Species composition.** Species, status, cover, height	**Ocular cover/observed species.** Species, cover, status	**Form FMH-15** (50 m transect data, species observed but not intercepted)[1] **Form FMH-16** (30 m transect data, species observed but not intercepted)
Cover - Points. Tran-	Not available	**Point transect**	**Form FMH-15** (50 m transect data) **Form FMH-16** (30 m transect data

FFI	FIREMON	FEAT	FMH
sect, point number, tape location, order, species, status, height			Used for shrub and herbaceous covers
Cover - Points by transects. Transect, species, status, hits	**PO Tran - Points Intercept by Transect** **PO Frame - Points Intercept by Frame/Grid**	Not available	Not available
Cover - Frequency	**CF - Cover Frequency**	**Cover by Frame**	Not available
Density - Belts. Transect, species, status, size and age class, count, height	**DE - Belt**	**Density.** Herbaceous, shrub, and tree density	**Forms FMH-17** and **17a** (herbaceous density data) Forms FMH-10 and 10A (seedling tree data)
Density - Quadrats. Quadrat number, species, status, size and age class, count, height	**DE - Quadrat**	**Density.** Herbaceous, shrub, and tree density	**Form FMH-18** (herbaceous density data)
Disturbance History. Change agents, disturbance codes, and timing variables	Not available	**Event Type** and **Disturbance Type** recorded in **Monitoring Event**	Not available
Fuel Characteristic Classification System (FCCS). Ecoregion, vegetation formation, structural stage, cover type, change agent, fire regime, FRCC	Not available	Not available	Not available
Fire Behavior. Fire information, location information, burning conditions, fire behavior, fuel moisture, and user variables for photo links	**FB - Fire Behavior**	Not available	**Forms FMH11, 1a** **Forms FMH-2. 2a** **Form FMH-3** (wind speed for smoke use only) **Form FMH-3a** (fuel load calculations only) 2
Metadata. Entered at project unit or in any of the UV fields in each form	**MD - Metadata**	Metadata entered in **Monitoring Unit**	Comments or Notes area on most FMH forms
Pilot Sampling	Not available	**Pilot Sampling**	Not available

FFI	FIREMON	FEAT	FMH
Plot Description. Plot dimensions, bio-physical description, photo plots, general fire behavior	**PD - Plot Description.** Biophysical descrip-tion, fuels, photos, plot-level fire behavior	General plot char-acteristics descriptions associated with **Macro Plot** and **Mon-itoring Unit**	**Form FMH-4** (bio-physical descriptions, monitoring type) **Form FMH-5** (Plot loca-tion) **Form FMH-7** (plot photo order only)
Post Burn Severity. Tape distance, burn effects on vegetation and substrate	Not available	**Post Burn Severity**	**Form FMH-21** (forest plot burn severity) **Form FMH-22** (brush and grass plot burn severity)
Rare Plant Species. Species, location along and from base-line, status, stage, size, number of stems and fruiting structures	**RS - Rare Species**	Not available	Not available
Surface Fuels (3-part form) 1. Fine woody debris 2. Coarse woody debris 3. Duff and litter	**FL - Fuel Load** 1. Fine woody debris (includes duff and litter depth) 2. Coarse woody debris	**Fuels** 1. Fuels 1 - 100 2. Fuels 1000 3. Fuels LD (litter and duff)	**Form FMH-7** (fuel-load transect azimuth and slope only) **Form FMH-19** (forest plot fuels inventory)
Surface Fuels - Alaska DuffLitter. Transect, sample location, off-set, litter depth, live and dead moss depth, upper and lower duff depth, lichen depth, fuelbed depth, fuel constant	Not available	Not available	Not available
Surface Fuels - Piles. Pile number, pile count, shape, dimen-sions, pack ratio, spe-cific gravity	Not available	Not available	Not available
Surface Fuels - Vege-tation. Sample loca-tion, herb and shrub status, cover, and height	**FL - Fuel Load** 3. Vegetation (live and dead herbs and shrubs)	Not available	Not available

FFI	FIREMON	FEAT	FMH
Trees (3-part form) [3, 4] 1. Single trees 2. Trees by diameter class 3. Trees by height class	**TD - Tree Data** 1. Mature trees 2. Saplings 3. Seedlings	**Overstory and Pole Trees.** Contains damage code and severity fields, status, and break-point diameter	**Form FMH-8** (overstory tagged tree data) **Form FMH-9** (pole-size tree data) [5] **Forms FMH-10 and 10a** (seedling tree data) **Form FMH-20** (tree post-burn assessment)

Notes:

[1] The Species Composition method could technically be used for Forms FMH-15 and FMH-16 by leaving Cover blank. FFI's summary report will not be accurate if Cover is left blank.

[2] FFI has no equivalent for FMH forms FMH-3 and 3-a, which describe visibility, CO exposure, emissions, particulates, and smoke. Sample protocols for these elements can be created in Protocol Manager and imported into FFI if they are important to sample for a particular study.

[3] The Trees protocol in FFI is a combination of three protocols that incorporate information from several FMH forms. If managers want to sample only one size class, they can use the individual FFI tree protocols, which include Trees-Individuals, Trees-Saplings, or Trees-Seedlings. These forms include only data entry fields for the size class of interest.

[4] FFI does not have protocols for plot-tree mapping (Forms FMH-11, 12, 13, and 14). X-Y coordinates can be entered in the Trees (or Trees-Individual) protocol, or users can enter X - Y coordinates into the FFI GIS module to plot the maps required in these forms.

[5] Only the Trees and Trees-Individual protocols in FFI store the information on tree tags and damage codes that is required in Form FMH-9.

FFI PDA Field Handbook

The *FFI PDA Field Handbook*, a component of the *FFI User's Guide*, covers operations that are done only on the PDA. For all operations that require the desktop, such as sending sample events to the PDA in preparation for field work and importing data from the PDA, see the PDA coordination section of the *FFI User's Guide*.

The handbook covers:

- Checklist and suggestions
- Setting data collection parameters
- Entering sampling data
- Using multiple PDAs
- Managing battery power
- Backing up and restoring the database and the FFI PDA software

The *FFI PDA Field Handbook* is available as a stand-alone PDF document that you can load on your PDA for use in the field. This requires that you install Adobe Reader for Pocket PC 2.0, which can be downloaded at http://www.adobe.com-/products/acrobat/readerforppc.

PDA overview and checklist

FFI on the PDA (FFI PDA) is a simple data capture interface that:

- Allows input, review, and editing of new protocol data in the field.
- Supports collection of data for multiple administrative units.
- Can be used with multiple PDAs in the field.

There are several things that FFI PDA does not do. It cannot:

- Provide a way to review or edit data from previous sample events.
- Allow creation of project units, macro plots, or sample events.
- Work in conjunction with a GPS unit to locate plots.

Before you leave the office

- Reduce the number of species in your active picklist as much as possible. Having fewer than 300 will improve the performance of the PDA.
- Print any hard copies of previous readings that you may need for reference.
- Obtain any backup paper forms that you may wish to carry.
- Make sure you have an adequate number of unknown species.
- Develop a strategy for handling unknown species.
- Develop a strategy for creating backup files.
- Fine-tune your PDA power usage.
- Obtain plenty of spare memory cards.

- Create a self-restoring Sprite backup file on each memory card that you will be using, before you leave the office.

In the field

- Stand with your back to the sun so that the screen is illuminated by sunlight instead of trying to shade the screen.
- Back up your data often.

Upon returning to the office

- Import your sample events and data to FFI on the desktop.
- Retrieve data from each PDA for each sample event.
- Reconcile any used unknown species.
- Review the imported data in the FFI **Data Entry and Edit** window.

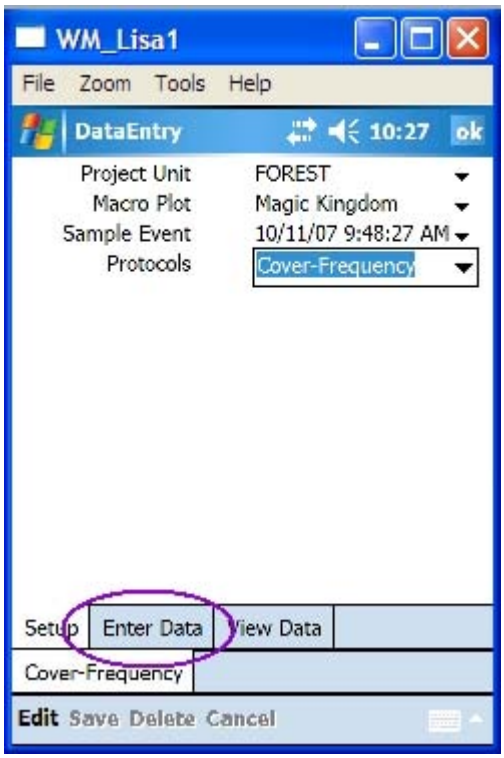
Entering sampling data

Entering sampling data on the PDA in the field involves these steps:

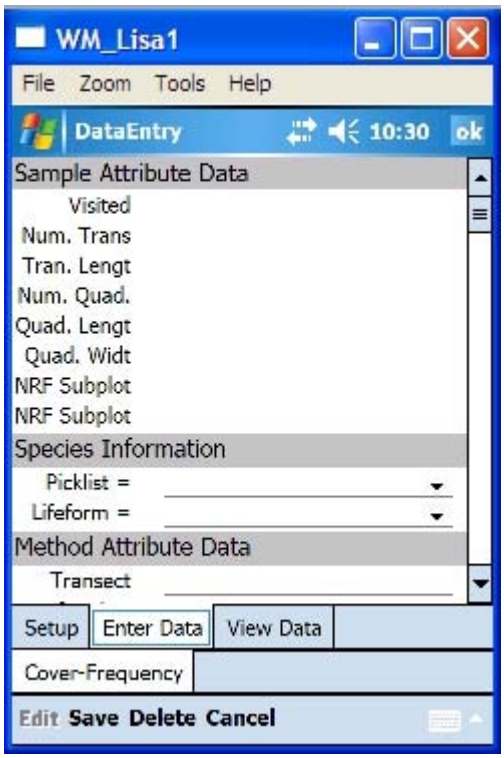
- Selecting data entry parameters
- Entering sample attribute data
- Entering species information
- Entering method attribute data

To begin

To begin sampling data on the PDA, first set up the data entry parameters (see Selecting sample events and protocols for information), and then click **Enter Data**. In this example, the protocol for which data is to be collected is *Cover-Frequency*.



The **Data Entry** window is now ready to accept data.



Next: Entering sample attribute data

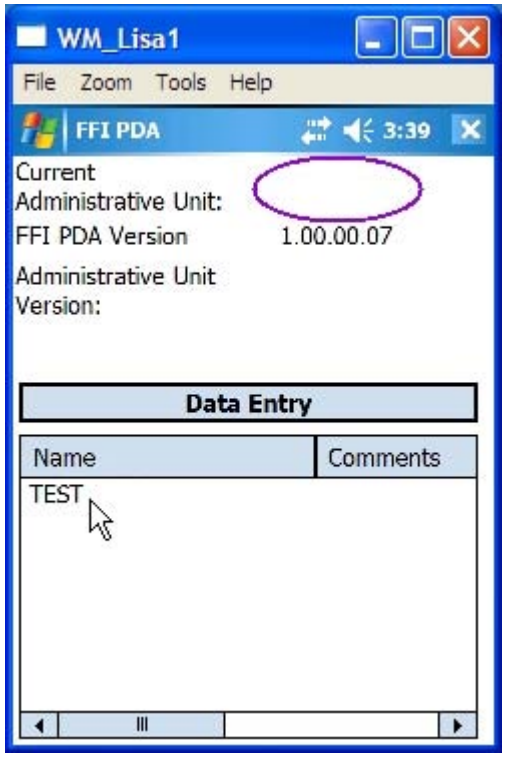
Tips

- For methods like *Density* that have groupings with tallies, you can enter the same grouping twice. Example: You find three live PIPO seedlings in height class one at the beginning of the belt and then find four more seedlings further down the belt. Instead of editing the old row, just enter a new row for the new seedlings. These can be grouped together at analysis time.
- If FFI reports errors as you enter method attribute data, find the values shaded in red, and click on the red exclamation point for an explanation of the error.
- *If your PDA experiences serious errors during operation, you might need to perform a soft reset. If the problem continues, you might need to execute a hard reset and reinstall FFI PDA. Check your PDA operation manual for instructions on resetting your PDA. Keep in mind that a hard reset will erase the device's memory, and no data will be saved.*

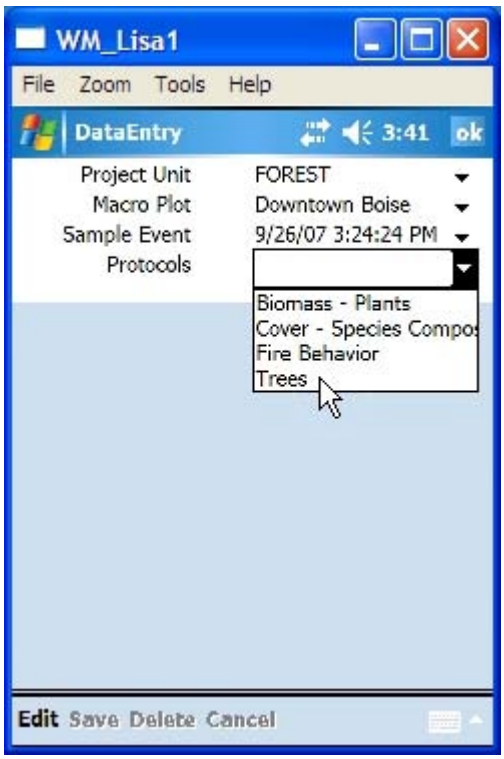
Selecting sample events and protocols on the PDA

After you have exported your sample events to the PDA and reached the field, you can select sample events and protocols on the PDA in preparation for data collection.

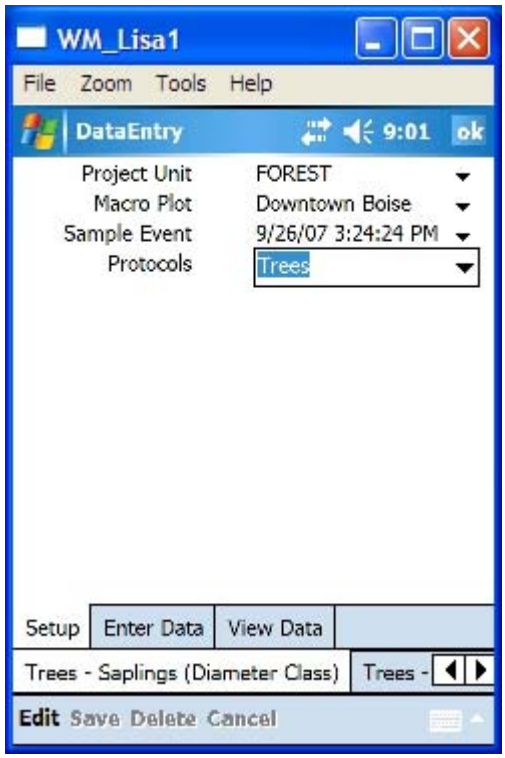
1. Start **FFI PDA** by tapping the **Start** menu and selecting **Programs**. In the **Programs** folder, tap **FFI PDA**.
2. In the main **FFI PDA** window, select the name of the administrative unit in the grid, as shown. The administrative unit name will then appear as the **Current Administrative Unit**.



3. Click the **Data Entry** bar.
4. In the **Data Entry** screen, use the pull-down lists to select the appropriate project unit, macro plot, sample event, and protocol to be sampled.



*NOTE: The **Trees** protocol includes three methods, and the **Trees - Saplings (Diameter Class)** method is currently active, as shown at the bottom of the screen. Use the left and right arrows to select the desired **Trees** method.*

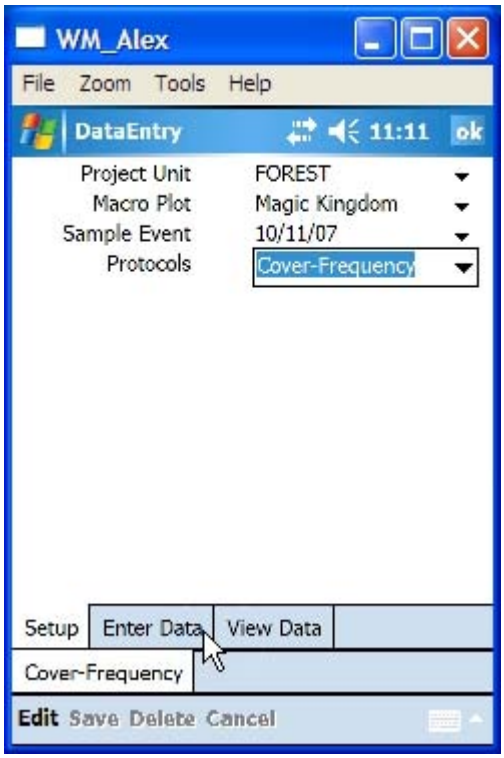


Next: Entering sample attributes

Entering sample attribute data

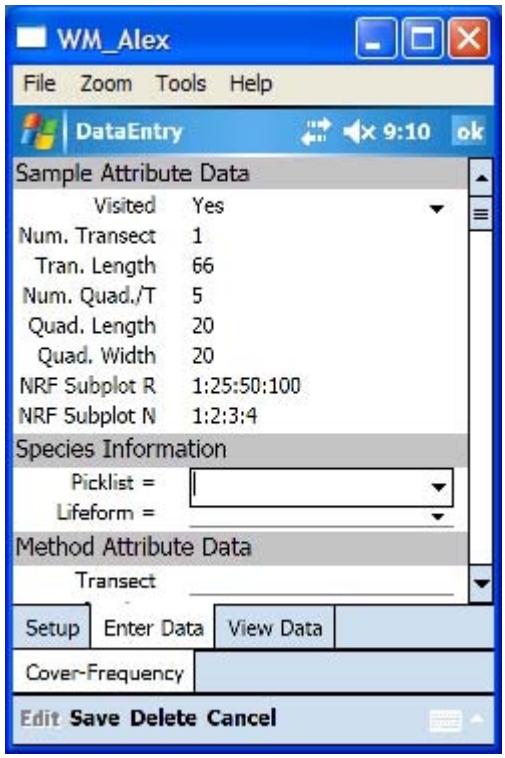
Enter data for the sample attributes:

1. In the **Data Entry** screen, tap **Enter Data**.



2. In the **Sample Attribute Data** window, select **Yes** in **Visited** to verify that the site was visited.
3. Enter data for each of the required sample attributes.

NOTE: You need to enter the sample attributes only once, and only one row is created in the database for sample attributes. These values will stay at the top of the data entry screen as you enter method attribute data.



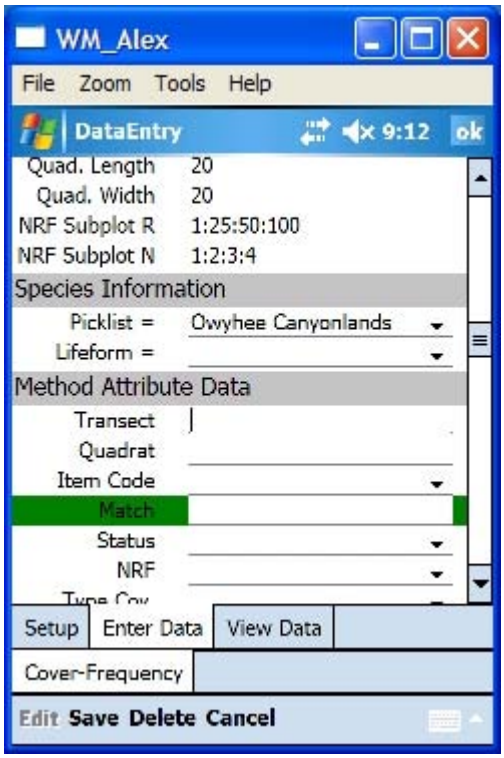
NOTE: If, during the field work, you determine that a sample attribute, such as plot size, is incorrect, don't attempt to change it on the PDA. Make a note in your field notebook and reconcile the data in FFI after import.

Next, enter species information.

Entering species information

In the **Species Information** fields, select either a picklist or lifeform. In this example, the *Owyhee Canyonlands* picklist is selected.

NOTE: You can select a lifeform or a specific picklist, or specifically choose not to filter by picklist, in which case the entire local species list is available during data entry.



NOTES:

- If you select a picklist, keep in mind that the picklist will remain selected as you move between methods. Be sure to unselect it whenever you need to access your full species list.
- FFI lets you use **Match**, an auto-fill feature, to select species.

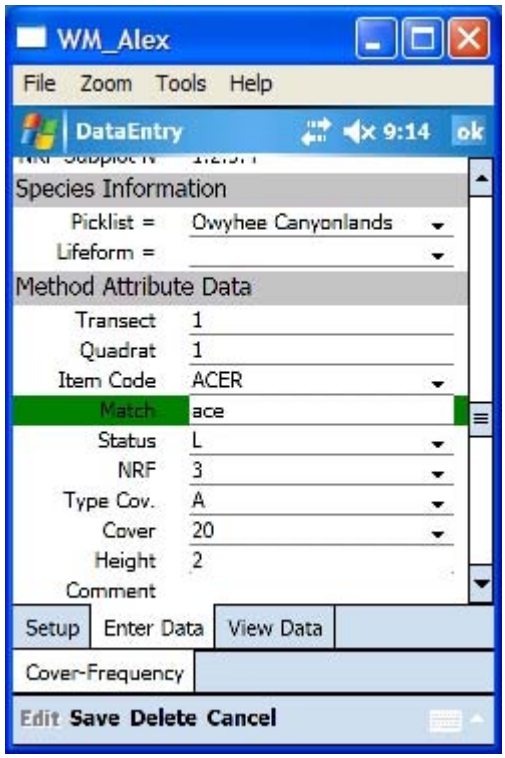
Next, enter method attribute data.

Entering method attribute data

Enter method attribute data, scrolling through the list of attributes for the protocol to ensure that you complete all fields.

NOTE: A row comprises a single method attribute record.

NOTE: If you are entering a values >0 and <1 in fields that allow decimal places, include the leading zero before the decimal point. For example, FFI PDA will interpret the value `.1` *as* `1`*, so be sure to enter* `0.1`*.*



*NOTE: You can use the **Match** auto-fill feature to quickly select a species that is in your species list or a selected picklist. In the **Match** field, begin to enter text. When the desired species is displayed, you can proceed. If **Match** does not find the species you are entering, it will display an error message.*

If FFI reports errors as you enter data, find the values shaded in red, and click on the red exclamation point for an explanation of the error. Correct errors as you work.

1. When you have completed a single record, tap **Save**. This saves the record and clears the form for entry of the next record.
2. When you have finished entering records for the method, or if you wish to review your work, tap **Save** and then tap **Cancel** to release the record. Then tap **Setup** or **View Data**.
3. To review your work, tap **Save** and then **Cancel** to release the record. Then tap **View Data**.
4. To edit a method attribute row, select it in the **View Data** grid and tap **Edit**. Make any necessary changes and tap **Save**.
5. To select another sample event or method for data entry, tap **Setup** and then select the event or method from the drop-down lists in the **Data Entry** window.
6. Continue until you have completed data entry for all of your sample events.

NOTE: Be sure to back up your database routinely throughout the day.

7. Close FFI PDA.

For instructions on moving your data from the PDA to the desktop, see the FFI User's Guide. These instructions are not contained in the FFI PDA field handbook.

Using multiple PDAs

You can use multiple PDAs to record data for a single sample event. This can be advantageous when sampling a long transect or belt, for example. It does require coordination between team members.

*NOTE: Use multiple PDAs only when you are collecting data for a sample event using multiple-record methods. If you collect data during a sample event using a single-record method, FFI will overwrite the data from the first PDA when you upload the data from the second PDA. The single-record methods are **CBI** (all CBI methods) and **Plot Description**. Also, although **Surface Fuels** is technically not a single-record method, when you use the **Surface Fuels - Fines** method, use a single PDA to record a single record per transect.*

Guidelines for using multiple PDAs

- Export the same sample events to each PDA that will be involved in sampling the plot.
- Enter the sample attribute data and species information for the sample event on all PDAs that will be used to sample the plot, even though it is redundant. Upon import, FFI will accept the sample attribute row from the first PDA that imports data and disregard the others.

NOTE: If, during the field work, you determine that a sample attribute, such as plot size, is incorrect, don't attempt to change it on the PDA. Make a note in your field notebook and reconcile the data in FFI after the data from all PDAs has been imported.

- Upon import, method attribute records from multiple PDAs will accumulate in the FFI database to comprise the data for the sample event. For example, if one PDA reads one half of a transect and a second PDA reads the other, the data from both PDAs will appear as one transect in the FFI database.
- Split up a transect or belt so that one team member covers the first half and another covers the second half.
- Establish a procedure for using unknown species. For example, one team member might use numbers 1 - 50 and another might use numbers 51-100. Each team member should record on paper or in an Excel spreadsheet what each unknown is used for.
- Ongoing communication can prevent assignment of two unknowns for the same species. For example, if team member A tells team member B that she has used UNK_001 for GAMU, then B can also use UNK_001 for GAMU instead of another unknown from his range.
    - If you inadvertently use two unknowns for the same plant, you can use the **Replacing a species in method data** function in Species Management to correct the error after the data is imported to the desktop.

- If you inadvertently use one unknown for two plants, be sure to correct the error right away. Edit each record on one PDA before you retrieve the data from that PDA.

Backing up and restoring FFI PDA and databases

Be sure to back up your PDA routinely to protect your data and applications. We recommend using a third-party utility. Should you ever need to execute a hard reset on your PDA, you can use the utility backup file to recover FFI PDA, your database, and any spreadsheets or other documents you are using. Sprite Backup software has proven to be very reliable, and has been tested thoroughly. Sprite works with removable media cards.

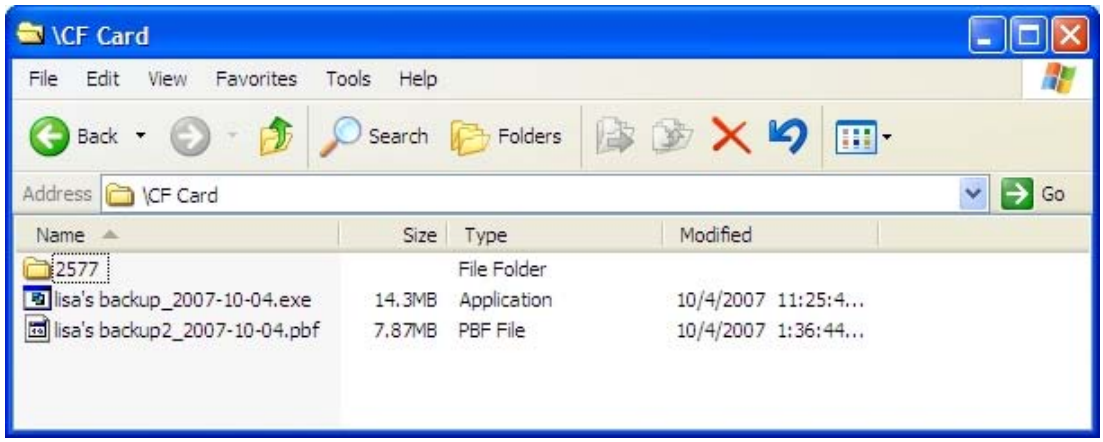
NOTE: Removable cards can fail. Use several smaller (256-MB or 512-MB) cards are better than one larger-capacity card for added security.

Using Sprite Backup software

A daily backup using **Sprite Backup** at the end of a day in the field will protect you from losing the FFI PDA software and database or any spreadsheets or Word documents that you may have on your PDA. Exit FFI PDA before performing a backup, and double-check that the memory card is inserted.

Sprite Backup can be purchased at www.spritesoftware.com and is easy to use. It includes many options, including daily backup scheduling.

Sprite can create two types of backup files: self-restoring files and non-self-restoring files. Self-restoring files are quite large, since they contain executable files, and they have an .exe file extension. Non-self-restoring files, used to back up databases, are smaller and have a .pbf file extension.



See:

- Creating self-restoring and non-self-restoring backup files
- Restoring from backup files

Creating Sprite backup files

For added security, consider saving backups to more than one card. Sprite Backup can be configured to perform daily backups to safeguard your field data.

Creating a self-restoring Sprite backup file on a storage card

Self-restoring backup files take up more room on the removable card, but are necessary for recovery from a hard reset in the field. Self-restoring backups will reinstall all of the software on the PDA, including FFI PDA and Sprite Backup itself. One self-restoring backup on each removable card should be adequate.

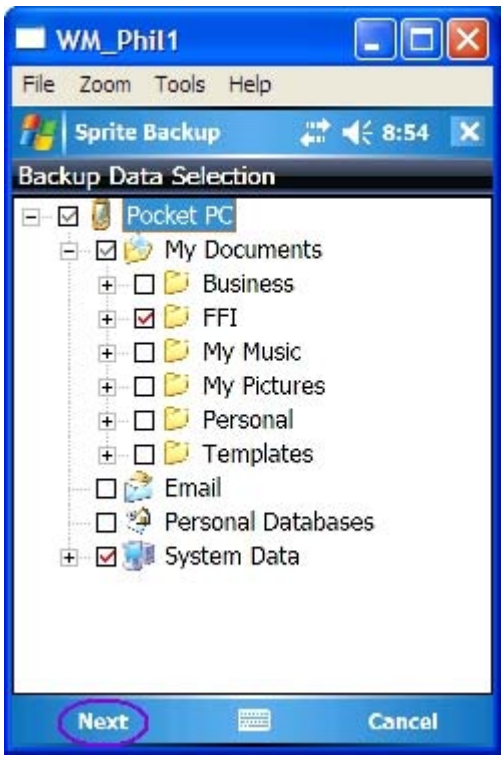
NOTE: Perform a self-restoring backup on each of your media storage cards before you leave the office.

1. Close FFI PDA.
2. Ensure that a storage card is in place.
3. Open **Sprite Backup** and tap **Options**.
4. Tap **Backup** and then tap **General**.
5. In the **General Backup Options** window, click the checkboxes as shown. Tap **OK** to return to the **Backup** window.

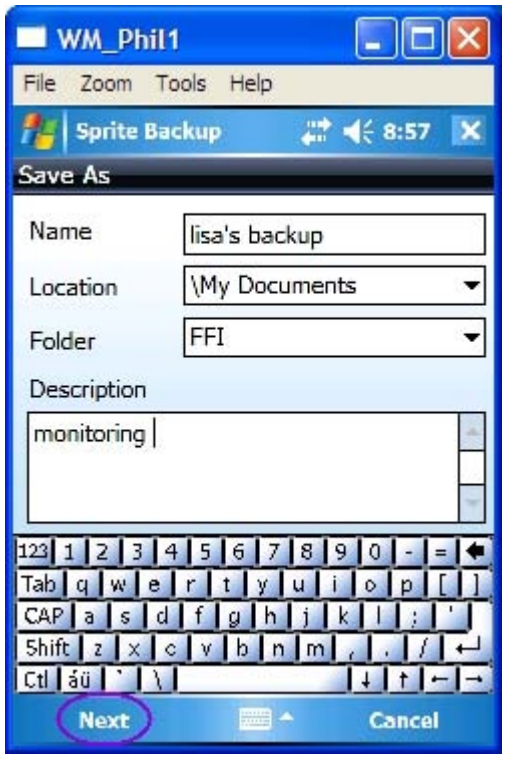
6. When you use Sprite with a memory card, Sprite creates a backup file on the card. In the **Backup** window, tap **Backup Card**. In the pull-down list, select the appropriate memory card and tap **OK**.

7. Click **OK** to close the small Sprite Backup message box and tap **Next** in the backup window.

8. Return to the main Sprite menu and tap **Backup**.
9. Select the folders and files that you wish to back up and click **Next**. To ensure that the FFI PDA and database are backed up, make the selections shown here, as well as any others that you may need.



10. Enter name and location information for the backup file and then tap **Next**.



11. Click **Next** in the **Device Reset Required** screen to initiate the backup.
12. The backup operation takes a few minutes, during which Sprite will shut down and restart the PDA and perform the backup. A progress bar will appear, and when the backup is complete, the device will again be reset.
13. When the **Sprite Backup Completion** window opens after the reset, tap **OK**.

NOTE: Refer to the Sprite Backup user guide for complete documentation.

Creating a non-self-restoring Sprite backup on a storage card

Non-self-restoring Sprite backups do not take up much room on the removable media card, since they contain only data. They can be made as often as you think appropriate.

The procedure for creating a non-self-restoring Sprite backup file is essentially the same as that shown above for a self-restoring file, with the following exception:

- Step 5: In the **General Backup Options** window, unclick the **Create self-restoring Backup Files** checkbox. Tap **OK** to return to the **Backup** window.

Continue the procedure as shown above. If you check the file size in **File Explorer**, you will note that the size of the non-self-restoring backup file on the card is approximately half that of the self-restoring file.

See also: Restoring from Sprite backup files

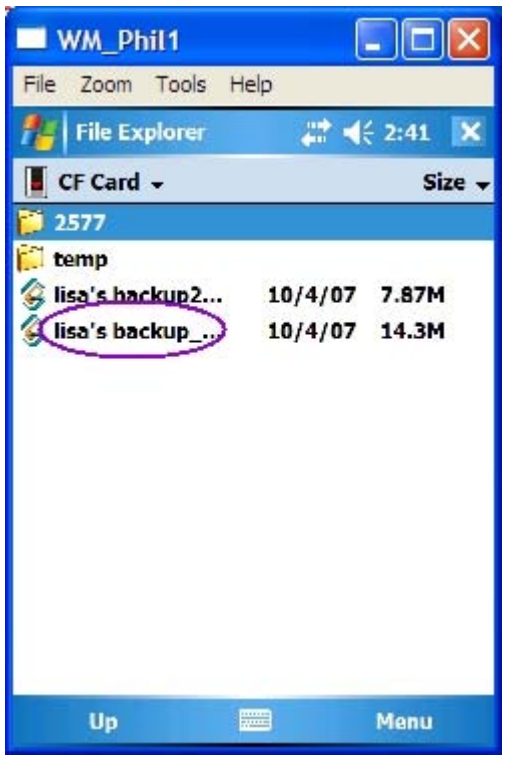
Restoring from Sprite backup files

If FFI PDA is not working properly, try to perform a soft reset on the device, which is similar to rebooting a desktop computer. Never intentionally perform a hard reset in the field.

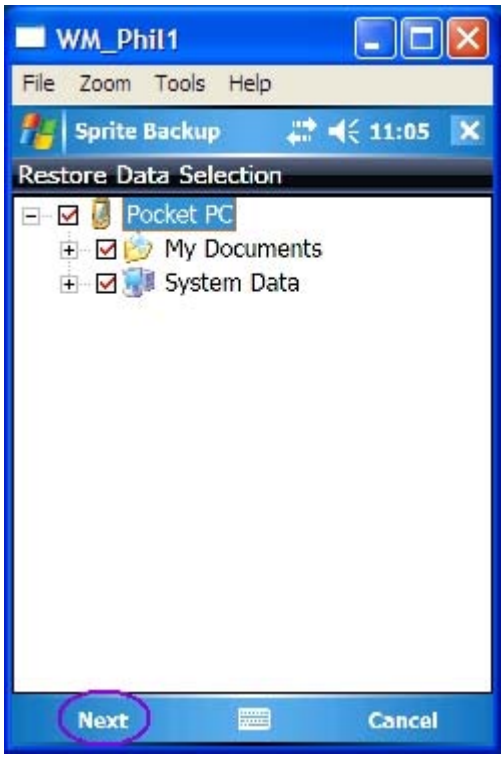
Restoring from a Sprite self-restoring backup file

If your PDA fails in the field, you can recover using a Sprite self-restoring backup file from a memory card. Should such a situation occur, Sprite Backup will probably not be on your PDA and it will not be listed in **Programs** under the **Start** menu. To recover:

1. Use **File Explorer** to navigate to the backup file on the memory card.
2. Click the filename to execute it.



3. After a few minutes, Sprite will open and the **Restore Data Selection** window will appear.



4. In the window, verify that all files that you wish to restore are checked, and tap **Next**.
5. Click **Next** in the **Device Reset Required** window. The restore may take several minutes.
6. When the device resets and the **Sprite Backup Restore Completed** window opens, click **OK**.

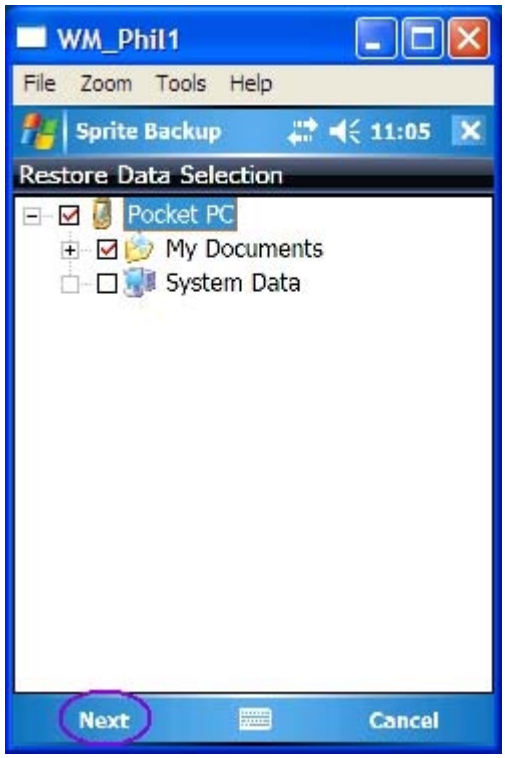
FFI PDA and Sprite Backup should now be reinstalled on your PDA along with any other applications and data that were included in the backup. You will need to re-enter any data that you had collected after the non-self-restoring backup file was created.

Restoring from a Sprite non-self-restoring backup file

If the database becomes corrupted while you are working in the field but your applications are intact, you can recover using your most current non-self-restoring backup file from a memory card. To recover:

1. Use **File Explorer** to navigate to the non-self-restoring backup file on the memory card.
2. Click the file.

3. Sprite will open and the **Restore Data Selection** window will appear.



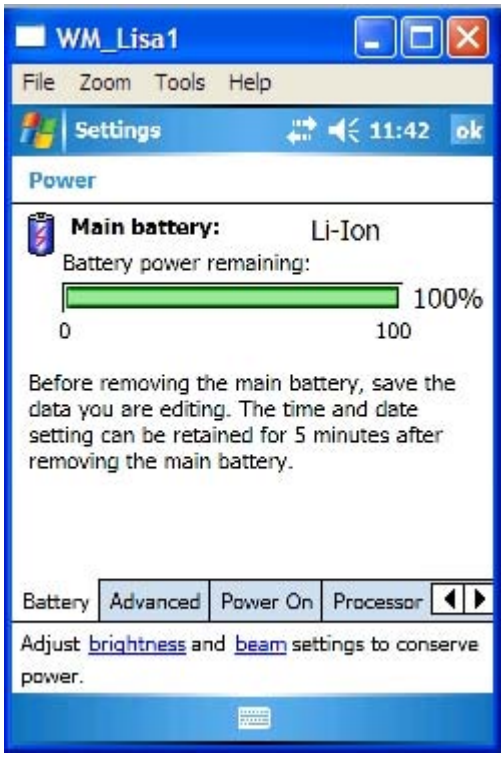
4. In the window, verify that all files that you wish to restore are checked, and tap **Next**.
5. Click **Next** in the **Device Reset Required** window.
6. When the device resets and the **Sprite Backup Restore Completed** window opens, click **OK**.

Your database should now be restored. You will need to re-enter any data that you had collected after the non-self-restoring backup file was created.

Managing the PDA battery

To minimize the possibility of data loss on the PDA, manage battery power properly and back up the PDA database to non-volatile storage, such as a secure digital or a compact flash card.

1. When using the PDA, check battery status frequently for power warnings.
2. To check battery status, select **Settings** on the **Start** menu, select the **System** tab, and click **Power**.



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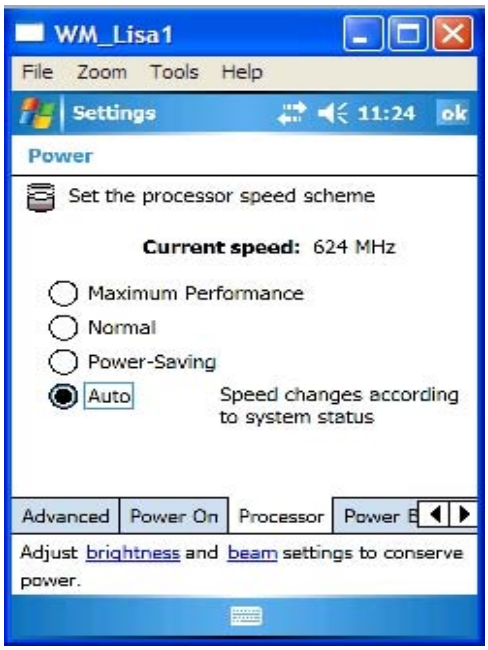
Conserving battery power

You can control several settings on your PDA to conserve power and extend battery life.

Adjusting battery settings

1. Select **Settings** on the **Start** menu.
2. Tap the **System** tab and then tap **Power**.
3. Select the **Advanced** tab.
4. Check the **On Battery Power: Turn off device if not used for** checkbox and set the number of minutes to the minimum you find usable in the field.

5. Select **Settings** on the **Start** menu, then select the **System** tab and click **Power**.
6. Select the **Processor** tab and select the setting that you find is the best balance between speed in the field and battery life.



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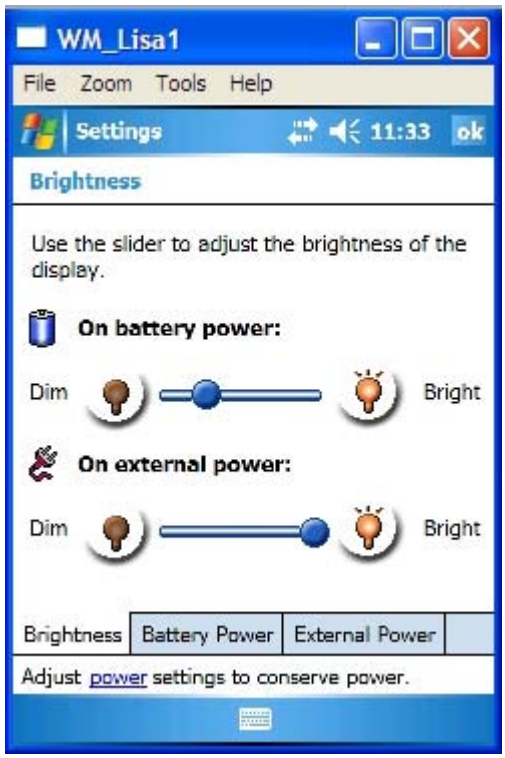
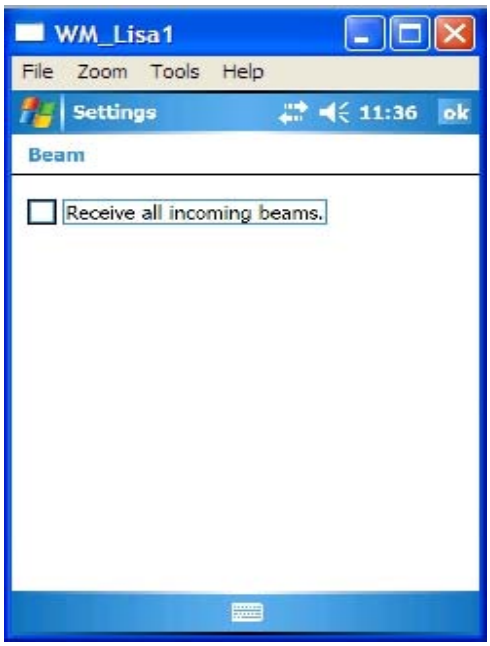
Conserving battery power (continued)

Adjusting screen brightness

1. Select **Settings** on the **Start** menu, then select the **System** tab and click **Brightness.**
2. Adjust the **On battery power** slider to the minimum that you find usable in the field.



3. Select the **Battery Power** tab.
4. Check **Dim if device is idle for more than** and set to the minimum number of minutes you find usable in the field.

Setting Not to Receive Beams and Other Signals

1. Select **Settings** on the **Start** menu, then select the **Connections** tab and click **Beam.**
2. Un-check the **Receive all incoming beams** checkbox.
3. If your PDA has Bluetooth or Wireless Ethernet hardware, you may be able to turn it off as well.