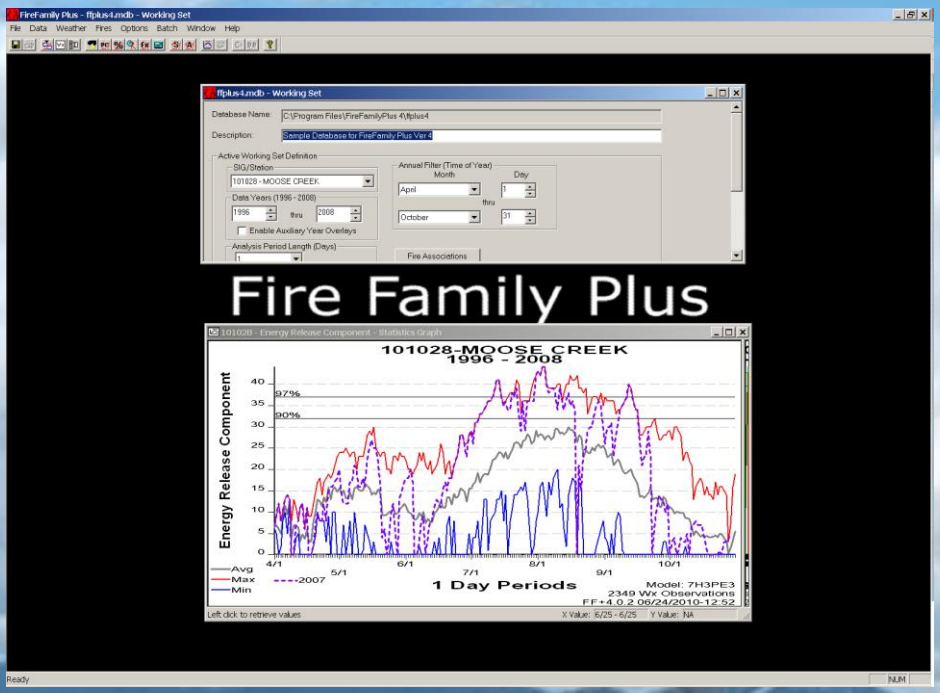
FireFamilyPlus Version 4

User Guide



Draft, June 2009

Preface

Welcome to the FireFamily Plus (FFP) Version 4 User's Guide, the first update to the FireFamily Plus Version 2 User's Guide (Bradshaw and McCormick, 2000). FFP is software for summarizing and analyzing daily weather observations and computing fire danger indices based on the United States National Fire Danger Rating System (NFDRS). It will also produce Fire Danger Indices for the Canadian Fire Danger Rating System (CFDRS). The guide provides details on obtaining historical fire weather and occurrence data, importing those data into FFP, and working with the analysis capabilities of the program.

In its minimal functionality, FFP provides climatological values of Fire Danger Indices used to establish climatological breakpoints for fire weather stations in the Weather Information Management System (WIMS).

Because FFP is based on an integrated fire weather/fire occurrence database, it has analysis tools to evaluate statistical relationships among weather stations/fuel models/indices, and the fire business they represent. It has a flexible analysis and graphing environment, including station grouping, variable period groups (daily, weekly, and so forth), overlay years and fire activity. FFP will generate Pocket Cards for Firefighter Safety and supports many of the climatology data requirements of Fire Behavior Analysts making long-range fire growth assessments using Rerap and fire growth projections using Farsite.

We hope you find this guide friendly and easy-to-use. If you have any questions, comments, or concerns about this guide, please contact:

USDA Forest Service
National Fire and Aviation Management Information Systems Team
3833 S. Development Avenue
Boise, ID 83705

(800) 253-5559

You can email us at:

fire_help@fs.fed.us

To obtain a copy of the FireFamily Plus User's Guide

1. Start your Internet browser.
2. In the address box, type **http://firefamilyplus.firemodels.org** and then press **ENTER**.
3. Click **Downloads**, and then click **FireFamily Plus User's Guide**.

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What's new

Version 4.0 is the upgrade to version 3.0 that was released in May 2007. We've incorporated many of the suggestions from the user community and continue modifications that allow the program to flow better. All reported bugs from version 3.0 have been corrected.

The FireFamily Plus version 4.0 (FFP4) database structure differs significantly from FireFamily Plus version 3.0 (FFP3) to support the batch and run saving operations. When a 3.x database is opened FFP4 will attempt to upgrade it to 4.0 and will save a copy in the 3.x format. To be safe, you should backup your important databases before using FFP4.

The following specific improvements have been made

Batch Modes

- FFP 4.0 performs in the same manner as previous versions but introduces a "batch mode." To facilitate building batch jobs, FFP "Runs" can be saved in the active database. Runs are numbered sequentially. All the parameters in the Run (station, SIG, data years, seasonal filters, overlay years, etc.) are saved. Once in the database these Runs can be used to 1) build batch jobs consisting of one or more saved runs, or 2) to reload identical settings. When running a batch job, output can be to the screen (flying windows) or auto-saved to disk.

Interactive Batch

- The interactive batch function allows you to "Run" any number of stations or Special Interest Group (SIG) at one time. Every report for every variable in the database is generated for all years of data for each station. Reports are tabs across the page top. Stations and variables are given in expansion lists on the left side of the screen. Icons allow you to change graph options, working set dates, overlay years, and fire-type selections. Changes are made to all reports and variables at once and re-displayed.

Fire Occurrence Data

- The new Bureau of Land Management (BLM) Wildland Fire Management Information (WFMI) Fire Occurrence Export format (pchaffp) is supported along with the new NWCG Unit Identifier's for BLM, National Park Service (NPS), and Bureau of Indian Affairs (BIA) fire associations. Also when importing Department of Interior (DOI) fires, additional "fire types" can now be imported.
- A Generic Fire Import module supports Comma Separated Value (.CSV) files for importing Custom agency fire data. More fields (e.g. county, latitude, longitude, etc.) can be included. The Fire PLanning (FPL) format is no longer supported but existing FPL files are easily converted to.CSV files.
- Fires from the Working Set Fire Associations can be exported to an ESRI shapefile (provided the fire report contains latitude and longitude).

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Weather Data

- ALL Station information from Weather Information Management System (WIMS) as of April 2007 is in the default FFP database structure. That means if you create a new database or upgrade from a Version 3.0.5 FFP database you do not need to import station catalogs. You may however, still wish to import a catalog to update information or when a new station has been added to WIMS.
- Generic Wx Import: This functionality allows flexibility to import data from alternate sources. It displays all of the weather observation elements from the FireFamily Plus WXOBS data table and allows you to select columns that match elements in your alternate weather file. You can select the field delimiter and date/time formats.
- Western Region Climate Center (WRCC) Remote Automated Weather Station (RAWS): This functionality allows flexibility in importing hourly RAWS data from the Western Region Climate Center's data lister (www.raws.dri.edu). You can include wind gust and solar radiation information to the FFP database.

Note: Data imported in any manner from the WRCC WILL NOT have a STATE of WEATHER (SOW) code.

Station information and NFDRS

- The latitude and longitude are now GIS friendly.
- When importing weather data, the WET FLAG data is now used and the WIMS snow cover logic has been implemented in FFP 4.
- Custom Yearly Initialization: To account for variable greenup dates and to better support the Canadian system a Custom Yearly Initialization feature has been added to FFP4. (See **Weather -> Custom Yearly Init**).
- Brush Dormant Date: To support areas where freezes do not generally occur, the capacity to allow shrubs to go into dormancy is supported by a new **Use Brush Dormant Date** box. This was requested by Russ Gripp and allows FFP to better emulate user control in WIMS. The default value for this field is unchecked. If the following conditions are met, the brush dormant date will apply:
- the brush dormant date is selected.
- a valid date entered.
- the vegetation has cured.
- the observation date is greater than the dormant date.
- the live fuel moisture model has dried the woody fuel moisture to it's
- dormant value.
- the live vegetation state is put into a dormant state so that woody fuel moistures do not increase late in the fall with fall rains.

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- If selected, a "**Use-Weighed 10-HR Sticks**" check box enables FFP to ignore weighed sticks and compute the 1- and 10-hour moisture by algorithm for the period of record. This allows for a consistent climatology for stations that may have some years of weighed sticks and some years without.

Reports

- Expanded report headers include all current settings and station metadata. The ability to control report header information is included under the **Options->Report Options** menu item. Also you can select a delimeter (e.g. comma) for some reports to facilitate importing into other applications such as spreadsheets or statistical analysis programs.
- There is a FlamMap Fire Risk Export function.
- Winds: Wind roses are available for hourly data.

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Contents

Preface……i

To obtain a copy of the FireFamily Plus User's Guide……i

What's new……ii

Chapter 1. About this guide……1.1

Before you begin ……1.1

How to use this guide……1.1

Conventions ……1.2

Chapter 2. Introducing FireFamily Plus……2.1

Installing FireFamily Plus ……2.1

To download the FireFamily Plus installation file……2.1

FireFamily Plus 4.0 Installation notes……2.2

To install FireFamily Plus……2.3

To start FireFamily Plus……2.7

Terms and concepts ……2.7

Screen terminology ……2.7

FireFamily Plus toolbar……2.8

Working set screen elements……2.9

Chapter 3. Working with a FireFamily Plus database……3.1

Opening the sample database……3.1

To open the sample database……3.2

Creating a new database ……3.2

To create and save a new database ……3.3

Retrieving and downloading data from KCFAST ……3.4

To retrieve historical fire weather data……3.4

To retrieve US Forest Service fire occurrence data……3.4

To retrieve station catalog information for a single station ……3.4

To download a file from ftp.fs.fed.us……3.5

Retrieving and downloading fire and weather data from FAMWEB (National Fire and Aviation Management Web Applications)……3.5

To obtain weather data and station catalogs from FAMWEB……3.5

To obtain fire occurrence files from FAMWEB……3.8

Managing a database ……3.9

To compact the database……3.9

Chapter 4. Importing data……4.1

How to import data……4.1

Importing station catalogs……4.1

DRAFT

To import a station catalog 4.1
To create a station catalog....4.3
To edit a station catalog....4.5
To delete a station catalog....4.6
Importing fire weather data....4.7
To import historical fire weather data (optional)....4.7
To import generic weather data.... 4.7
To access WRCC RAWS data.... 4.9
To import WRCC data.... 4.15
FWX and FW9 files from WRCC.... 4.19
Importing federal fire occurrence data....4.22
Organizational structure.... 4.22
To import Forest Service fire occurrence data (RAW files).... 4.24
Department of Interior WFMI files....4.24
Defining Custom Agencies and importing fire occurrence data.... 4.26
Creating the organizational structure....4.26
Importing generic user-defined fire occurrence data....4.30
User variables.... 4.33
Managing user variables.... 4.34
Importing user variables.... 4.36
Viewing observations....4.37

Chapter 5. Working with FireFamily Plus.... 5.1

Defining an active working set.... 5.1
To define the Active Working Set.... 5.1
About the Enable Auxiliary Year Overlays check box....5.3
To set fire associations.... 5.3
Working with Station Metadata in the Station Catalog.... 5.4
To export metadata for all stations.... 5.5
Working with Special Interest Groups (SIGS)....5.7
To create a SIG....5.7
To set weights of stations in a SIG....5.9
To save a SIG....5.11
To edit a SIG....5.11
To delete a SIG from the database....5.12
To export metadata for stations in a SIG....5.13

Chapter 6. Working with reports and graphs....6.1

Reviewing weather data and generating reports....6.1
To review weather observations.... 6.1
To review weather data by generating a statistical table.... 6.2
To review weather data by generating a statistical graph....6.5
To resize a statistical graph.... 6.7
To determine a specific value on a statistical graph.... 6.8

DRAFT

Working with overlays ……6.9

Using the Enable Auxiliary Year Overlays check box…… 6.8
To create an overlay on a statistical graph of your choice.....6.10
Merging graphs…… 6.13
To merge additonal varaibles onto your base graph.....6.13

Changing the look of your statistical graphs..... 6.15

Introduction to annotations.....6.18

Report options..……6.21

To configure information included in a report.....6.22

Working with Season Reports...……6.23

To generate a Persistence Probability report.....6.24
To generate a Severity List.....6.26
To generate a Severity Summary..... 6.27
To generate a Probability Analysis.....6.29
To generate a Daily Listing..... 6.30
To generate Percentile Weather..... 6.32
FlamMap Fire Risk Export.....6.35

Working with weather data..... 6.37

Variables…….. 6.37
Live Fuel Index (LFI)……..... 6.37
Custom Yearly Initialization……..…… 6.38
Winds ……..…… 6.41
To generate a wind report by month..... 6.44

Reviewing fire occurrence data..... 6.45

To review fire occurrence data by generating summary graphs..... 6.45
To review the working set fire occurrence data by generating summary graphs..... 6.48

Using the Event Locator..... 6.53

To use the Event Locator.....6.54
To search for erroneous data - an example.....6.57
To search for a fire-ending event - an example.....6.59
To perform a more complex query - an example.....6.60

Using the NFDRS calculator……... 6.63

To use the NFDRS calculator.....6.63

Chapter 7. Working with fire analysis tools.....7.1

Performing cumulative and probability fire analysis.....7.1

To perform cumulative and probability fire analysis using ERC.....7.4

Evaluating the histogram.....7.6

Evaluating the cumulative distributions.....7.7

Evaluating Fires Probability Analysis graphs.....7.9

Setting the decision points.....7.13

DRAFT

To set decision points....7.14
To view discarded fires.... 7.17

Reviewing the Decision Points graphs.... 7.17

Changing decision points to reflect fire business....7.19

To change the class lower limits.... 7.21
Working with the fire business candidates list.... 7.24
Developing a list of potential fire business candidates....7.24
Viewing candidates list.... 7.25

Chapter 8. Generating a pocket card....8.1

Identifying the years of interest, fires, and index values....8.1

To determine the years of interest for comparison....8.1

Generating the pocket card 8.3

To generate a pocket card....8.3
To print a pocket card.... 8.6
To change the background pattern of your pocket card....8.7
To save a pocket card....8.8

Chapter 9. Working with fire danger projections....9.1

Understanding generated fire weather records from climatological percentiles.... 9.1

Reviewing the active working set 9.2

Generating fire danger projections.... 9.3

To start the fire danger projection module.... 9.3
To select the fire danger projection options....9.3
To add days of projected weather data....9.6
To remove a record from your list of fire danger projections.... 9.6
To modify the weather for a specific date.... 9.7

Generating reports and graphs.... 9.8

To generate reports and graphs from your projections....9.8
To create an overlay on your statistical projections graph....9.11

Chapter 10. Performing hourly data analysis.... 10.1

Viewing hourly observations.... 10.2

To view all observations in your working set.... 10.2
To save (export) observation records to your computer....10.3
To delete a range of observations from your active working set.... 10.4
To sort the weather observations....10.5
To increase a column width.... 10.6
To print the weather observations in your working set....10.6

Generating hourly listings....10.6

To generate an hourly listing....10.6

Generating diurnal graphs.... 10.9

DRAFT

To generate a diurnal graph.....10.10
To save your diurnal reports and graphs..... 10.13
Exporting hourly weather data to FARSITE…..... 10.14
To create a FARSITE export file.....10.14
Using the hourly event locator…..... 10.16
To search for erroneous data - an example.....10.16
To search for a run of extreme burning conditions - an example.....10.17
The Nelson Dead Fuel Moisture Model…….....10.19
Hourly values…..... 10.19
Compare with daily NFDRS.....10.20
Chapter 11. Batch functions……11.1
To save a run..... 11.2
Creating a new batch ……..... 11.2
To create a new batch..... 11.2
Maintaining and running batches..... 11.4
To manage a batch list..... 11.4
Run classic..... 11.5
Run auto-save..... 11.6
To select batch options..... 11.6
Saved run maintenance..... 11.11
Manual run maintenance..... 11.12
Restore settings from a previously saved run..... 11.14
Chapter 12. Interactive batch……12.1
Using Interactive Batch..... 12.1
To use interactive batch..... 12.1
Changes you can make in the interactive batch session..... 12.6
Chapter 13. Exporting data……13.1
Exporting data..... 13.1
Exporting station metadata..... 13.1
Exporting SIGs ……..... 13.3
Exporting fire data……..... 13.4
Exporting weather observation records..... 13.5
References……R.1
Appendix A. Retrieving NIFMID data using KCFAST.....A.1
Accessing KCFAST..... A.1
To access KCFAST from the Internet.....A.1
To setup your WIMS/NIFMID logon ID for KCFAST retrievals.....A.2

DRAFT

Retrieving weather, fire occurrence, and station catalog data..... A.3

To retrieve historical fire weather data.....A.3

To retrieve US Forest Service fire occurrence data.....A.4

To retrieve station catalog information for a single station..... A.5

Downloading files from the ftp site to your personal computer.....A.6

To download a file from ftp2.fs.fed.us.....A.7

Appendix B. Using FireFamily Plus with RERAP.....B.1

To generate a Percentile Weather report..... B.1

Appendix C. Editing "unknown" fire reporting units.....C.1

To open the template database.....C.1

To add a subunit to the FireSubunits table - an example.....C.3

Appendix D. Weather data sources.....D.1

DRAFT

Chapter 1. About this guide

This guide explains how to use FireFamily Plus version 4. It contains information about how to create a new database by importing station catalogs and weather and fire data, how to define an active working set, how to generate reports and pocket cards, and how to perform fire analysis and projection functions.

Before you begin

Before using FireFamily Plus software, you must feel confident that:

- You are familiar with your personal computer and function keys and understand basic computer concepts.
- You are familiar with Microsoft Operating Systems (Windows 2000, Windows XP, or Vista).
- You have a basic understanding of fire weather observations, fire danger concepts, and terminology.

How to use this guide

You do not need to read the entire FireFamily Plus User's Guide to complete a specific task. Once you understand how to start FireFamily Plus, you can quickly locate commonly used tasks by reviewing the "Contents" in the front of this guide.

This guide is divided into chapters. The chapter title appears at the top of each page. At the beginning of each chapter you will find an overview of the topics explained. Where appropriate, diagrams are shown immediately following each task.

Chapter 1, "About this guide," introduces the FireFamily Plus User's Guide and explains how to use the guide.

Chapter 2, "Introducing FireFamily Plus," explains important terms and concepts, how to install FireFamily Plus, and introduces the FireFamily Plus toolbar and working set screen elements.

Chapter 3, "Working with a FireFamily Plus database," explains how to create and manage a database.

Chapter 4, "Importing data," explains how to import station catalogs, fire weather, and fire occurrence data as well as how to define custom agencies and how to work with user variables.

Chapter 5, "Working with data in FireFamily Plus," explains how to define an active working set, how to work with station metadata and special interest groups (SIGs).

Chapter 6, "Working with reports and graphs," explains how to review weather data, generate reports, work with overlays and graphs, season reports,

DRAFT

weather and fire occurrence data, and how to use the event locator and the NFDRS calculator.

Chapter 7, "Working with fire analysis tools," explains how to perform and review cumulative and probability analyses, how to work with decision points, and how to use the fire business candidates list.

Chapter 8, "Generating a pocket card," explains how to generate a pocket card that identifies years of interest for comparison. It also includes instructions for changing the background pattern and saving pocket card graphs.

Chapter 9, "Working with fire danger projections," explains how to use fire weather records generated from climatological percentiles, how to review the active working set, and how to generate fire danger projections, reports and graphs.

Chapter 10, "Performing hourly data analysis," explains how to generate and view hourly listings and diurnal graphs, and how to export hourly data to FarSite. This chapter also explains how to use the hourly event locator and Nelson Dead Fuel Moisture Model.

Chapter 11, "Batch functions," discusses saving runs and managing batch lists.

Chapter 12, "Interactive batch," explains how to work with the new interactive batch function.

Chapter 13, "Exporting data," explains how to export SIGs and station metadata, fire data and weather observation records.

Appendix A, "Retrieving NIFMID data using KCFAST," explains how to access KCFAST, how to retrieve weather, fire occurrence and station catalog data, and how to download and save files using the ftp site.

Appendix B, "Using FireFamily Plus with RERAP," explains how to generate a percentile weather report.

Appendix C, "Editing unknown fire reporting units," explains how to work with "unknown" units and subunits.

Appendix D, "Weather data sources and attributes," explains how to obtain sources of weather data and discusses their characteristics.

References are arranged alphabetically and contain sources of information used to complete this guide.

Conventions

The following conventions are used within this guide:

- Labels for buttons, dialog boxes, screens, files, and other and hard label keys appear in **bold**. For example, the second step in a procedure might state:

On the **Set Fire Associations** dialog box, click the **USFS** tab.

DRAFT

Topics of special interest or hints that will help you perform a specific task are shown with a line before and after the text. The text appears in italic type. For example:

Although you can delete and then recreate a SIG, you cannot change its name once you save it.

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Chapter 2. Introducing FireFamily Plus

This chapter explains how to use FireFamily Plus. Topics include:

- Installing FireFamily Plus.
- Terms and concepts.
- Screen terminology
- FireFamily Plus toolbar
- Working screen set elements

Installing FireFamily Plus

This section outlines the basic instructions to install the FireFamily Plus program for Windows 2000, Windows XP, and Vista operating environments. The "FireFamily Plus Version 4.0 Release Notice" contains the information and instructions you need to choose the correct installation package.

To download the FireFamily Plus installation file

1 Start your Internet browser.

2 In the address box, type **http://firefamilyplus.firemodels.org**, and click on the **Downloads** link.

3 You can obtain the Relase Notice in two ways: 1) from the **Downloads** page, click on **firefamilyplus4_relase_note.pdf** in the first line of the table, or 2) go to **Release Notice** at the left side of the screen under **Software**, and click on **Relase Notice** under **FireFamily Plus 4.0**.

4 Review the Release Notice to determine the appropriate file needed to install FireFamily Plus version 4.0.The release notice also identifies the system and data requirements, sample database, and includes "uninstall" instructions. Review the entire notice carefully for complete instructions.

5 Double-click on the appropriate installation file, and then save it in the folder of your choice.

---

*For a new installation, click on **ffp4setup.msi***

The following diagram shows the FireFamily Plus **Downloads** page on wwwfiremodels.org. The arrow points to the FireFamily Plus Release Notice.

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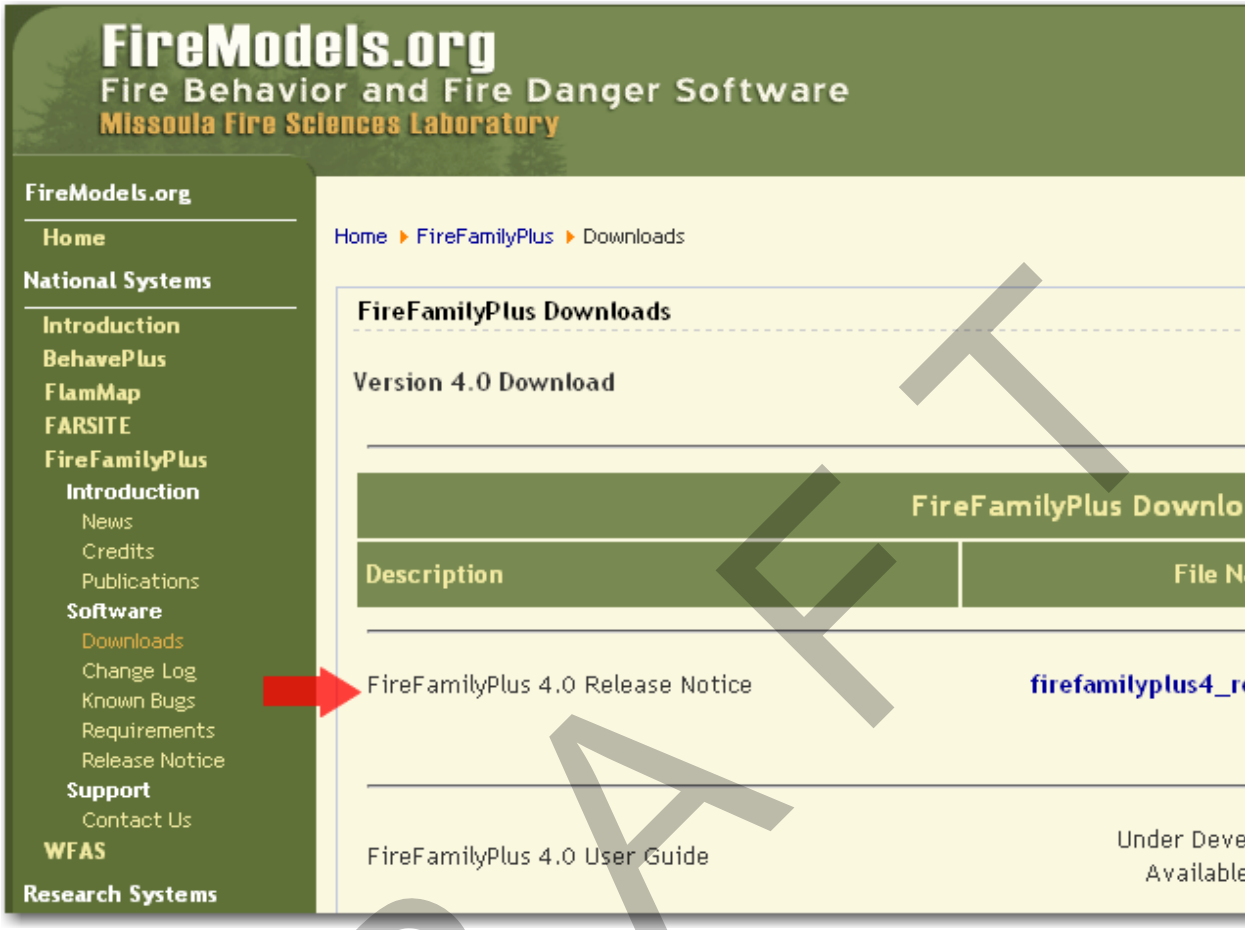

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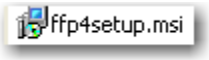
FireFamily Plus 4.0 installation notes

- You do **NOT** need to, nor should you uninstall FFP 3.0.5.
- **BACKUP YOUR VERSION 3.0.5 DATABASES**.
- The FFP 4 database structure is significantly different from FFP 3 to support the batch and run saving operations. When a 3.x database is opened FFP 4 will attempt to upgrade it to 4.0 and will save a version in a 3x format with a **_v3** added to the file name (not extension). But to be safe, you should backup your important databases before using FFP 4.0.
- If you have a previous Alpha or Beta version of 4.0, you will need to uninstall it.
- FFP 4.0 should NOT require administrative privileges.
- Execute the installation file: **ffp_setup.msi** (~ 7 MB)
- FFP 4.0 will install to: Program Files/FireFamily Plus 4
- FFP does NOT create a desktop shortcut.

To install FireFamily Plus

1 From your personal computer, double-click the self-extracting FireFamily Plus installation file (**ffp4setup.msi**).



2 Complete the installation process as instructed on your screen and described below.

The **Welcome** dialog box shown below opens initially. Click **Next** to continue the installation process.

The **Select Installation Folder** dialog box allows you to choose an installation location. Select the Target Folder as shown or use the browse button to select an alternate location.

3 Click **Next** to continue the installation process.

4 You will see a dialog box similar to the one shown. Select the **Everyone** radio button as shown.

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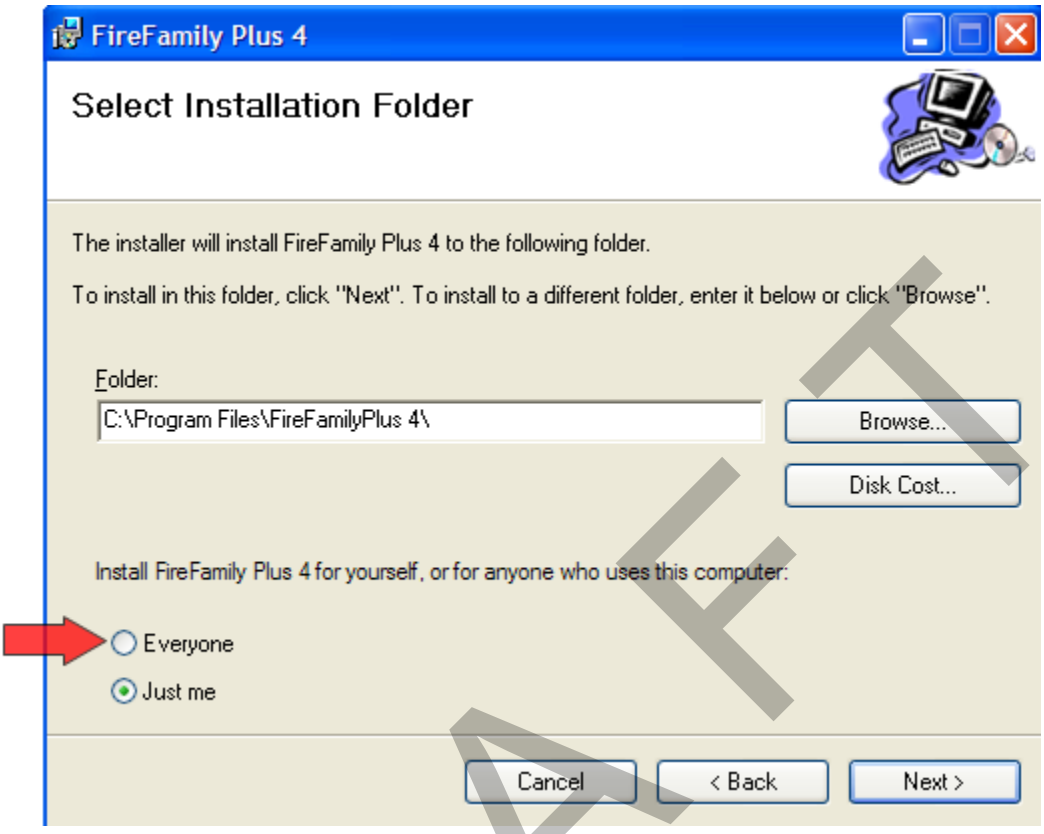

5 Click **Next** to confirm and continue installation of FireFamily Plus.

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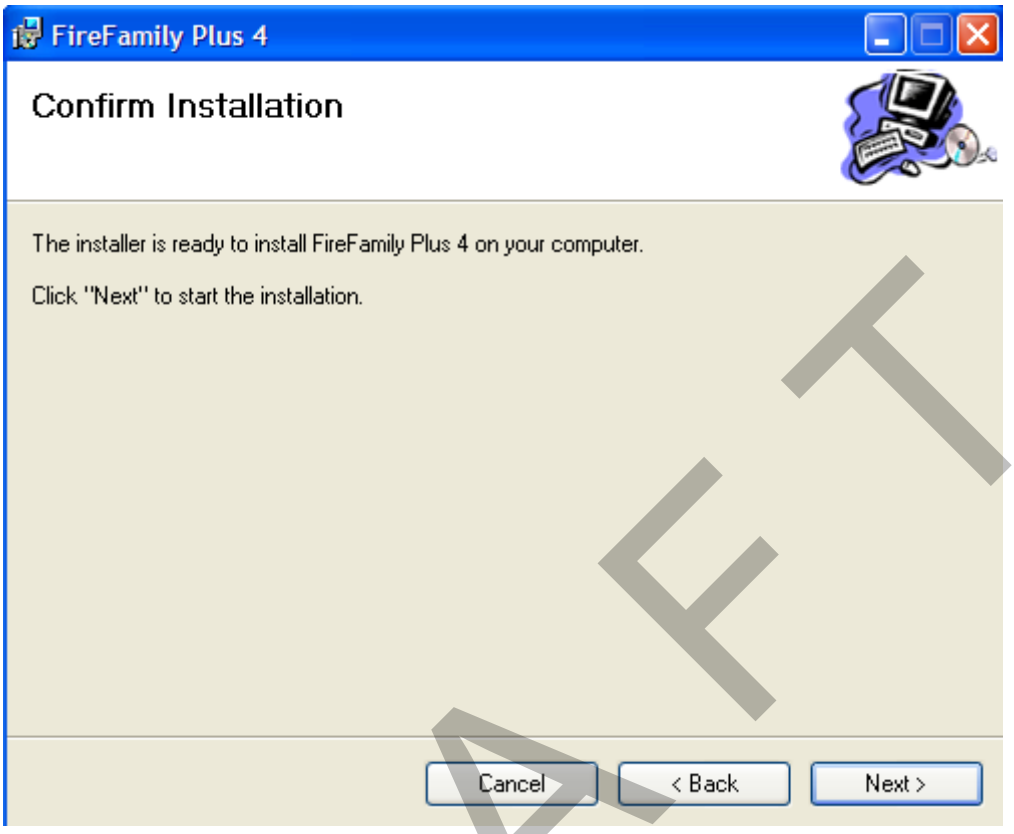

The following progress bar indicates that installation is proceeding.

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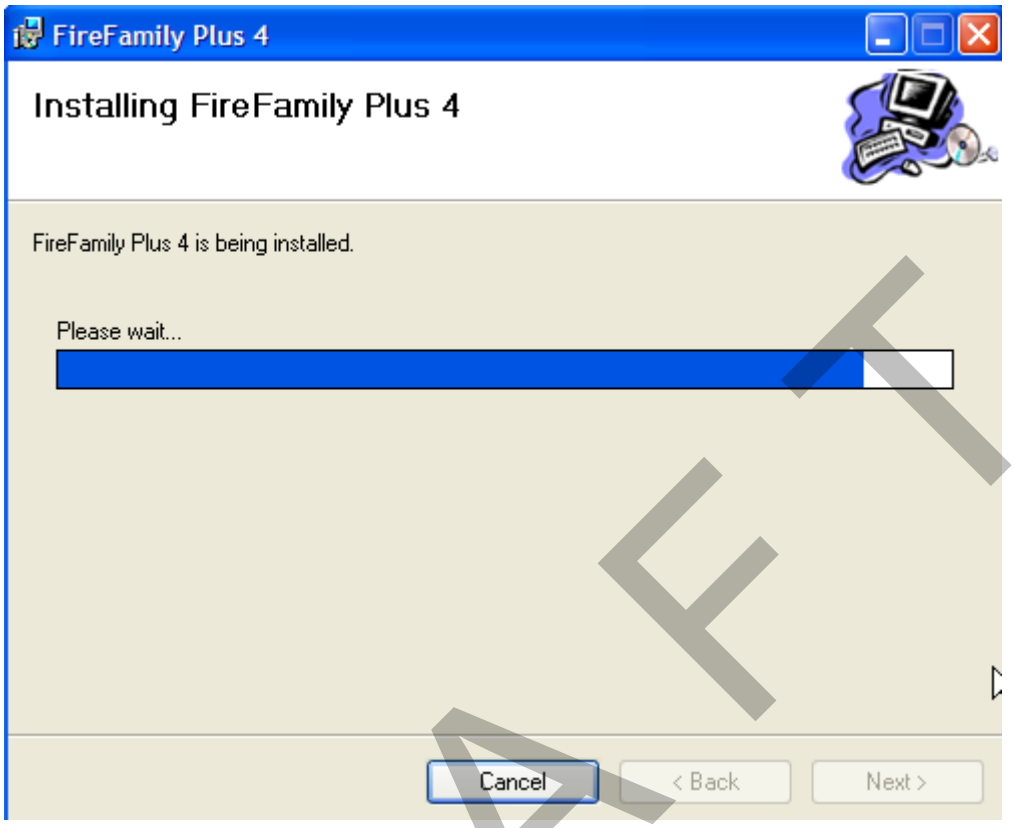

The next dialog box indicates that the installation process is complete.

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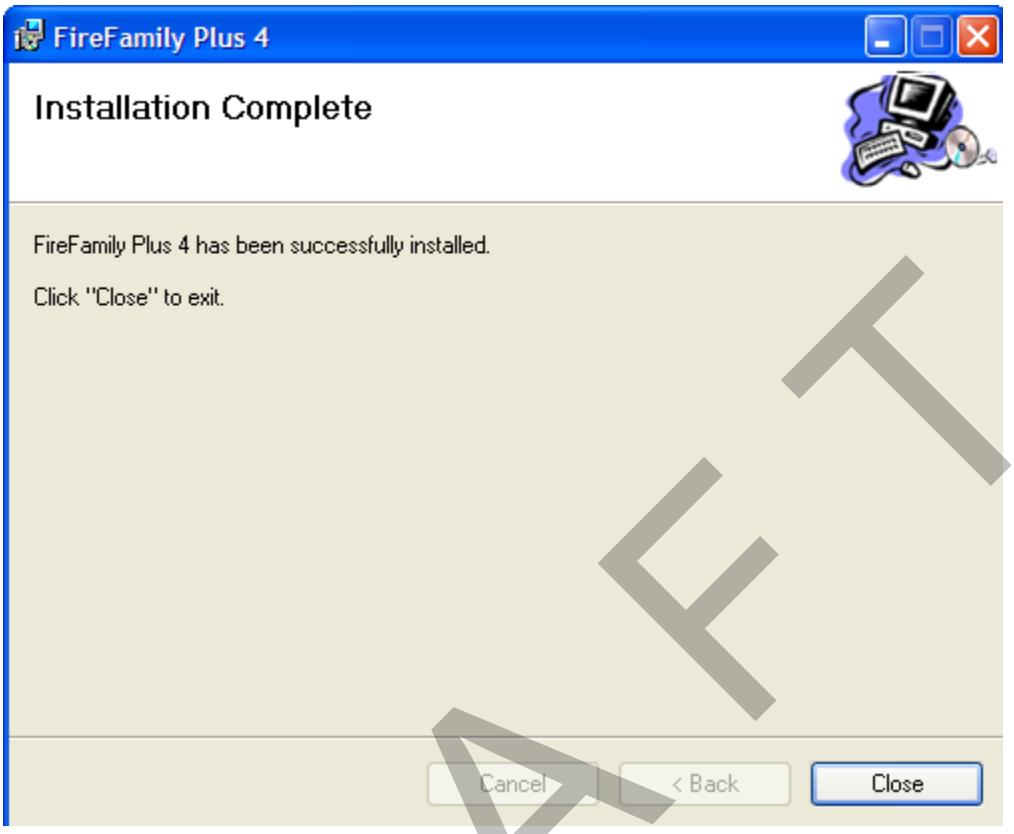

6 Click **Close** to proceed.

To start FireFamily Plus

1 Start FireFamily Plus4 by **Start -> Programs -> FireFamilyPlus4** or by creating a desktop shortcut. If FFP3 is installed, FireFamily Plus4 will automatically open the most recently used FFP 3.0.5 database and attempt to upgrade it.

Terms and concepts

This section identifies some of the screens, toolbars, and menus that you will be using in FireFamily Plus. If you are not already familiar with Windows-based programs, become familiar with these terms and concepts before proceeding with the remaining chapters in this guide.

Screen terminology

The following diagram outlines many of the elements available on the Windows-based FireFamily Plus screen

Screen elements and toolbars unique to a specific module are introduced within the corresponding chapter.

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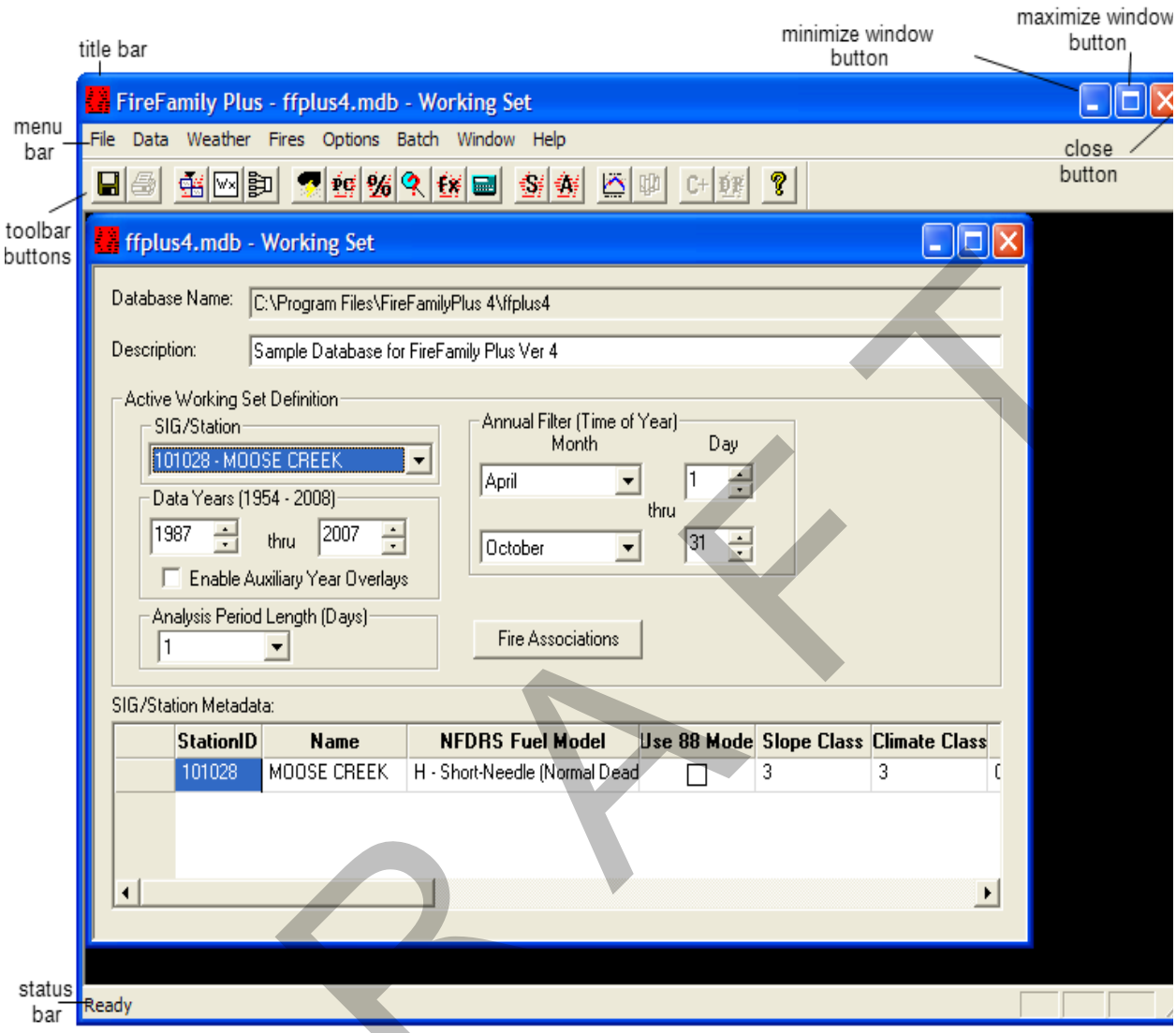

FireFamily Plus toolbar

The following diagram shows the expanded FireFamily Plus toolbar. This toolbar allows you to quickly access many FireFamily Plus functions by simply clicking a button.

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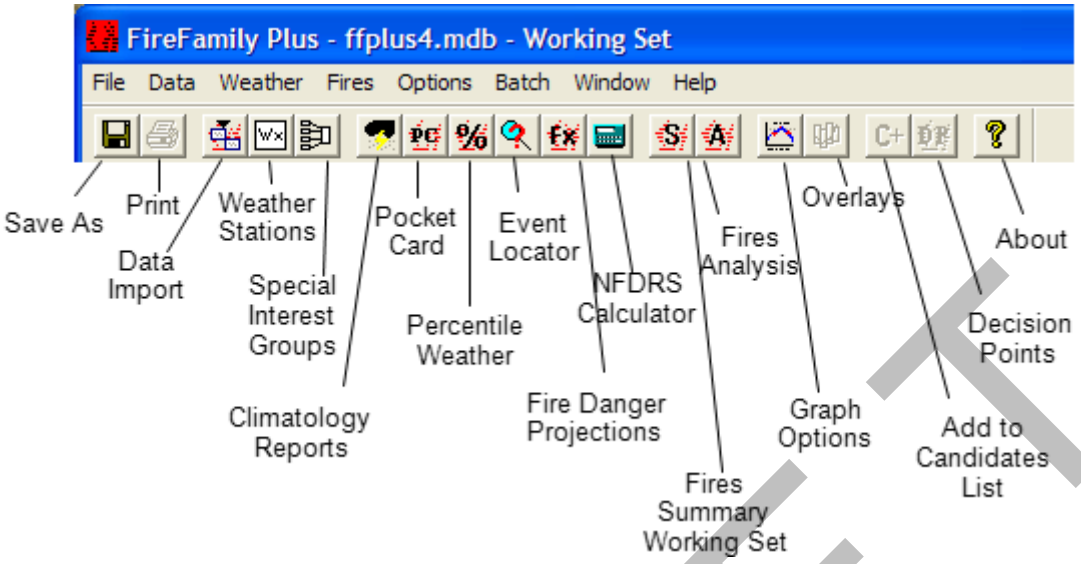

Working set screen elements

The following diagram shows the new FireFamily Plus Working Set screen.

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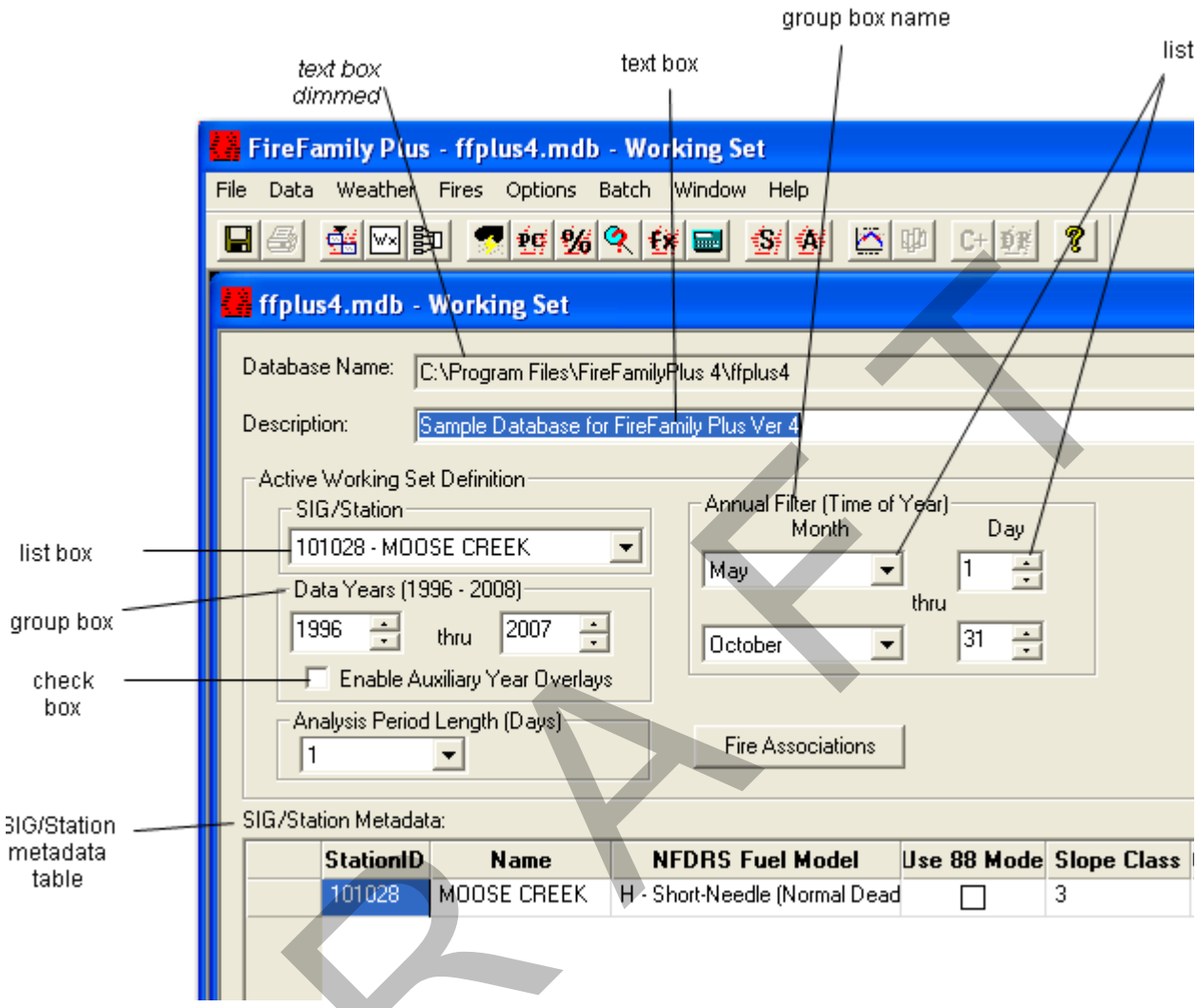
group box name
list
text box
text box dimmed
FireFamily Plus - ffplus4.mdb - Working Set
File Data Weather Fires Options Batch Window Help
ffplus4.mdb - Working Set
Database Name:
C:\Program Files\FireFamilyPlus 4\ffplus4
Description:
Sample Database for FireFamily Plus Ver 4
Active Working Set Definition
SIG/Station
101028 - MOOSE CREEK
Data Years (1996 - 2008)
1996
thru
2007
Enable Auxiliary Year Overlays
Analysis Period Length (Days)
1
Annual Filter (Time of Year)
Month
Day
May
1
thru
October
31
Fire Associations
SIG/Station Metadata:
StationID
Name
NFDRS Fuel Model
Use 88 Mode
Slope Class
101028
MOOSE CREEK
H - Short-Needle (Normal Dead
3
list box
group box
check box
SIG/Station metadata table

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Chapter 3. Working with a FireFamily Plus database

This chapter explains how to work with a database in FireFamily Plus. Topics include:

- Opening the sample database.
- Creating a new database.
- Managing a database

Opening the sample database

FireFamily Plus is shipped with a sample database "ffplus4.mbd." It contains station catalogs "101028" and "240107" and the Special Interest Group "Sample SIG," along with associated weather and fires data.

For more information about Special Interest Groups, see "Working with Special Interest Groups" in Chapter 5, "Working with data in FireFamily Plus."

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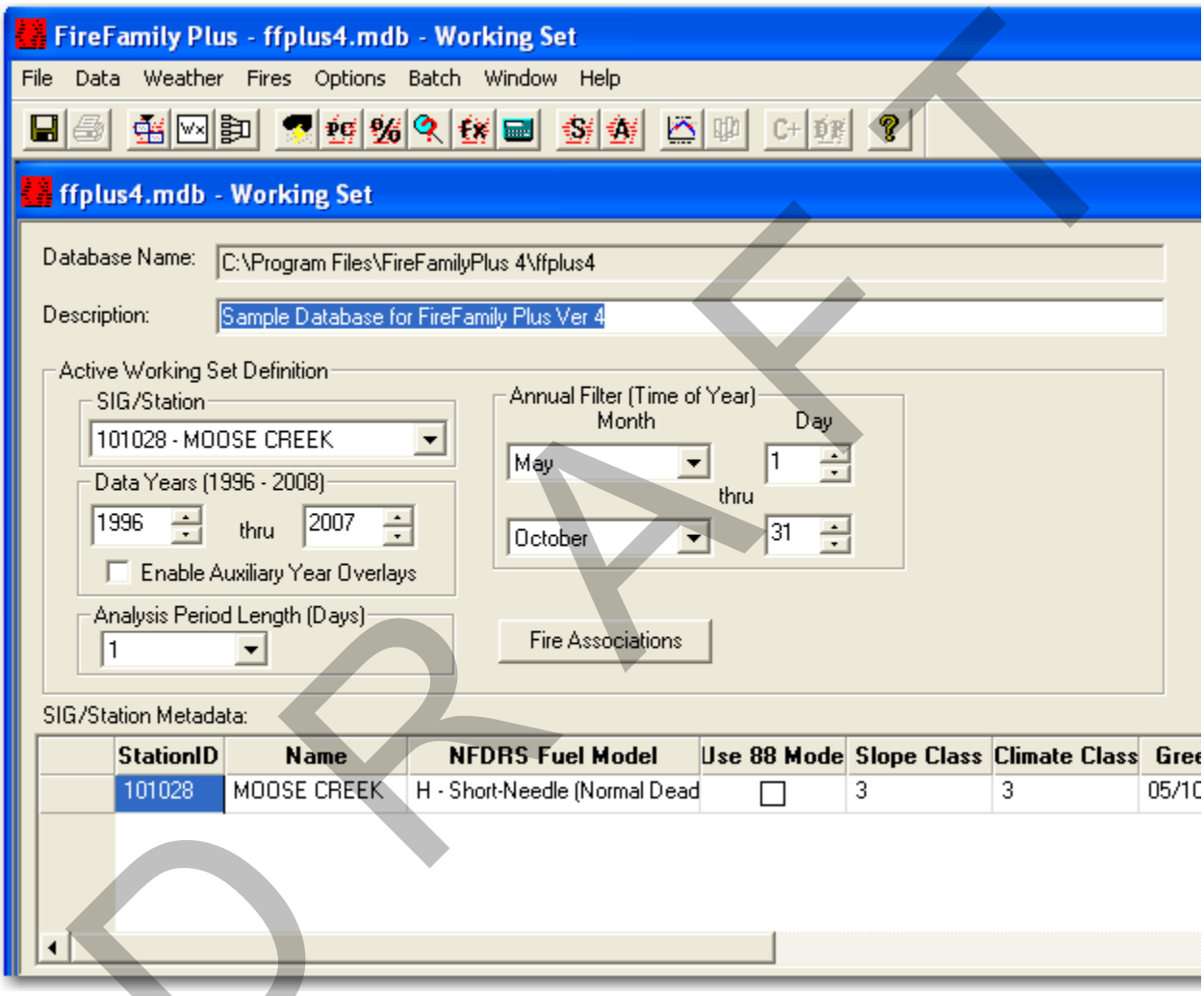
To open the sample database

1 On the **File** menu, click on the FFP4 database and click **Open**.

2 Select **ffplus4.mdb**, the FireFamily Plus4 database, and click **Open**.

The following figure shows the sample database "ffplus4" as it first appears on your screen.



3 Close the file. **File -> Close**.

For more information about specific elements on this screen, see Chapter 2, "Introducing FireFamily Plus."

Creating a new database

This section explains how to create a FireFamily Plus database that you will populate with station catalogs and imported historical and fire occurrence data. Topics include:

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- Retrieving and downloading data from Kansas City Fire Access Software (KCFAST).
- Retrieving and downloading fire and weather data from FAMWEB (National Fire and Aviation Management Web Applications).
- How to obtain your station catalogs, fire weather, and fire occurrence data (for more detailed instructions on importing data, see Chapter 4).

You can create as many databases as required to meet your needs. Although you can keep many databases open at the same time during your FireFamily Plus session, only one database is "active" at any given time.

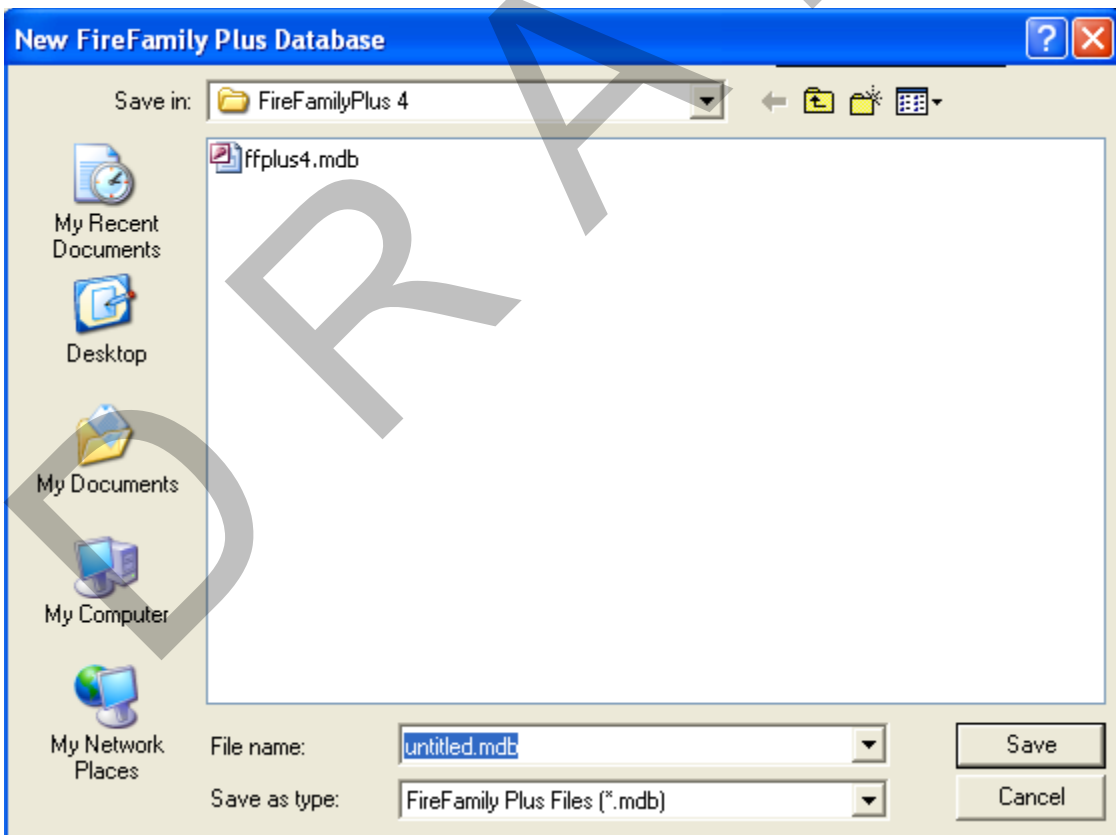
To create and save a new database

1 On the **File** menu, click **New**.

2 In the **File name** box, type the name of your new database, and then click **Save**.

3 Enter a meaningful description (up to 50 characters in length).

The following diagram shows the **New FireFamily Plus Database** dialog box.



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Retrieving and downloading data from KCFAST

To begin, you must access KCFAST from the Fire and Aviation Management website at: http://fam.nwcg.gov/fam-web/

First, you will need to retrieve historical fire weather data, fire occurrence data, and station catalog information. Next, download the files from the fpt site to your computer.

For complete instructions about using KCFAST, see Appendix A, "Retrieving National Interagency Fire Management Integrated Database (NIFMID) data using KCFAST," at the back of this guide. You will need a user name and password to access the data.

To retrieve historical fire weather data

1 From the **KCFAST Main Menu**, click **Weather**.

2 Click **Data Extract**, and then click **Historical**.

3 Type the **Station ID**, and then **Begin** and **End Date Range**.

4 Click **Raw Datafile - 1972 Data Format**.

*To use diurnal functions or create files to support FARSITE, select Raw Datafile - 1972 Data Format, *.FW9. (See "Importing Fire Weather Data" in Chapter 4).*

5 Select the E-mail notification option of your choice, click **Submit**, then write down the file name.

To retrieve US Forest Service fire occurrence data

1 From the **KCFAST Main Menu**, click **Fire**.

2 Click **Standard Extract**.

3 Type the two digit **Region** and two digit **Forest** numbers.

4 Type the **Begin Year** and **End Year** under **Date Range**.

5 Click **NFMAS - PCHA (PC Historical Analysis)**.

6 Click **Raw Datafile**.

7 Select the E-mail notification option of your choice, click **Submit**, then write down the file name.

To retrieve station catalog information for a single station

As of April, 2007, station information is included in the default FFP database structure. If you create a new database or upgrade from a Version 3.0.5 FFP

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database, you do not need to import station catalogs. You may still import a station catalog to update information or if a new station has been added.

1 From the **KCFAST Main Menu**, click **Weather**.

2 Click **Station Catalog**, and then click **Station Information**.

3 Click **BY SINGLE STATION**, and then type the desired **Station ID**.

4 Click **Send file to FTP site.**

5 Select the E-mail notification option of your choice, click **Submit**, then write down the file name.

To download a file from ftp2.fs.fed.us

1 Start your Internet browser.

2 In the address box, type **ftp://ftp2.fs.fed.us/incoming/wo_fam** then press **ENTER**.

3 Right-click the file name of your choice, click **Copy to folder,** then double-click the folder of your choice. (See Chapter 4 for more information on importing data).

Retrieving and downloading fire and weather data from FAMWEB (National Fire and Aviation Management Web Applications)

The National Fire and Aviation Management Web Applications website provides another source of historical fire weather observations. This site is organized by state and includes federal fires and weather observations from WIMS users. Observations are updated once a year for the previous year and for all historical data.

To obtain weather data and Station Catalogs from FAMWEB

1 Go to the FAMWEB website at http://fam.nwcg.gov/fam-web/weatherfirecd.

2 Select a state from the list at the left side of the page.

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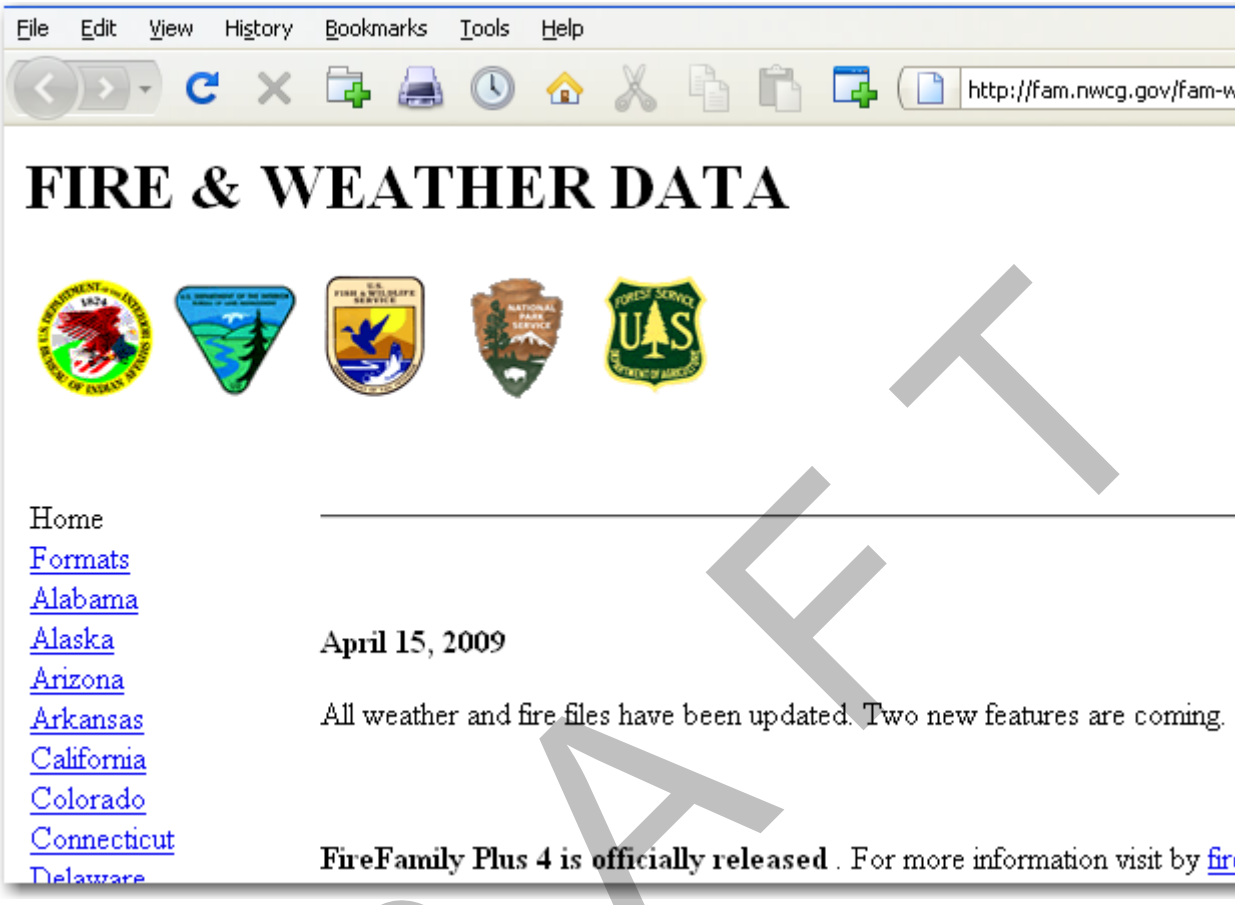

3 Right-click on the file you would like to download.

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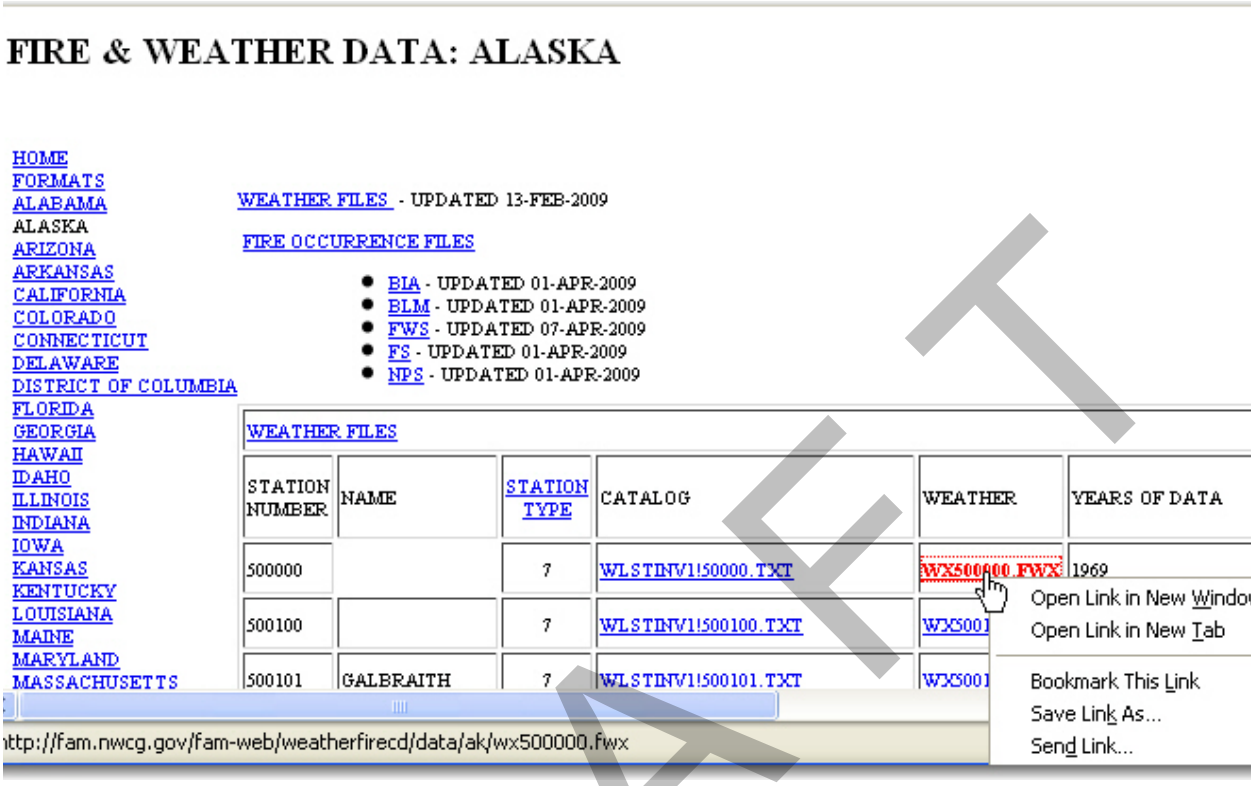
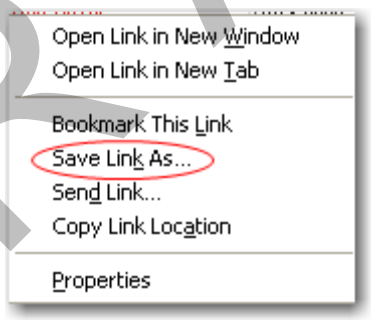


4 Select Save File. (**Save Link As**)



5 Save weather files as .fwx files.

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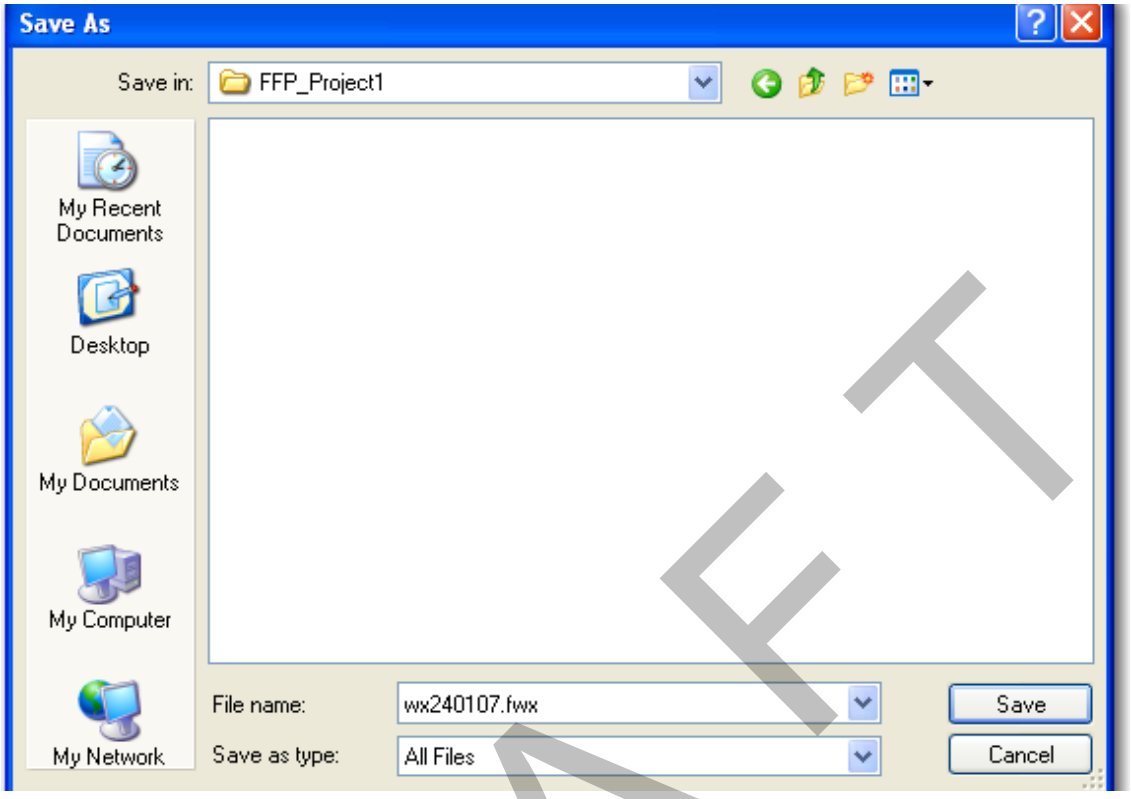


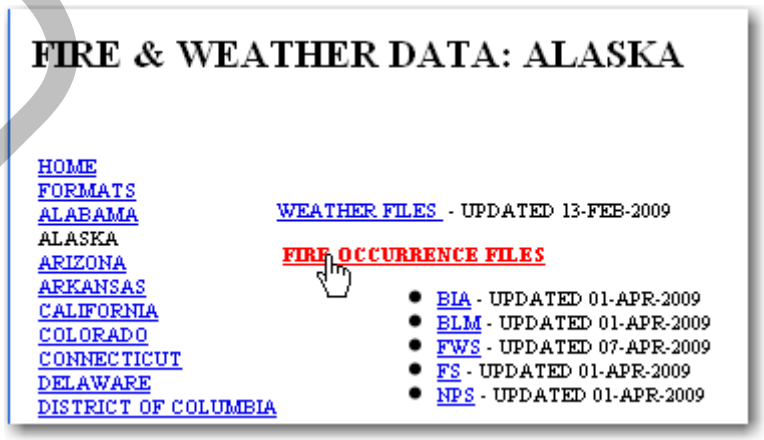
6 You can import these .fwx files into FireFamily Plus as discussed in Chapter 4

7 Station Catalog files can be downloaded and saved as a text file in a similar manner.

To obtain fire occurrence files from FAMWEB

1 Click **Fire Occurrence Files** at the top of the page.

2 Select an agency from the list provided.



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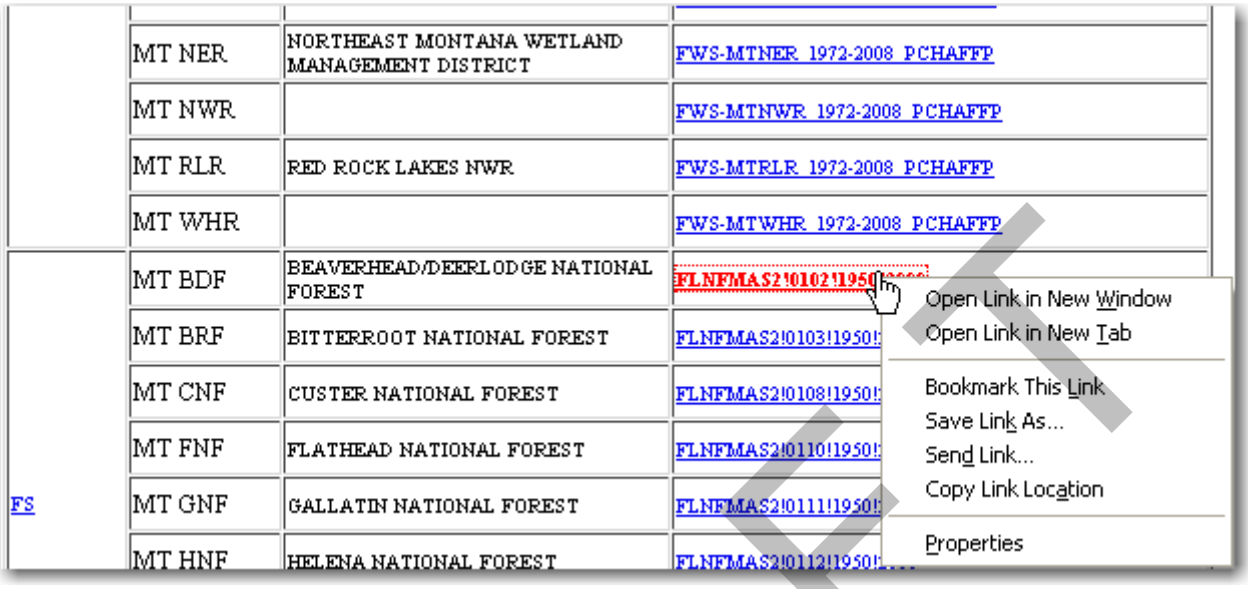
3 Right-click on the file you would like to download.



4 Save the file.

5 You can import the file into FireFamily Plus as discussed in Chapter 4.

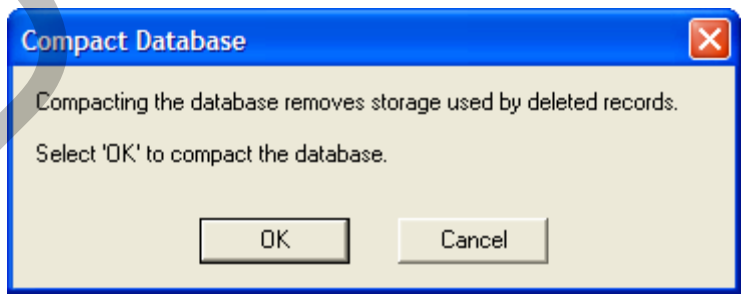
Managing a database

To compact the database

1 On the **Data** menu, click **Compact**.

2 Click **OK**.

The following diagram shows the **Compact Database** dialog box. From here, you can remove unused storage for records deleted from your database.



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Chapter 4. Importing data

How to import data

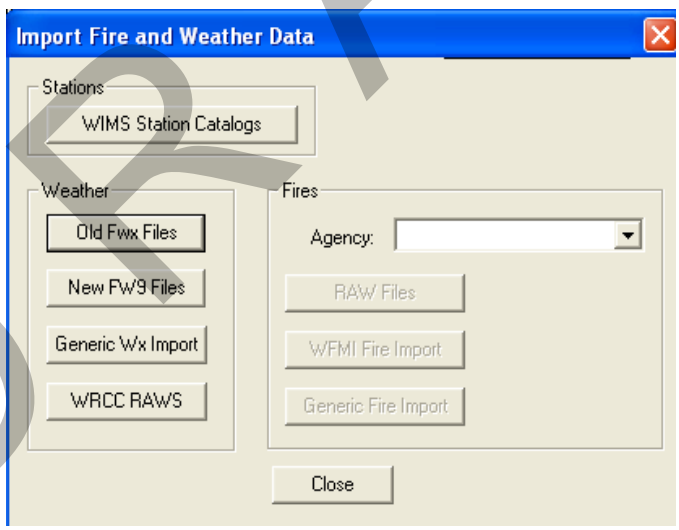
This chapter explains how to import files to use in FireFamily Plus. Topics include:

- Importing station catalogs.
- Creating a new station.
- Importing fire weather data.
- Importing federal fire occurrence data.
- Defining custom agencies and importing fire occurrence data.
- User variables.

Importing station catalogs

Station information is now included in the default FFP database structure. Therefore, if you create a new database or upgrade from an FFP version 3.0.5 database, you do not need to import the catalogs. You may still wish to import a station catalog to update information or when a new station has been added.

After saving the historical fire weather data, fire occurrence data, and the station catalog information on your personal computer, you can import the information into the newly created database.



To import a station catalog

Station catalog information as of April 2007, is included in the default FireFamily Plus database structure. This means that if you create a new database or upgrade from a Version 3.0.5 database, you do not need to import the catalogs. You may still wish to import a catalog to update information or if a new station has been added to the network.

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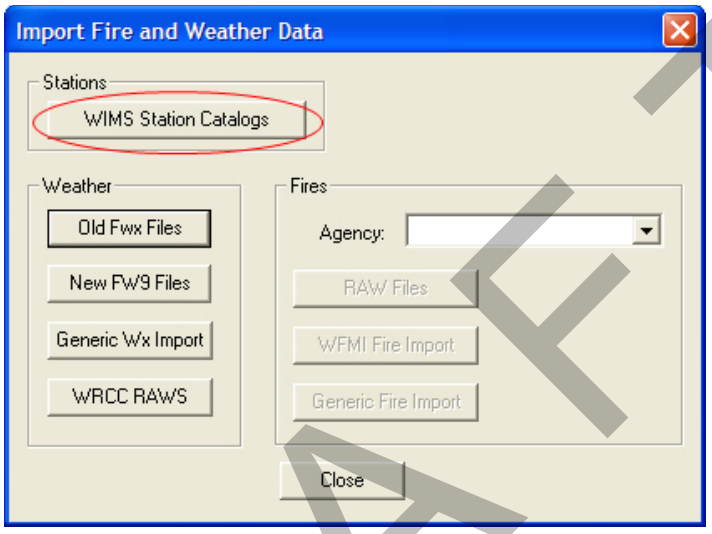
Refer to Chapter 3 for additional information on obtaining a "new" station catalog.

1 On the **Data** menu, click **Imports**.

2 Click on the **WIMS Station Catalogs** button as shown.



3 A dialog box will open. Select the weather station files you would like to add and click **Open.**

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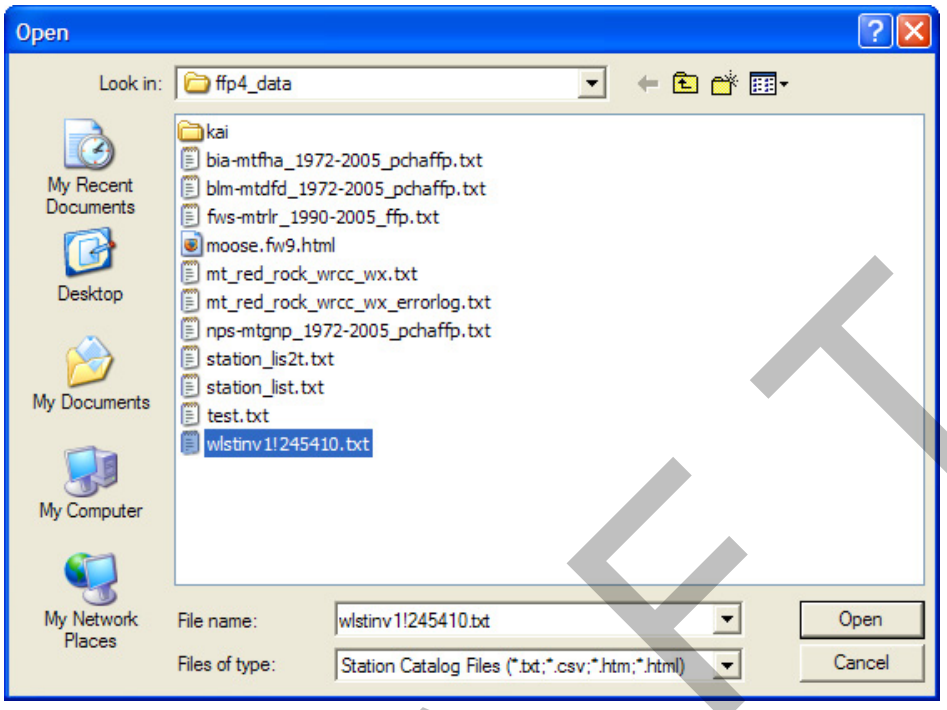
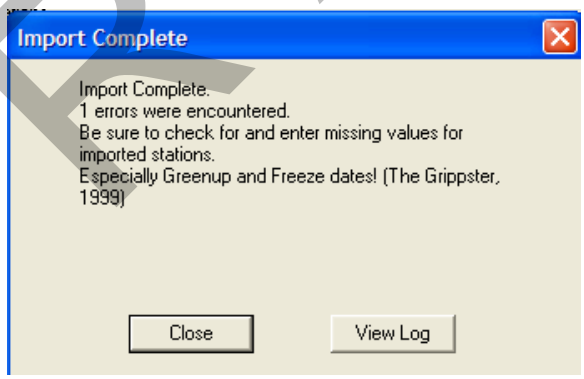


4 When finished click **Close** and then click **Close** on the **Import Fire and Weather Data** dialog box.

5 An **Import Complete** dialog box indicates that the station catalog was added successfully.



*To review, print or save the error log, click **View Log**.*

To create a station catalog

1 On the **Data** menu, click **Stations**. The following dialog box will open:

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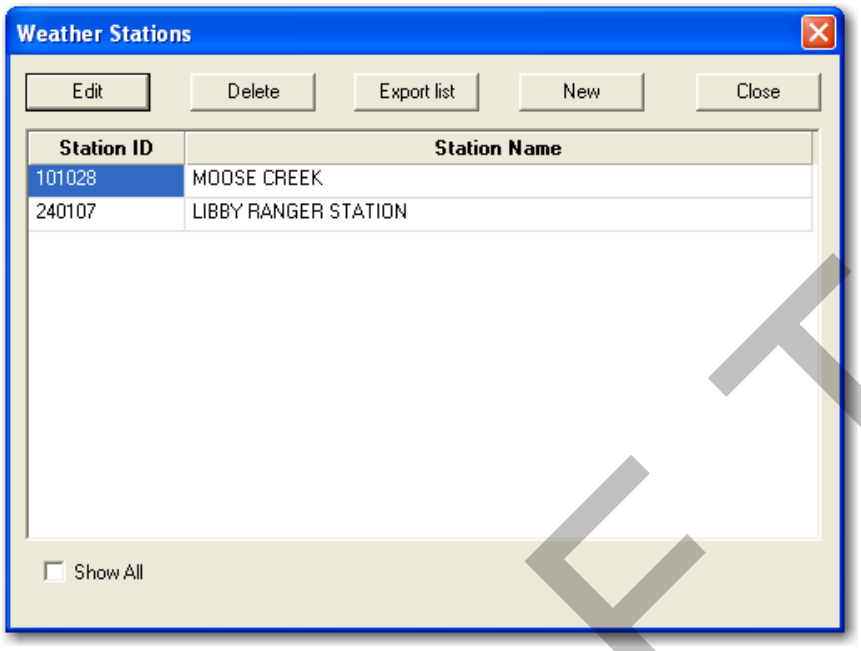
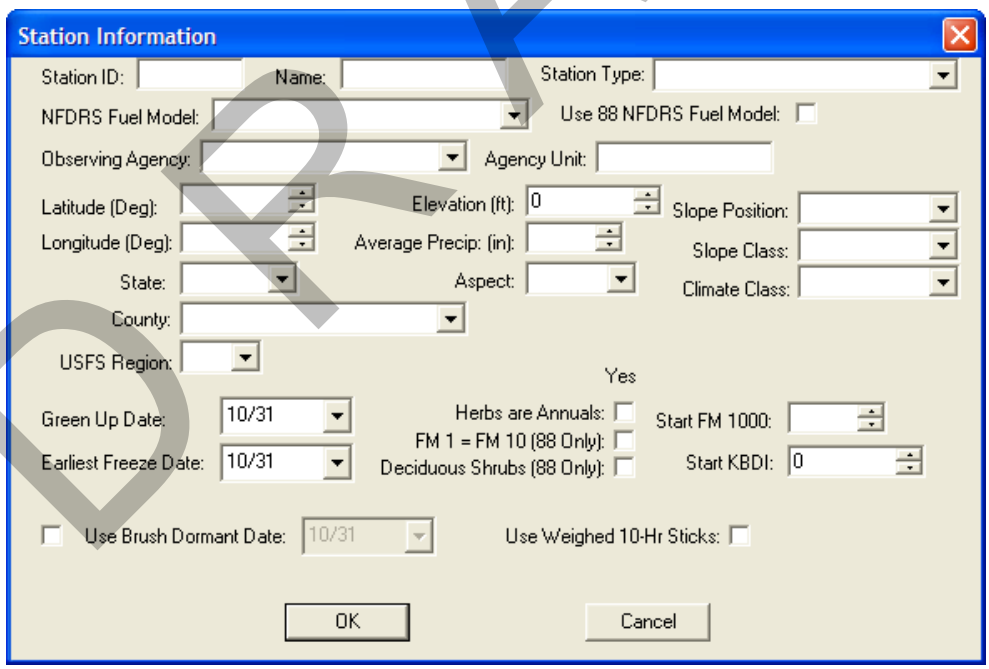


2 Click on the **New** button.

3 The **Station Information** dialog box shown below will open:



4 Populate the fields with reasonable values.

At a minimum, an input file requires an observation data and one or more variables. Optionally, the weather Station ID may be included as part of every record.

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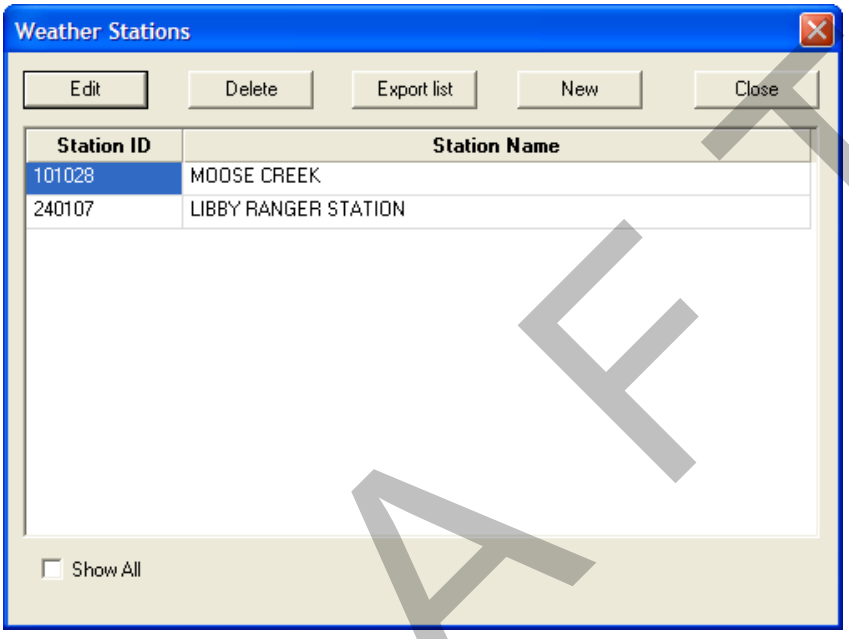
To edit a station catalog

1 To review the station catalog, click **Stations** on the **Data** menu.

2 Click the **Station ID** of your choice, and then click **Edit**.

The following **Weather Stations** dialog box lists all of the station catalogs available in your working set database.



The following **Station Information** screen shows station catalog "101028."

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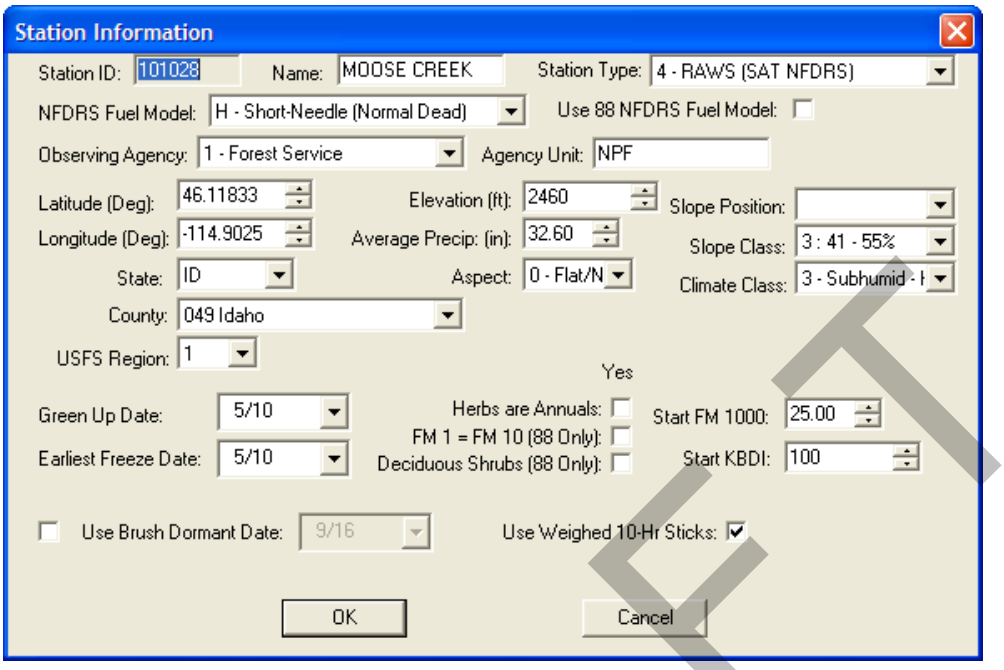
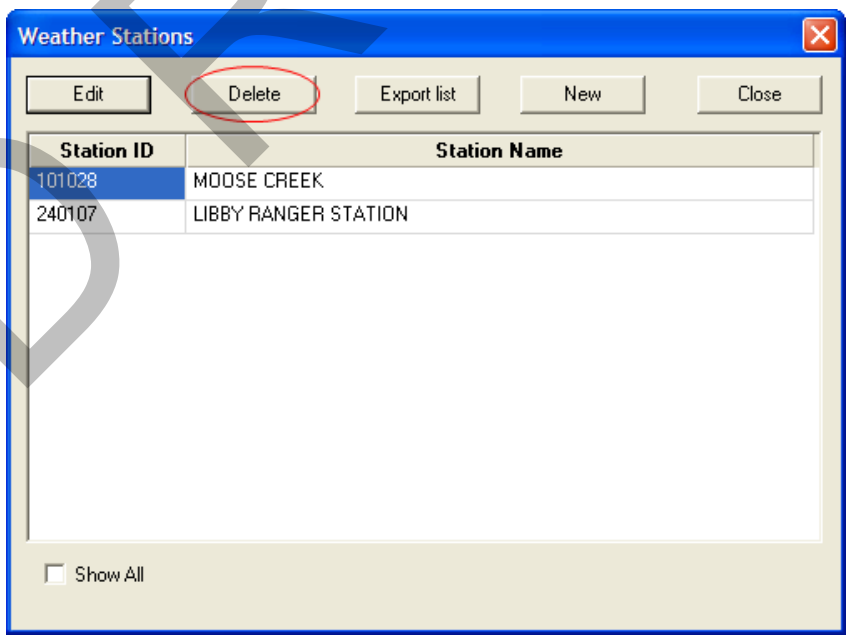


To delete a station catalog

1 Open the **Data** menu and select **Stations**.

2 The following **Weather Stations** dialog box will open.

3 Select the station you would like to delete and click **Delete**.



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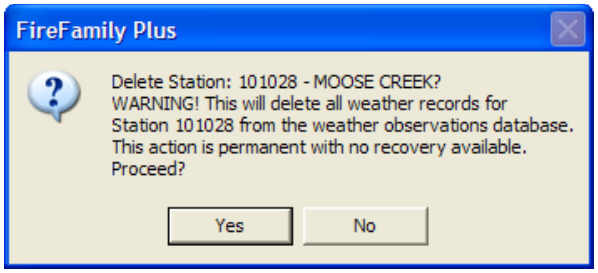
4 The delete confirmation dialog box shown below will open. Click **Yes** to confirm or **No** to cancel.



Importing fire weather data

To import historical fire weather data - optional

1 On the **Data** menu, click **Import**.

2 Click **Old Fwx Fires**, and then double-click the historical fire weather data file(s) of your choice.

*To import historical fire weather data retrieved in the 1998 data format, click **New FW9 Files**. Naming conventions for fire weather files are generally WX123456.FWX, or wxobs72a!12345! from ! to !.fwx, wxobs98a!12345! from ! to !.fw9.*

There are two standard formats for extracting fire weather observations from the National Interagency Fire Management Integrated Database (NIFMID) - the older FWX and the new FW9 formats. There are also other sources of these data (see Appendix D).

To import generic weather data

This functionality allows flexibility in importing data from alternate sources. It displays all weather observation elements available in FireFamily Plus and allows you to define data in your alternate weather file by selecting columns, the field delimiter, and date/time formats.

1 Click on the **Generic Wx Import** button and you will be prompted to select a weather file for importing. The file should be tab, comma, or semi-colon delimited.

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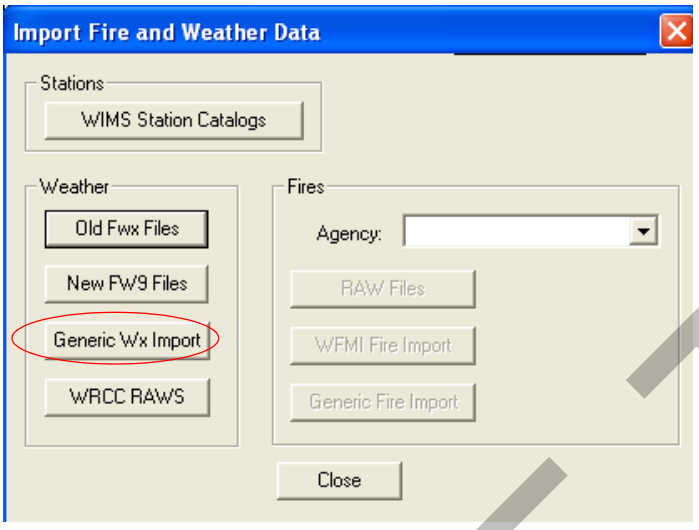

As an example, the following figure sets up a comma delimited import format from a file containing Station ID, date (Obs Date), time, (Obs Time) observation type (Obs Type), temperature (Temp), relative humidity (RH), wind speed (Wind Speed), and precipitation (Precip Amt). **Select fields in the order in which they appear in the file.**

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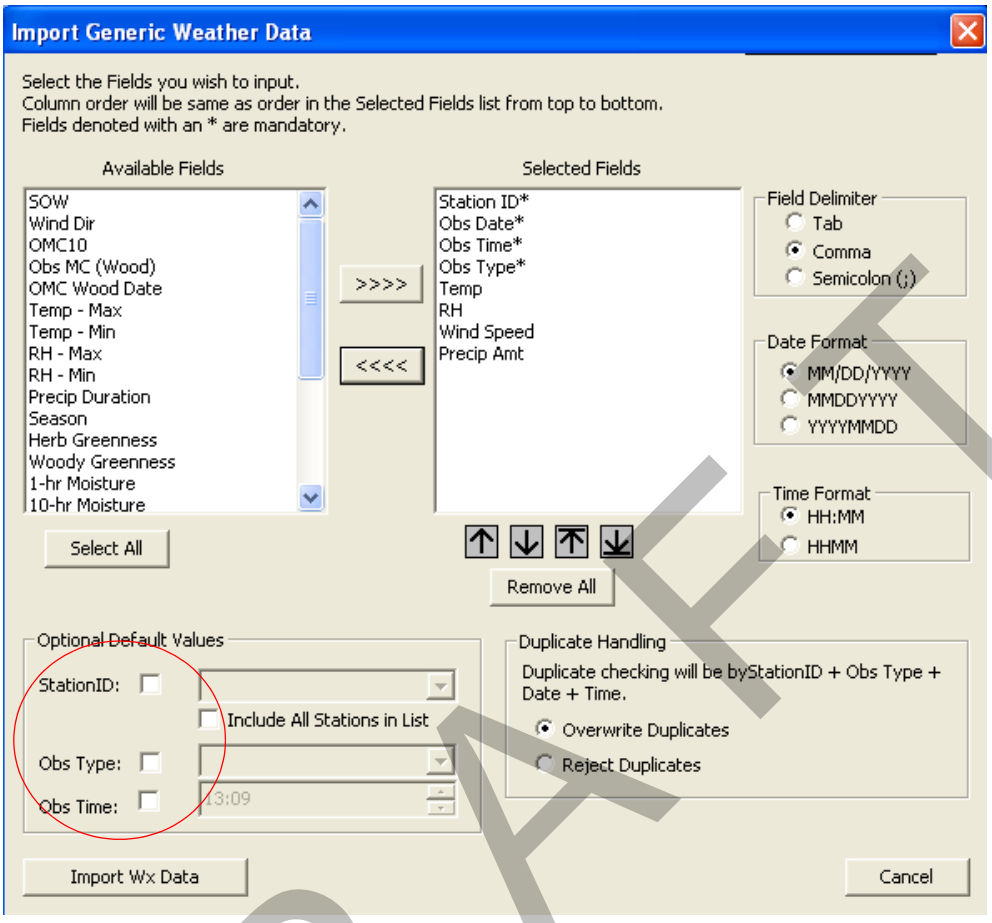

2 If the file is for a single station and there is no station field in the import file, click the **StationID** box, select the Station ID from the list of available stations in the current working set, or check the box labeled **Include All Stations in List** to select from a list of all stations. Also select whether or not to overwrite or reject duplicate values. Duplicate values occur when the StationID, Observation Type, Date and Time match an existing record in the observations data table.

To access WRCC RAWS data

This functionality allows flexibility in importing hourly RAWS data from the Western Region Climate Center's data lister (www.raws.dri.edu).

Once at this website there are several ways to navigate to a region and station of interest.

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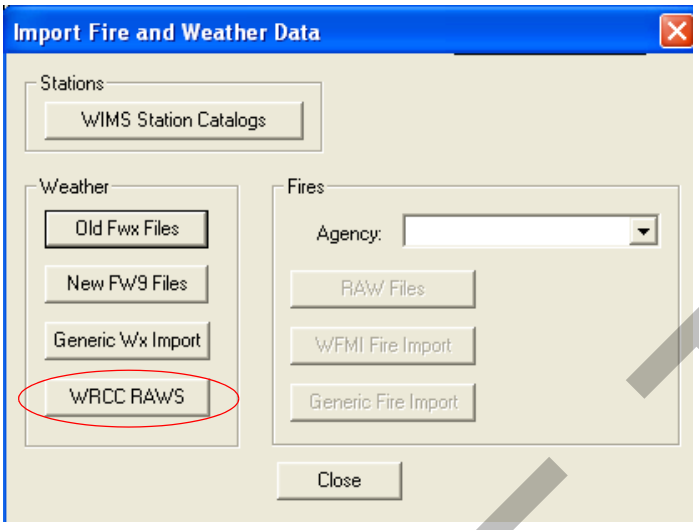
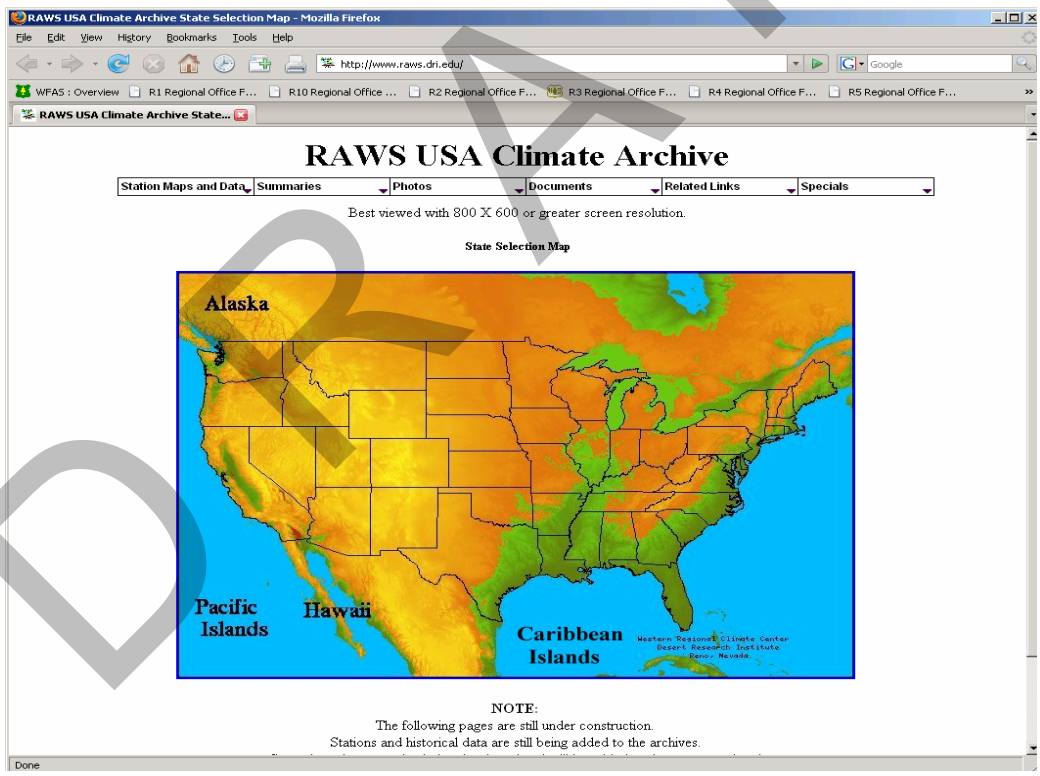


To download from the WRCC, follow these steps:

1 Go to the Western Region Climate Center website - www.raws.dri.edu.



2 Select the state of interest from the map shown. For Alaska, Pacific Islands, Hawaii, and Caribbean Islands, click on the respective name on the map provided.

3 From this map, either click on the station of interest, or select the name of the station from the list of stations in the left panel.

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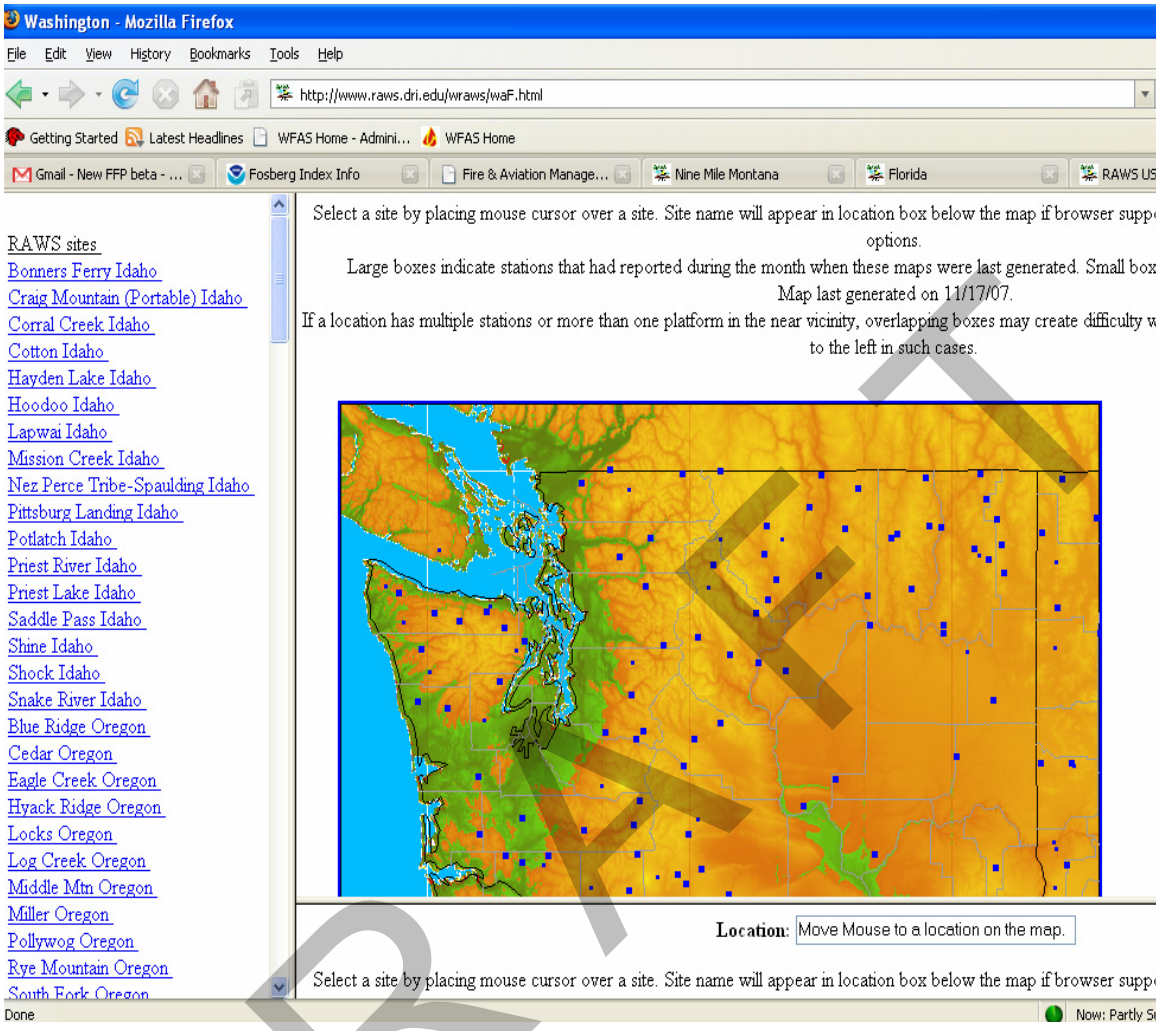

Note: The stations are not in alphabetical order by name but rather by WRCC station ID, so the station you are looking for may be further down the page in the left column.

After you have located a station of interest, use the **Data Lister** function from the extensive menu located at the left of the screen:

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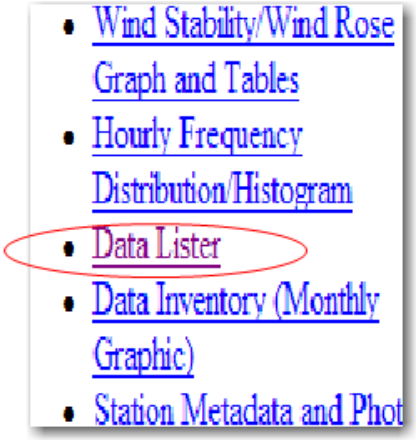

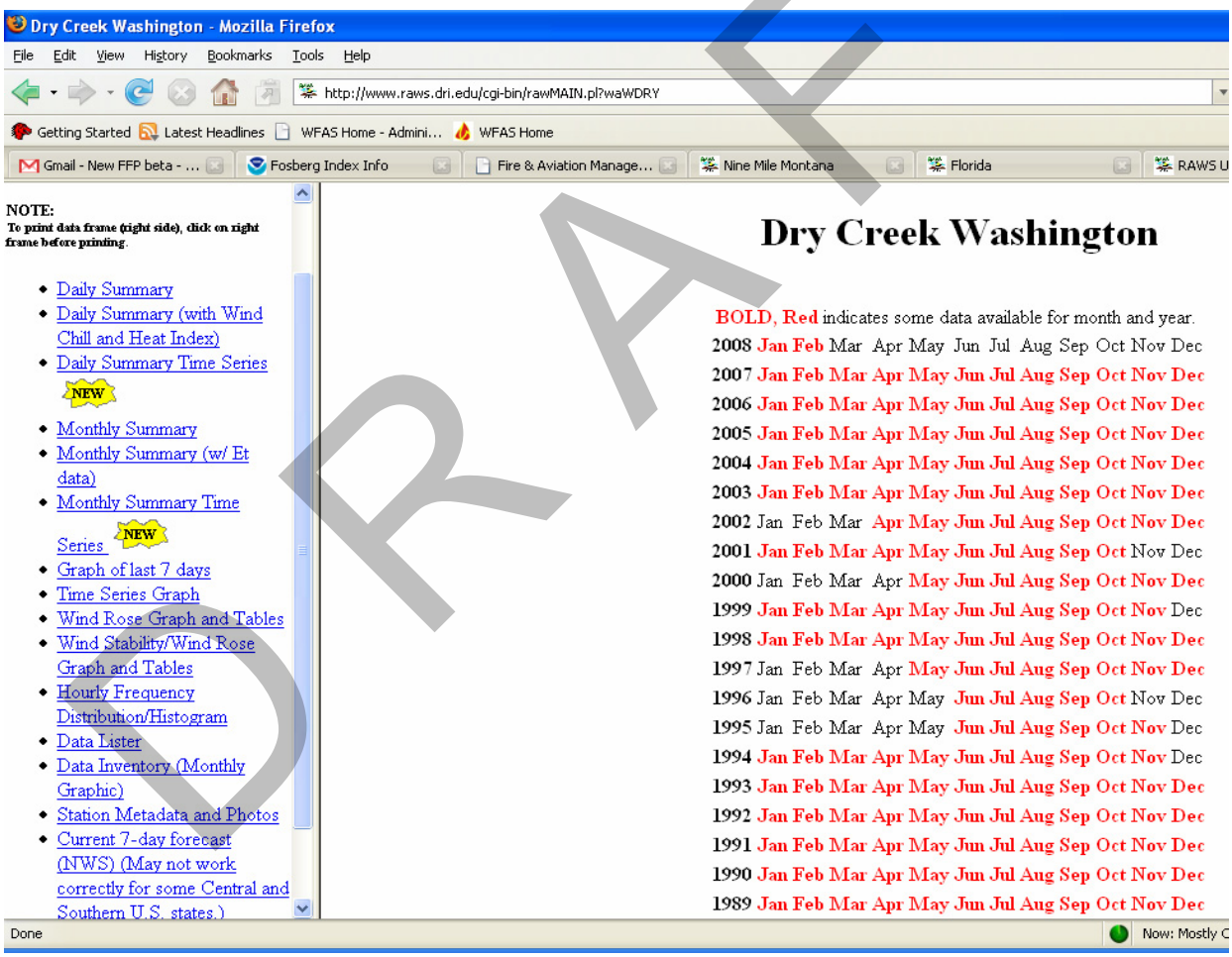

4 Define the data period of interest by defining the starting and ending dates in the following form. Once you have defined the data period, chosen the output format and entered the password (for data older than 30 days), click **Submit Info** to retrieve the data. Access to data older than 30 days

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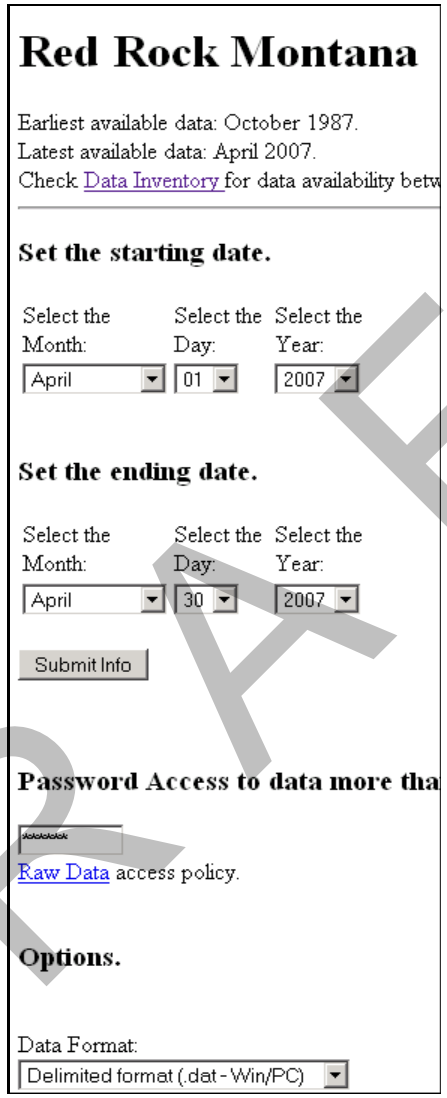
requires a password which can be obtained from the Western Region Climate Center by E-mailing: wrcc@dri.edu.

5 Under **Options**, in the **Data Format** drop-down menu, select **Delimited format (dat-Win/PC)** as shown.



6 Click on the **Submit Info** button when the form is completed.

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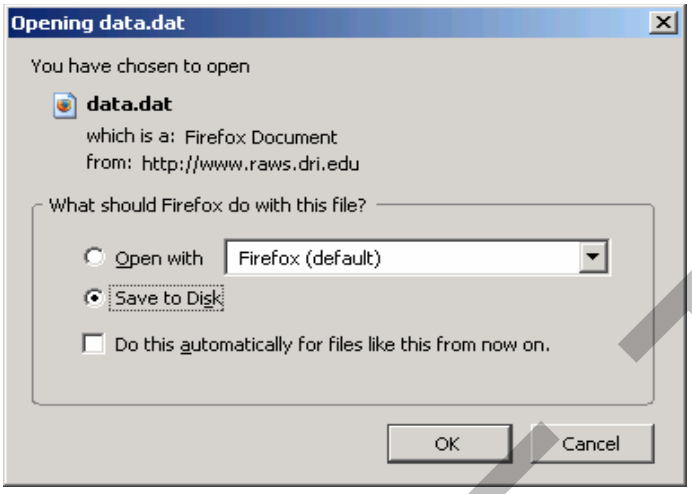
7 Once your selection is returned, a dialog box as shown below will appear, allowing you to save the data to a location of your choice.



8 View/and or save the **data.dat** file.

You can open the file with a browser of your choice to view the data or click on the **Save to Disk** radio button to save the file. You may change the filename at this time or accept the default (**data.dat**)

Data.dat *is the default name but you can change it to a more meaningful name.*

9 If you specify a browser and click **OK,** an example similar to the following will open.

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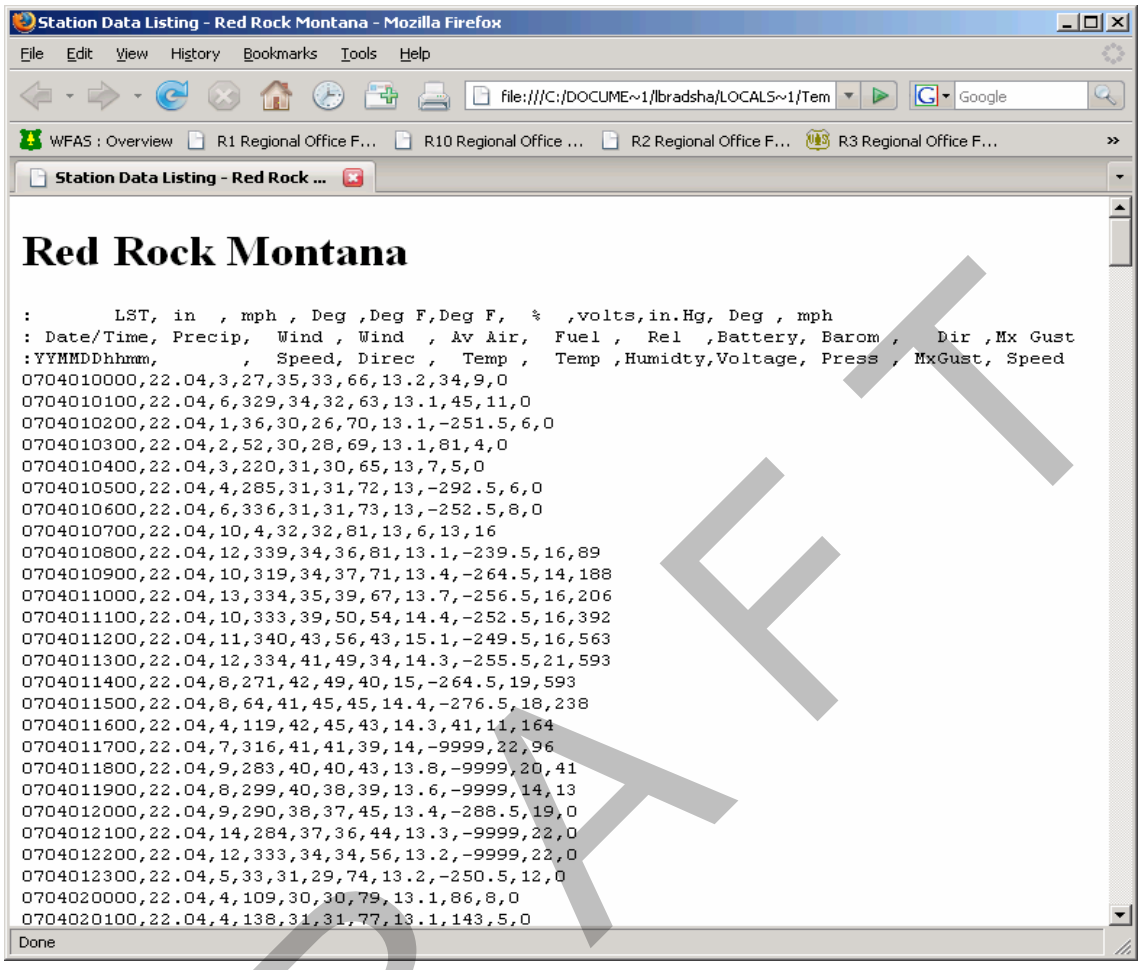
An example data format is shown below:



To import WRCC data

The Data Lister from the WRCC does not include station numbers in either the WIMS or the internal WRCC classification scheme. Consequently, FireFamily Plus requires you to associate the retrieved file with a FireFamily Plus Station Catalog.

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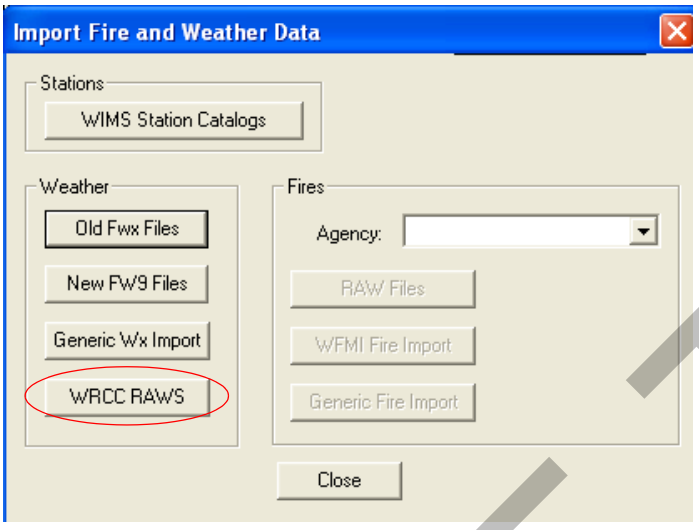
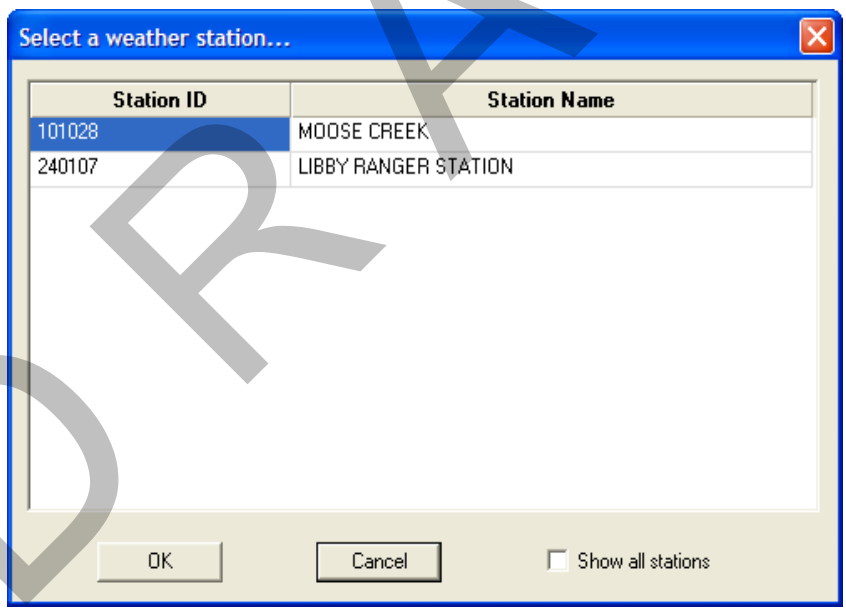


1 After clicking on **WRCC RAWS** in the **Import Fire and Weather Data Dialog Box**, the following screen will appear.

This screen shows only the stations that already have associated weather data.



2 Next check the **Show all stations** box at the lower right of the dialog box and you will be able to view a list of all NFDRS stations in the FireFamily Plus database. An example is shown below.

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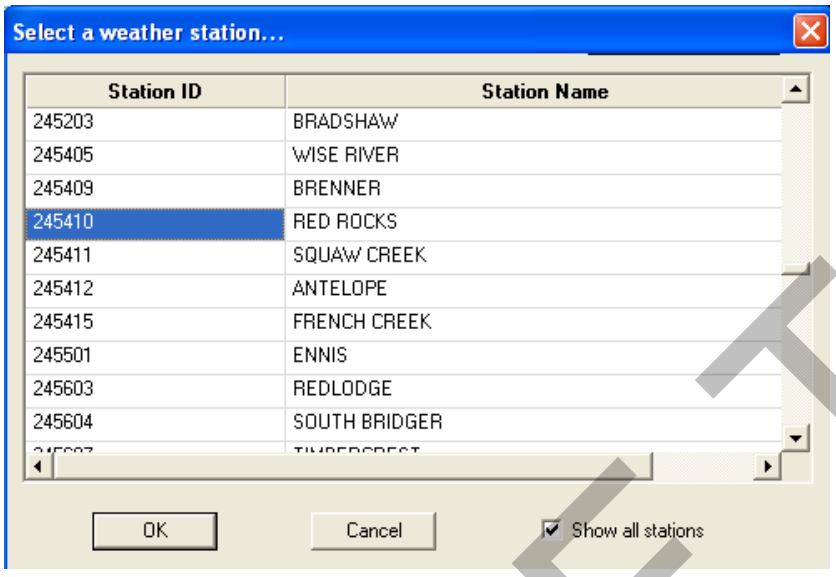
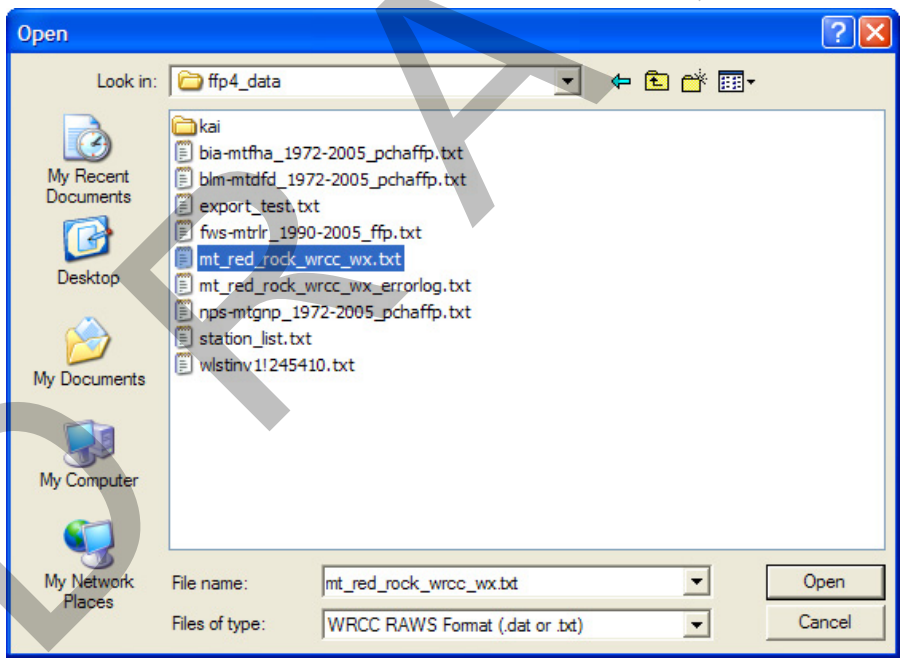


3 Select the station you want your data associated with and click **OK**. The following dialog box will open.



4 Select the weather file and click **Open** to select the weather file that you saved from WRCC and the data import process will begin.

5 Click on **View Log** and make sure that the Import Log has no errors.

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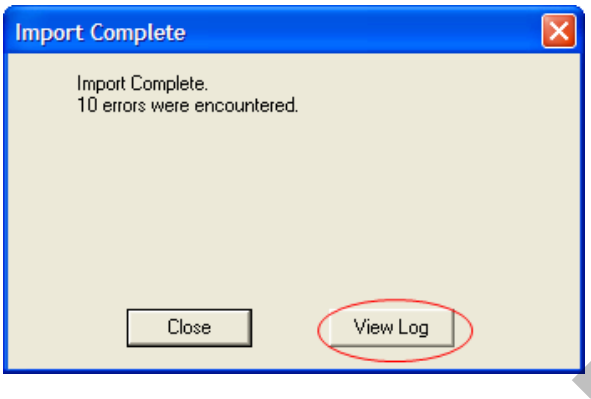

Warning: Imports from the WRCC may require considerable data quality control. The log lists the record number and date (yymmddhhmm) and the field in question.

An error message from a WRCC data import is shown below:

```
FireFamily Plus WRCC RAWS File Import Log
Started: 02/01/2007 at 17:25:40

**************************************************
Import File Name: C:\Documents and Settings\lbradsha\My Documents\ffp4_data\mt_red_rock_wrcc_wx.t
       WARNING: Record Number 1228, 8712060000 - Gust Speed (110) appears to be invalid
       WARNING: Record Number 7792, 8809100100 - Gust Speed (281) appears to be invalid
       WARNING: Record Number 17686, 8911130600 - Gust Speed (131) appears to be invalid
       ERROR: Record Number 18954, 9001060800 - Temp (401) is invalid
       ERROR: Record Number 18955, 9001060900 - Temp (401) is invalid
       ERROR: Record Number 25749, 9010211700 - Temp (403) is invalid
       ERROR: Record Number 25750, 9010211800 - Temp (303) is invalid
       WARNING: Record Number 25879, 9010270400 - Gust Speed (136) appears to be invalid
       ERROR: Record Number 27167, 9012210800 - Temp (-45.99) is invalid
       ERROR: Record Number 27190, 9012220700 - Temp (-41.99) is invalid
       ERROR: Record Number 27191, 9012220800 - Temp (-43.99) is invalid
       WARNING: Record Number 35145, 9112010100 - Gust Speed (301) appears to be invalid
       WARNING: Record Number 36018, 9201070700 - Current Precip (  3.3900) is invalid. Recip cou
reset.
       WARNING: Record Number 37474, 9203101100 - Gust Speed (287) appears to be invalid
```

An example of hourly observations constructed from WRCC data is shown below.

Note that SOW (State of Weather) is blank.

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Weather Data

	StationID	ObsDate	Type	SOW	Temp(F)	RH	24hr Precip	Duration	Wind Speed	Direction	Azin
1	245410	10/13/87 13:00	O		51	23	0.00	0	3	3	119
2	245410	10/13/87 14:00	R		53	22	0.00	0	3	4	191
3	245410	10/13/87 15:00	R		52	23	0.00	0	6	5	215
4	245410	10/13/87 16:00	R		51	25	0.00	0	9	2	106
5	245410	10/13/87 17:00	R		49	27	0.00	0	3	4	173
6	245410	10/13/87 18:00	R		44	29	0.00	0	2	1	43
7	245410	10/13/87 19:00	R		38	33	0.00	0	3	1	52
8	245410	10/13/87 20:00	R		33	38	0.00	0	3	8	4
9	245410	10/13/87 21:00	R		30	42	0.00	0	2	8	11
10	245410	10/13/87 22:00	R		26	49	0.00	0	4	8	1
11	245410	10/13/87 23:00	R		28	45	0.00	0	2	8	1
12	245410	10/14/87 00:00	R		21	56	0.00	0	2	1	32
13	245410	10/14/87 01:00	R		19	59	0.00	0	5	8	11
14	245410	10/14/87 02:00	R		17	77	0.00	0	4	4	176
15	245410	10/14/87 03:00	R		19	63	0.00	0	3	1	64
16	245410	10/14/87 04:00	R		17	70	0.00	0	1	7	302

FWX and FW9 files from WRCC

WRCC also offers FWX and FW9 files for importing. You can use the standard FWX and FW9 data import options available in FireFamily Plus but the behavior of these data are slightly different because WRCC does not use WIMS station IDs. To import FWX or FW9 files, follow the Data Lister instructions but select the appropriate format from the **Data Format** pull-down list as shown.

Data Format:

Traditional RAWS format

- Traditional RAWS format
- Delimited format (.dat - Win/PC)
- Columnar format (.txt - Win/PC)
- Excel (.xls)
- Delimited format (.txt - Unix/MAC)
- Columnar format (.txt - Unix/MAC)
- HTML - (.html)
- Fire Weather .dat format
- Fire Weather .fw9 format (98)
- Fire Weather .fwx format (72A)

FWX and FW9 formats from WRCC do not have State of Weather (SOW) and FireFamily Plus will assume SOW = 0.

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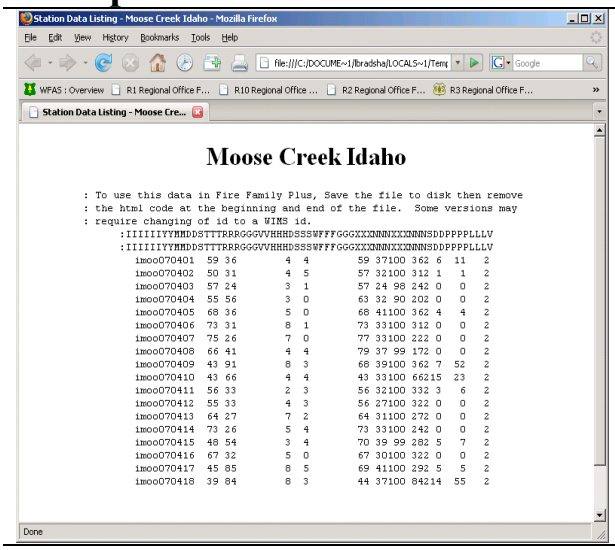
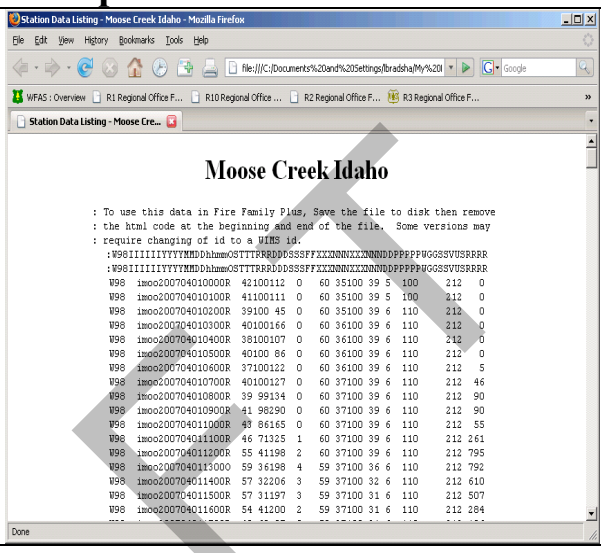
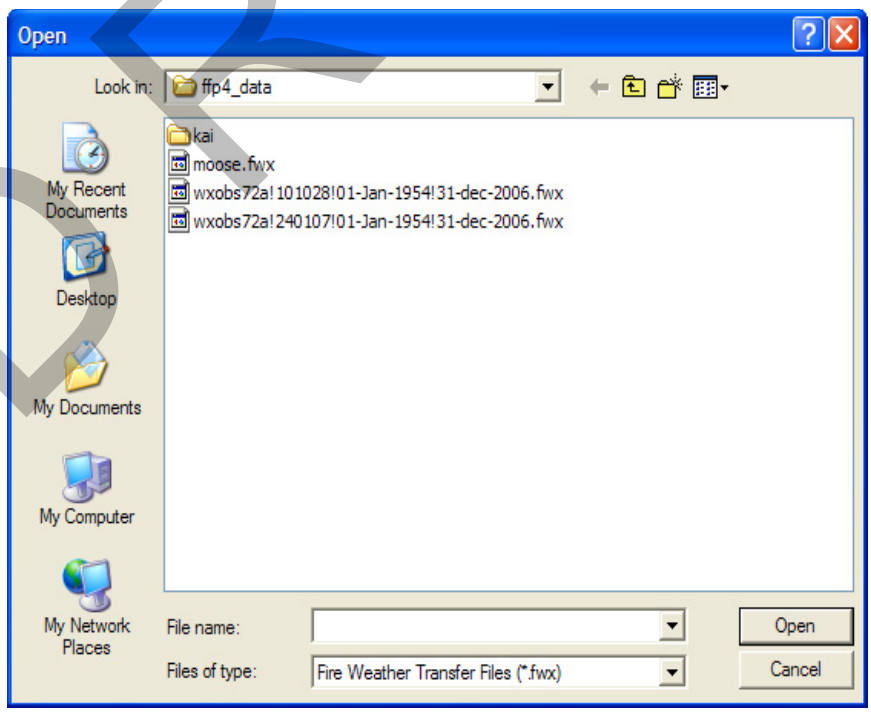
The following example shows FWX and FW9 formatted files for Moose Creek, Idaho.

Example FWX file	Example FW9 file
	

*Note that the WRCC station ID is "**imoo**" and that there is hourly data in the FW9 file.*

Select the file with weather data as shown below:



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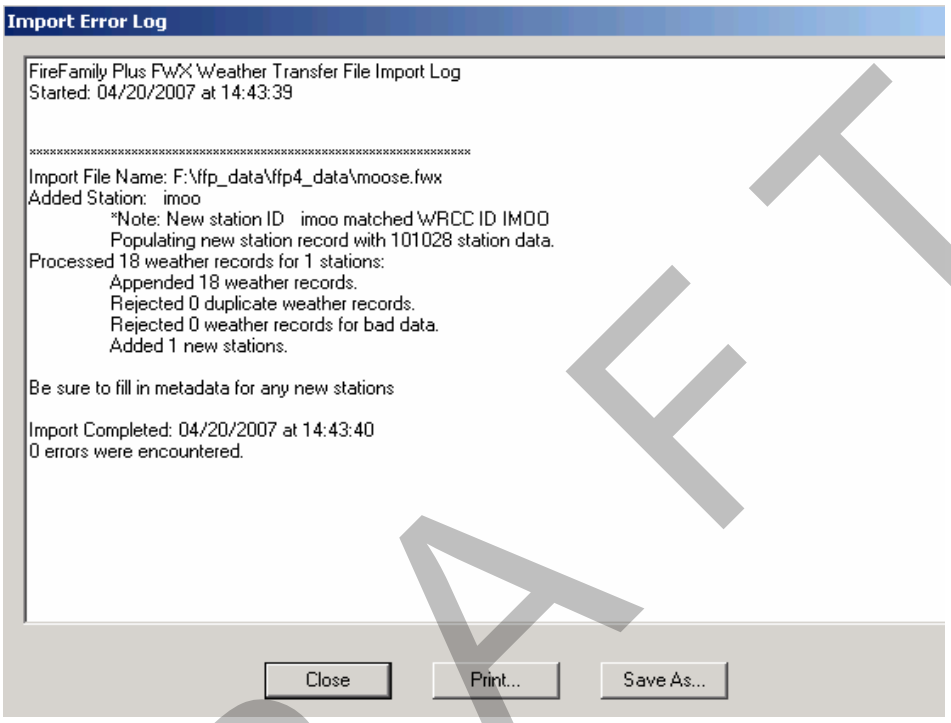
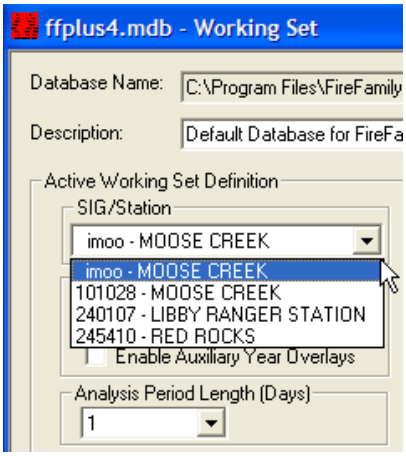
Upon importing the FWX and FW9 files into FireFamily Plus, the program will recognize the WRCC station ID, cross-reference the data to any existing data and copy the data over to a new station under the WRCC station ID.

The following is an example of an import error log showing WRCC ID "Imoo" cross-referenced to station 101028 (Moose Creek, Idaho).



A new station labeled with the WRCC station ID will appear in the SIG/Station drop-down menu. The new weather data will not include State of the Weather (SOW) but will include Solar Radiation. It is assumed that SOW=0. Notice that you did not have to import a station catalog. The station information was populated automatically.



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Notice the format of Moose Creek ("**imoo**"). This weather data does not have a SOW entry but it does include solar radiation.

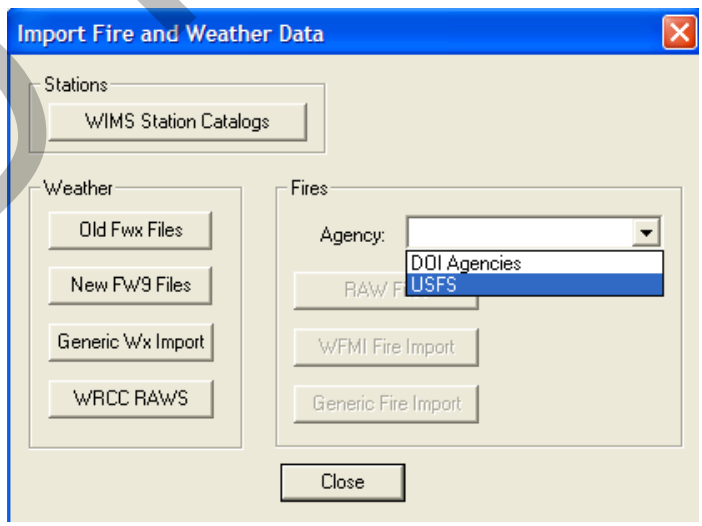
Weather Data

	StationID	ObsDate	Type	Direction	Azimuth	Max Temp	Min Temp	Max RH	Min RH	WetFlag
1	imoo	04/01/07 00:00	R	2	112	60	35	100	39	0
2	imoo	04/01/07 01:00	R	2	111	60	41	100	39	0
3	imoo	04/01/07 02:00	R	1	45	60	39	100	39	0
4	imoo	04/01/07 03:00	R	4	166	60	39	100	39	0
5	imoo	04/01/07 04:00	R	2	107	60	38	100	39	0
6	imoo	04/01/07 05:00	R	2	86	60	38	100	39	0
7	imoo	04/01/07 06:00	R	3	122	60	37	100	39	0
8	imoo	04/01/07 07:00	R	3	127	60	37	100	39	0
9	imoo	04/01/07 08:00	R	3	134	60	37	100	39	0
10	imoo	04/01/07 09:00	R	6	290	60	37	100	39	0
11	imoo	04/01/07 10:00	R	4	165	60	37	100	39	0
12	imoo	04/01/07 11:00	R	7	325	60	37	100	39	0
13	imoo	04/01/07 12:00	R	4	198	60	37	100	39	0
14	imoo	04/01/07 13:00	O	4		60	37	100	36	0
15	imoo	04/01/07 14:00	R	5	206	60	37	100	32	0
16	imoo	04/01/07 15:00	R	4	197	60	37	100	31	0

Importing federal fire occurrence data

Organizational structure

1 To import fire occurrence data, first select an agency.



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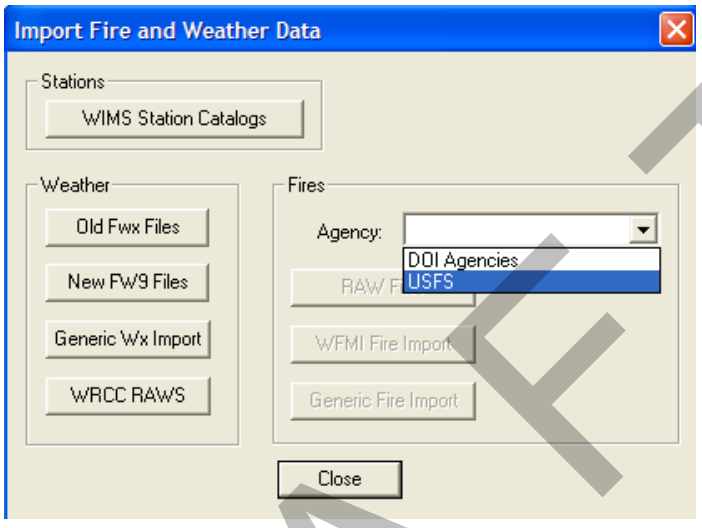
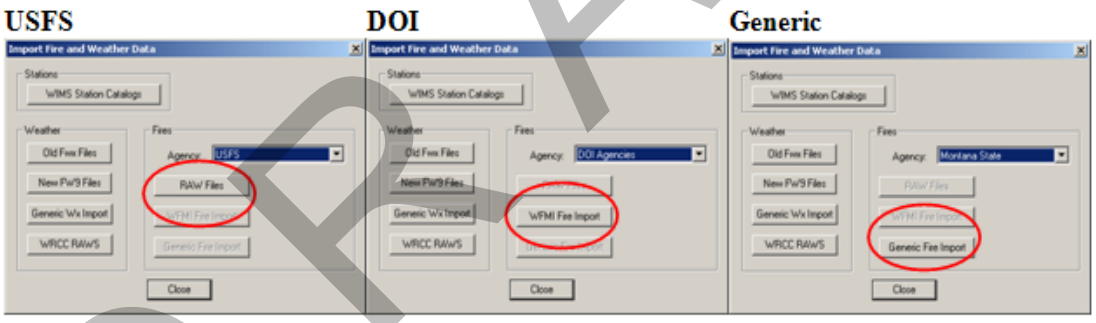
The only default choices are USFS and DOI. Once an agency is selected, the appropriate button is highlighted for you to press. Use the **RAW Files** import for USFS and the **WFMI Fire Import** option for all DOI agencies. Additional agencies can be added to import any other fire occurrence data (see "Defining Custom Agencies and importing fire occurrence data" later in this Chapter).





The US Department of Interior (USDI), BIA, NPS, BLM, and Fish and Wildlife Service (FWS) now use National Wildfire Coordinating Group (NWCG) Unit Identifiers as shown in the following diagram.

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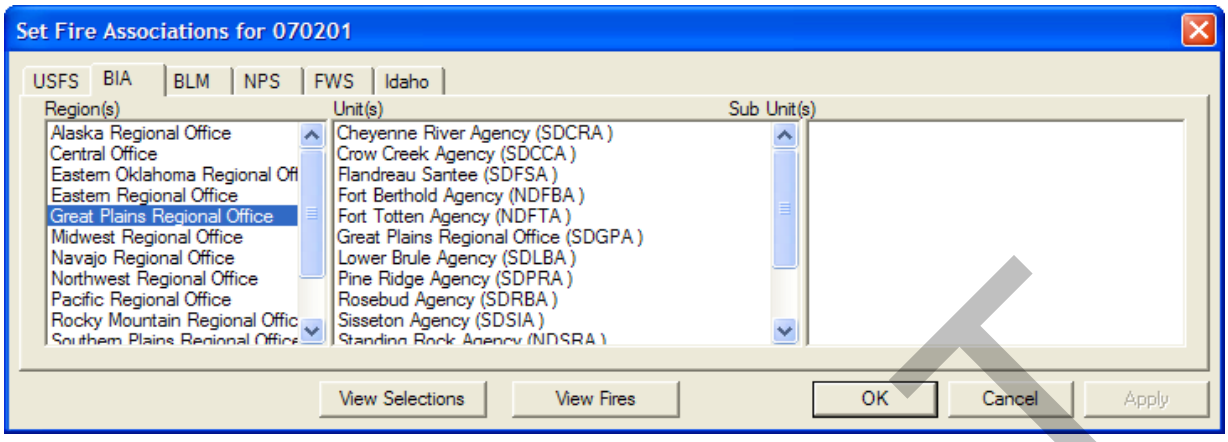


Forest Service fires are still recorded by Region/Forest/District.

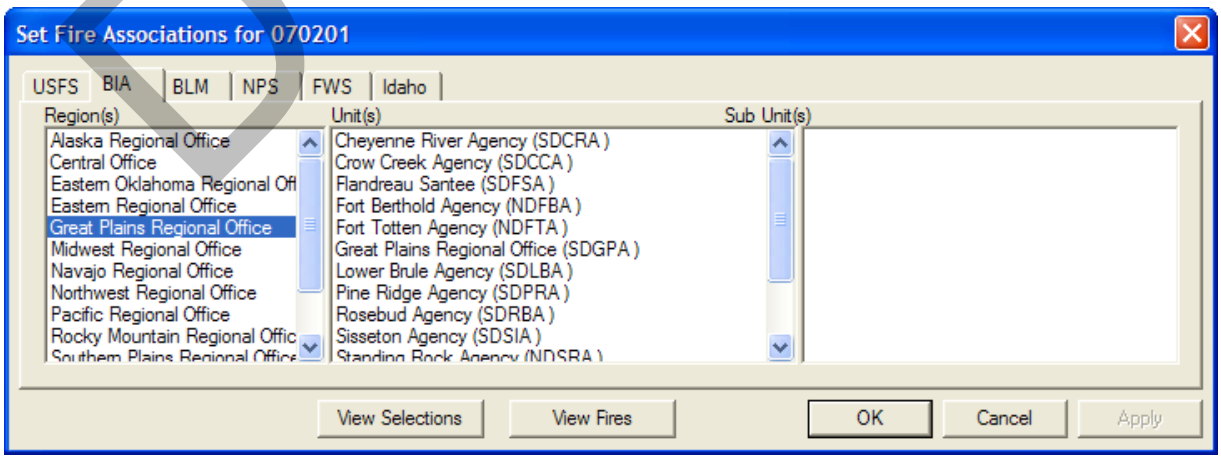
To import Forest Service fire occurrence data (RAW files)

1. In the **Agency** box, type or select **USFS**.
2. Click **RAW** Files, and then double-click the fire occurrence file(s) of your choice.
3. When finished click **OK**, and then click **Close**.

Since FS fire occurrence data is verified for duplicate records, this import process may require several minutes. For datasets containing more than 10,000 records, this process may require several hours!

Department of Interior WFMI files

The BLM BIA, NPS, and now the FWS use the Wildland Fire Management Information (WFMI) System. These records use a new data format called "**PCHA_FFP**" (Personal Computer Historical Analysis).



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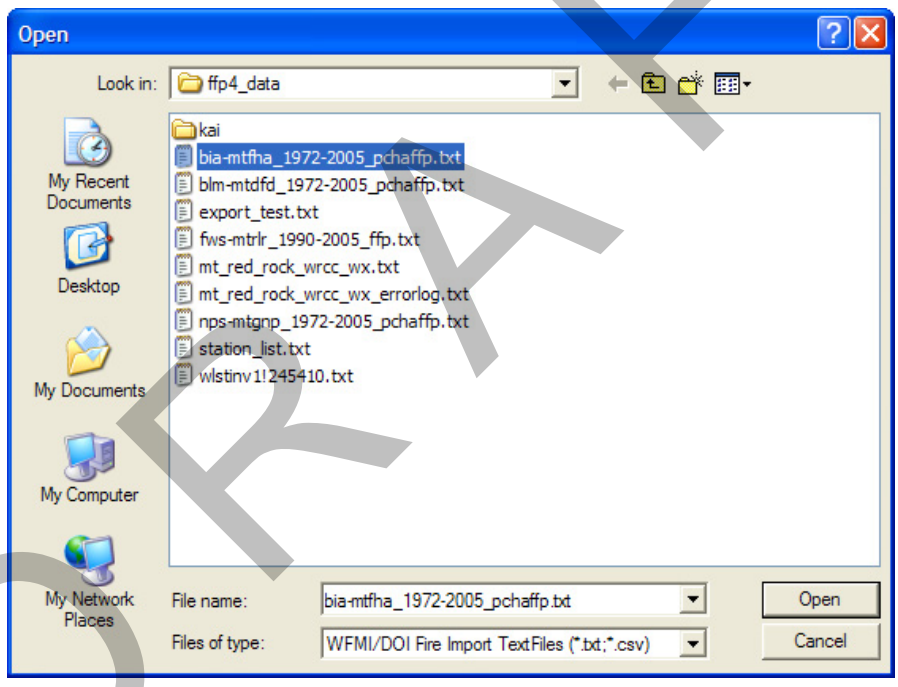
The following is an example of PCHA_FFP formatted fire records.

```
Export Name|PCHA
Version|1.0
Creation Date|06/08/2006 06:42
Selection Criteria|BIA - Northwest Region - Flathead Agency (MTFHA)|F
Record Count|3244
FireId|Organization|Unit|UnitIdentifier|FireName|FireNumber|FireCode|
453051|BIA|NWR|MTFHA|POWER LINE|2201||1|6|05/17/1972 17:30|05/17/1972
453052|BIA|NWR|MTFHA|OLIVER|2202||1|1|06/09/1972 18:45|06/09/1972 20:
453053|BIA|NWR|MTFHA|BURKE|2203||1|6|06/10/1972 18:00|06/10/1972 19:0
```

1. Select a file. The following **Select Fire Types to Import** dialog box will open.
2. Click **Open**.



3. Select **Fire Types to Import** by checking the individual boxes at the left side of the following dialog box or click the **Select All** button to include all of the fire types listed.
4. When you are finished with your selections, click **OK**.

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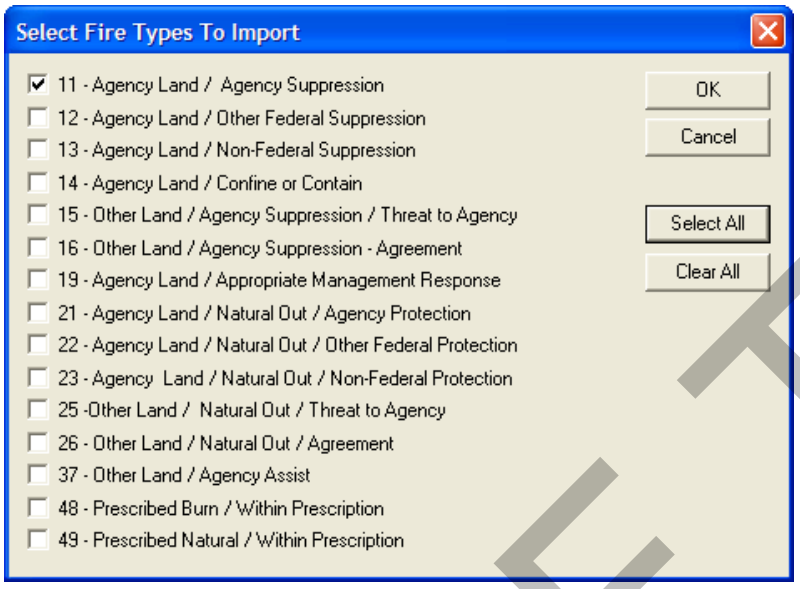

Additional fire types (19, 25, 26, and 37) have been added with FireFamily Plus version 4.0.

Defining Custom Agencies and importing fire occurrence data

Creating the organizational structure

To import fire occurrence data from Non-Federal agencies, you must first define the organizational structure of the agency.

1 Select the **Data -> Agencies** menu option.

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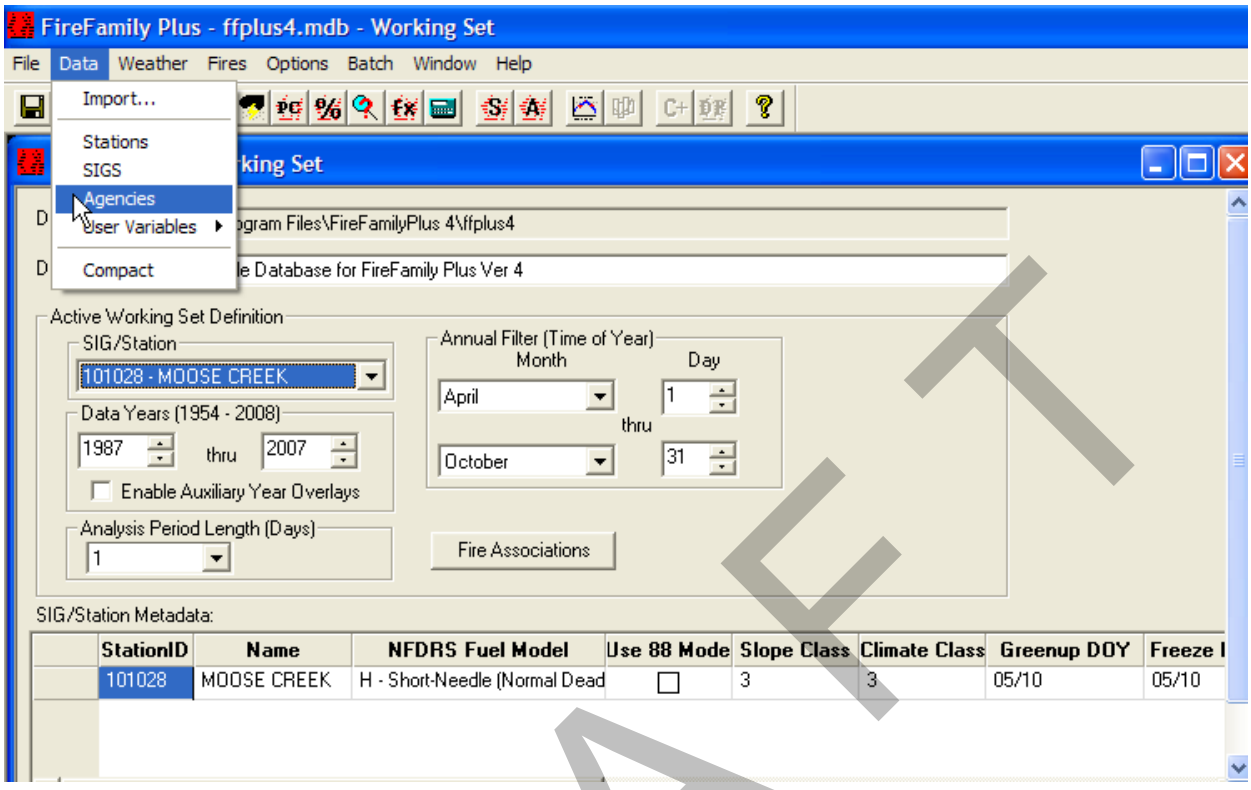
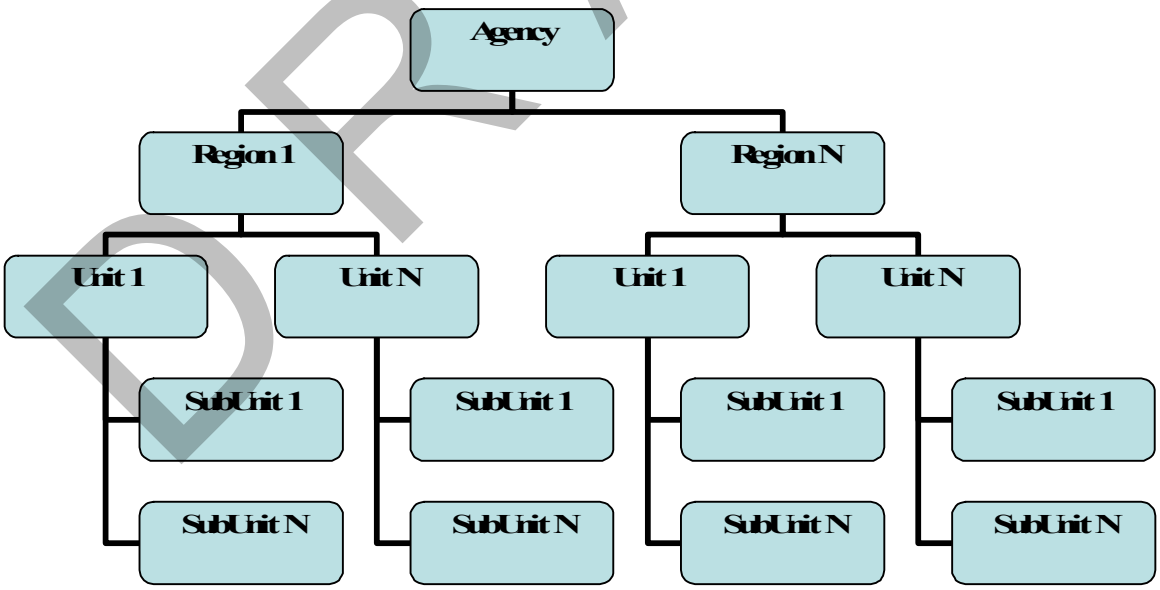


The following structure is assumed to exist.



Selecting the **Agencies** menu option will bring up the following dialog box:

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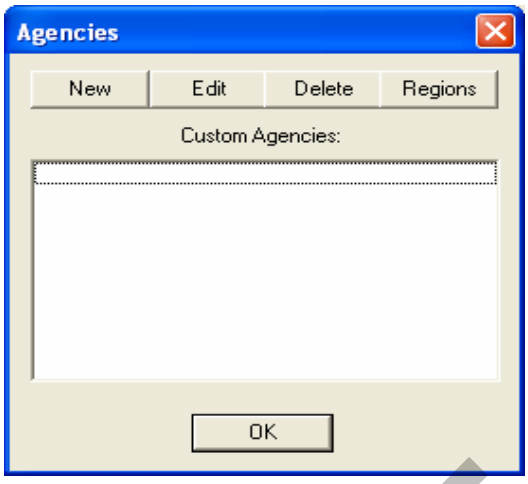
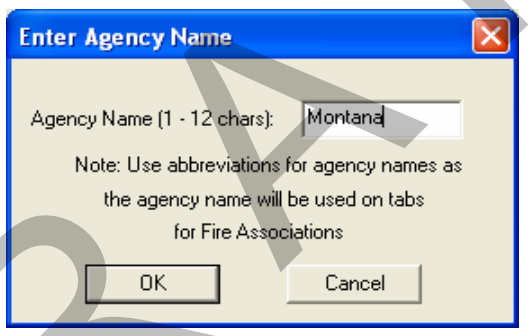


2 To create a new agency, press the **New** button and the following dialog box will appear.



3 Enter a one to 12 character name for the agency. Spaces are allowed. A new agency will be created.

4 Next, if applicable, you can create Regions. Click on the new agency name to highlight it and press the **Regions** button.

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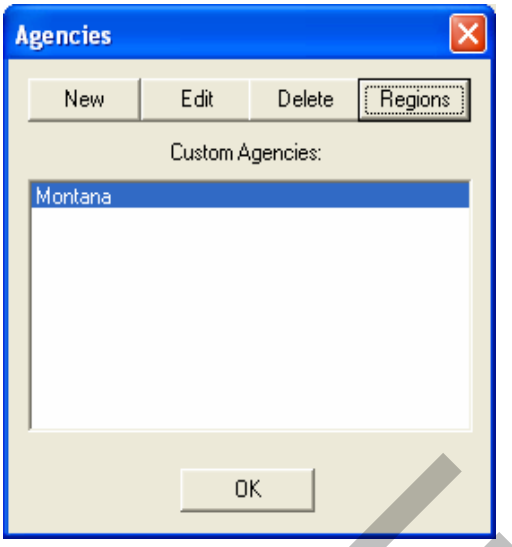
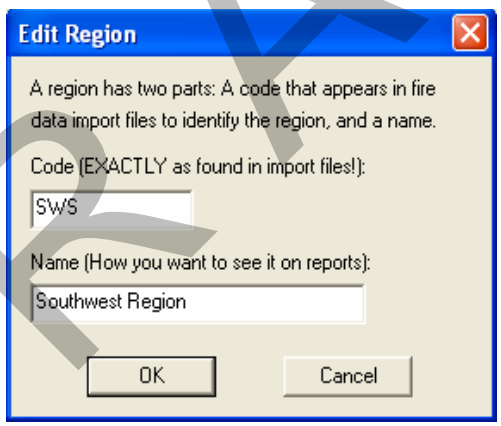


The following dialog box will open. Ensure that the **Code** field is populated wtih the code as it will appear in the import file.



5 Once a zone is identified, you can further describe the organizational structure using Units. Select a region from the list to highlight and press **New**.

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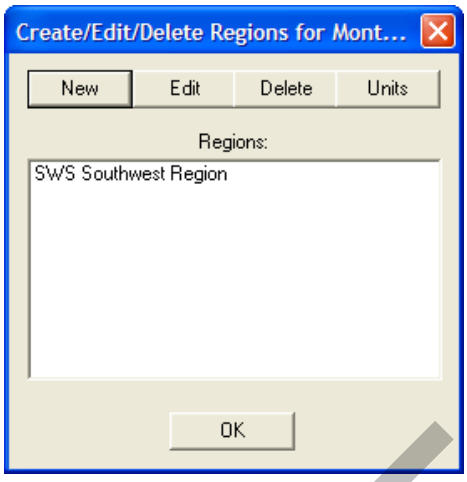
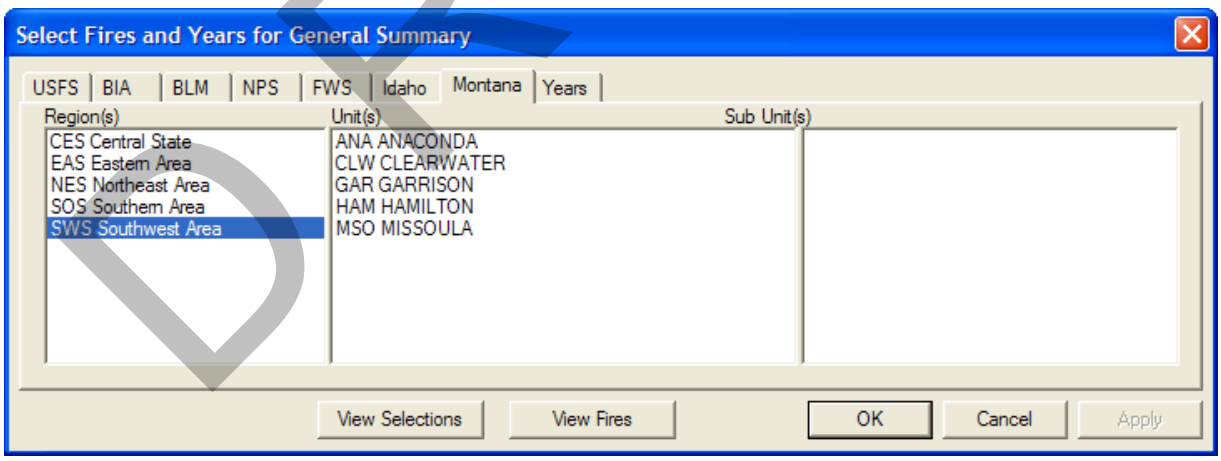


Pressing the **Units** button will bring up a dialog box similar to the **Agencies** and **Regions** boxes.

6 Again press **New** and define the units within that particular region and ensure that the unit code matches the unit code as it is displayed in the input file. Subunits can be defined in the same way. Continue adding regions, units, and subunits until the structure of the new organization is defined.

The following shows an example of a custom-defined agency (Montana), Region(s), and Unit(s).



Importing generic or user-defined fire occurrence data

The custom agency fire occurrence import functionality has been replaced with a generic fire import function in FireFamily Plus 4.0.

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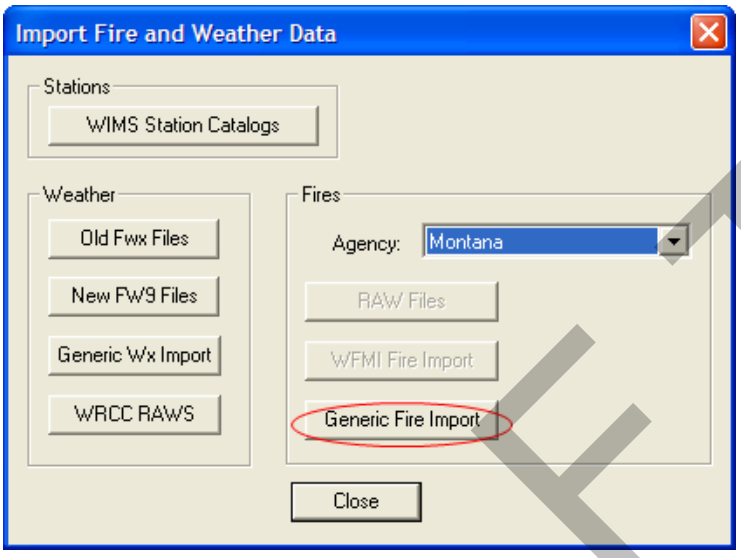
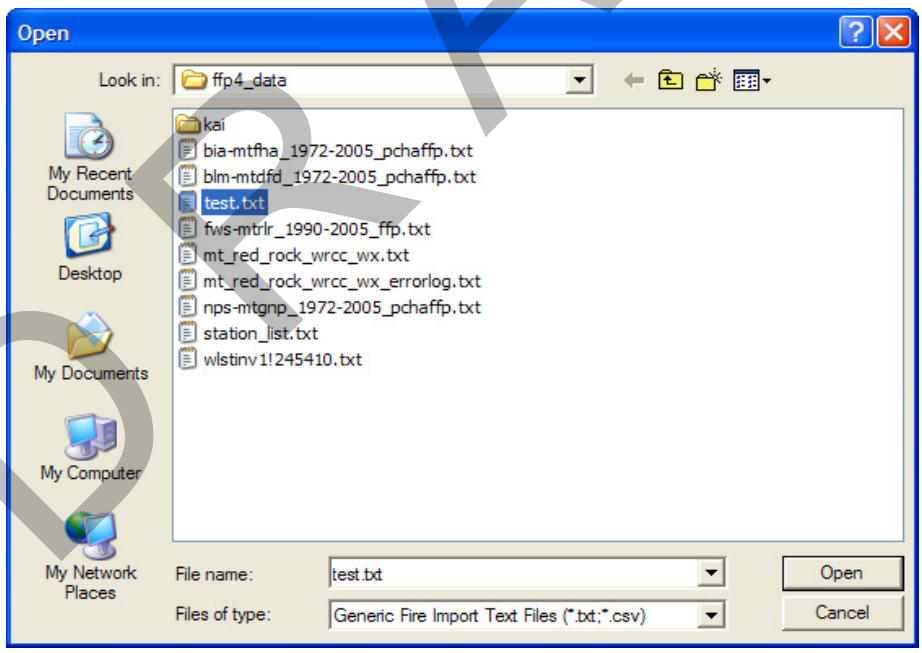
1 Click on **Data -> Import** and the following **Import Fire and Weather Data** dialog box will open.



2 Select **Generic Fire Import** and the following box will appear:



3 Select a generic fire import file.

The **Generic Fire Data** dialog box and functionality has been extensively reworked in FireFamily Plus 4.0. The ***first*** time you see the following dialog box for a custom agency, you will need to define the format of the input file.

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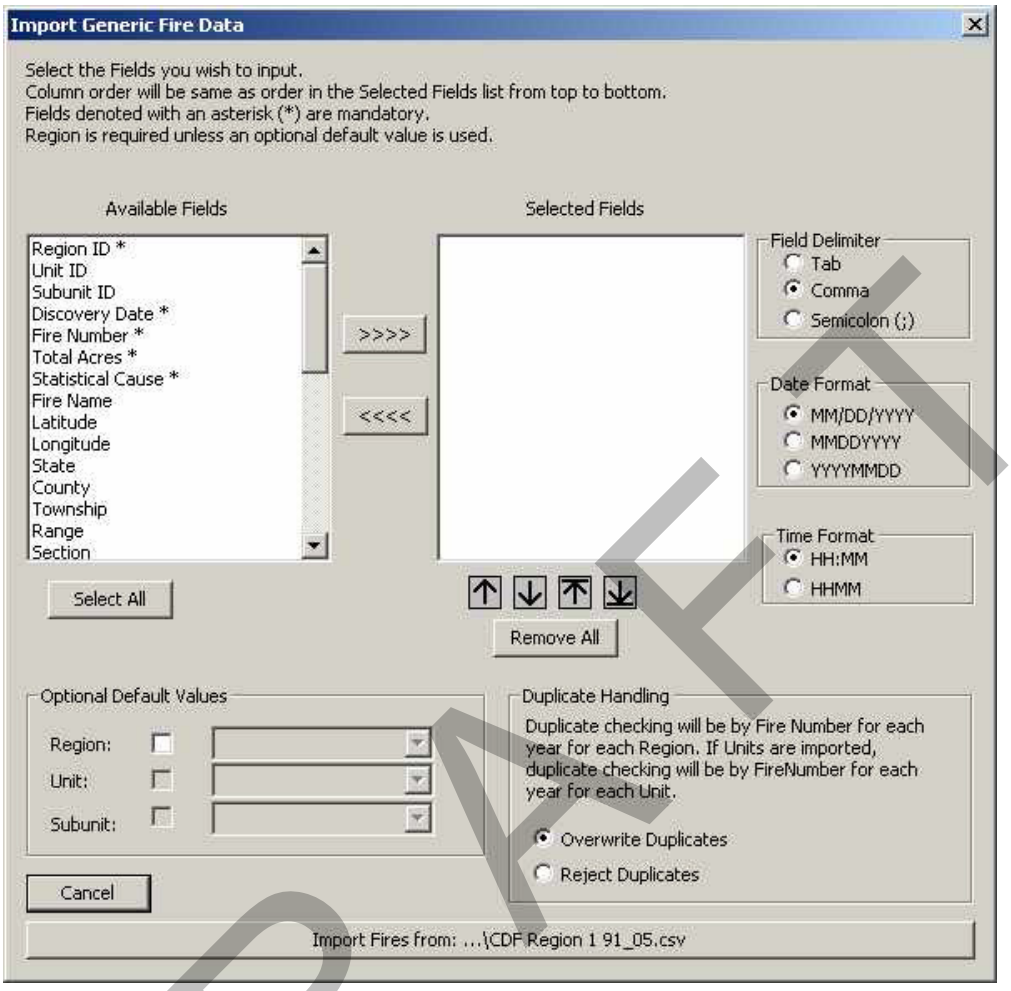

To properly import a file, you should:

1. Select the fields **in the order that they appear in the file**. Ensure that all required fields (identified with an *) are selected.
2. Define a delimiter (tab, comma, or semi-colon).
3. Select a date and time format.
4. Select the fields in the order they occur in your data file along with some specifics on the delimiter and date/time formats.

Move the fields from **Available Fields** to **Selected Fields** by highlighting a field in the **Available Fields** column and pressing the > > > > button. Or you can double-click the field. Required and commonly used fields are at the top of the available field list.

You can insert default values for Region/Unit/Subunits and control duplicate checking as in FireFamily Plus Version 3.0.

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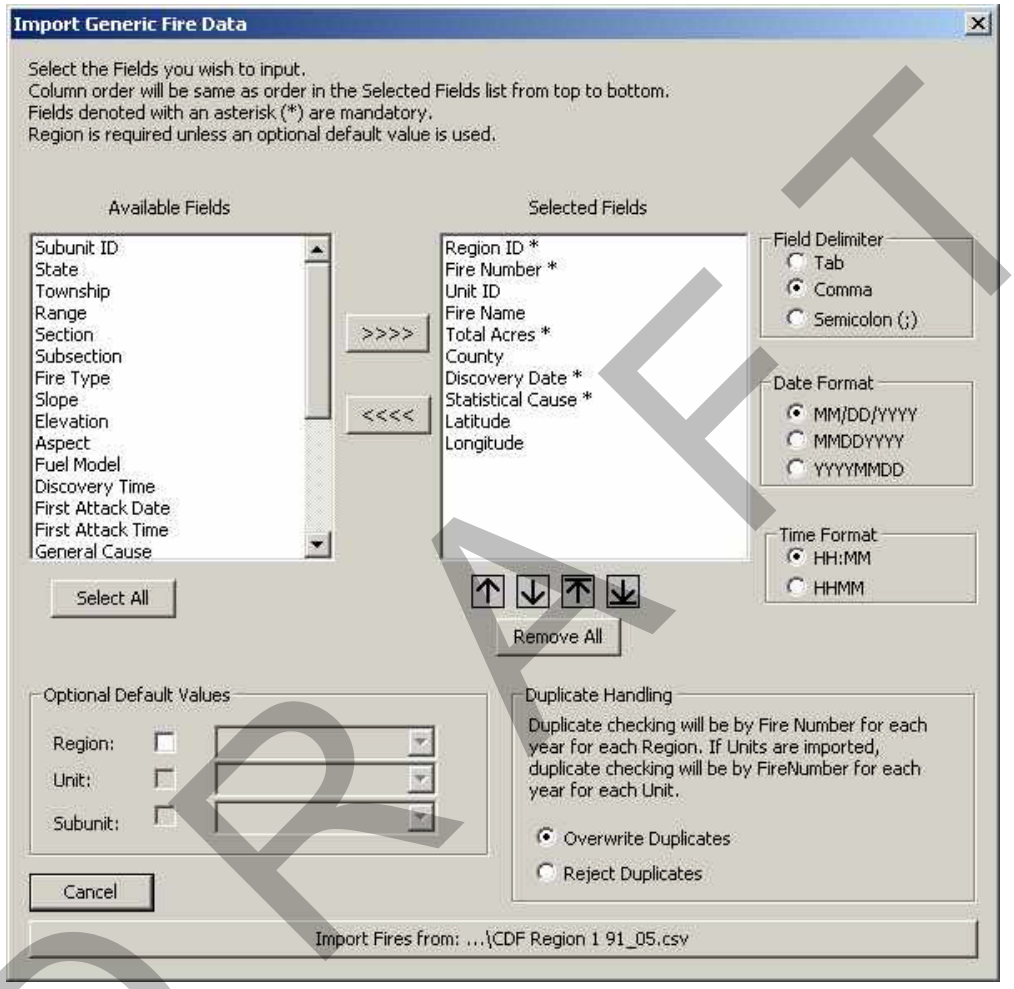
After selecting all of the fields you want to include (note that many more fields are available than in Version 3.0.5, including location, latitude, and longitude), the fire data are imported by selecting the **Import Fire Data** button. The example below includes the FireFamily Plus required fields plus county, fire name, and location by latitude/longitude.



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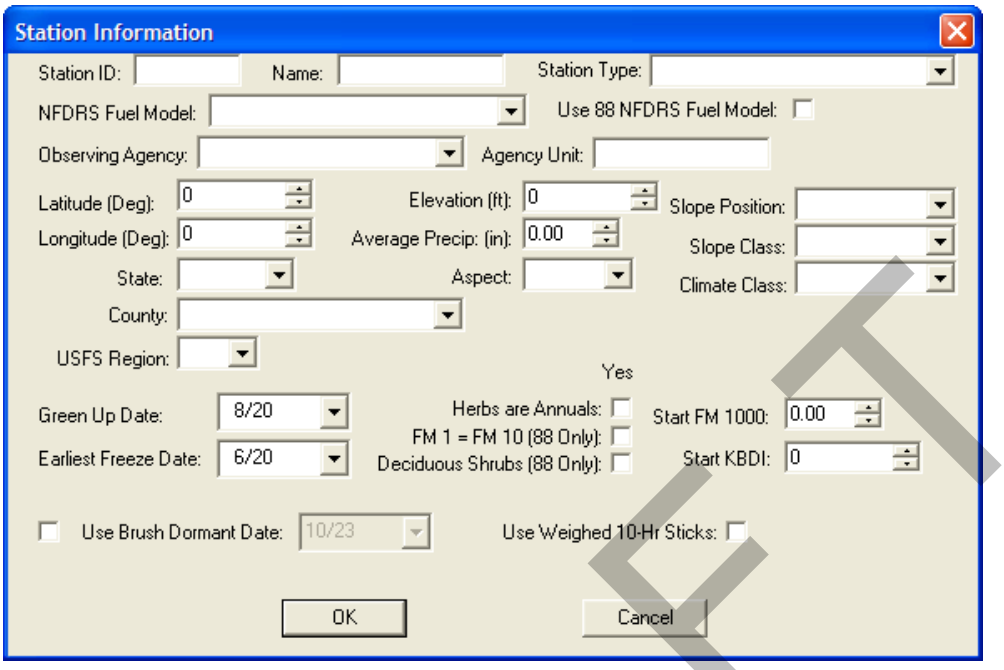
User variables

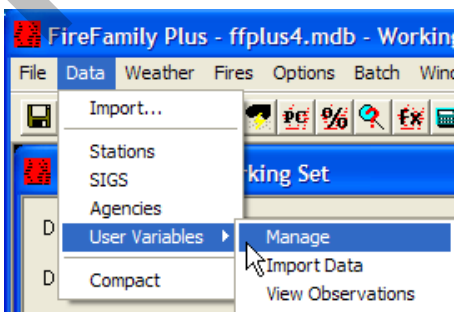
FireFamily Plus provides the ability to import user-defined variables that are associated with a pre-defined weather station. Defining user variables is a two-step process. First you must specify the layout of a text file that will contain the user-defined variables. Secondly you must import the data into the current working dataset. An associated station must exist for the data to be successfully imported. However, you can create a "dummy" station if none exists by selecting **Data**, **Station**, and **New** as shown and by populating fields with reasonable values.



At a minimum, an input file requires an observation date and one or more variables. Optionally, the weather station ID may be included as part of every record. Once the data are imported, the new user defined variables are available in all FireFamily Plus modules with the exception of Percentile Weather.

Managing user variables

1 Select **Data** and **User Variables** to add new variables of your choice by importing a text file.



2 First choose **Manage** (you should see the following screen):

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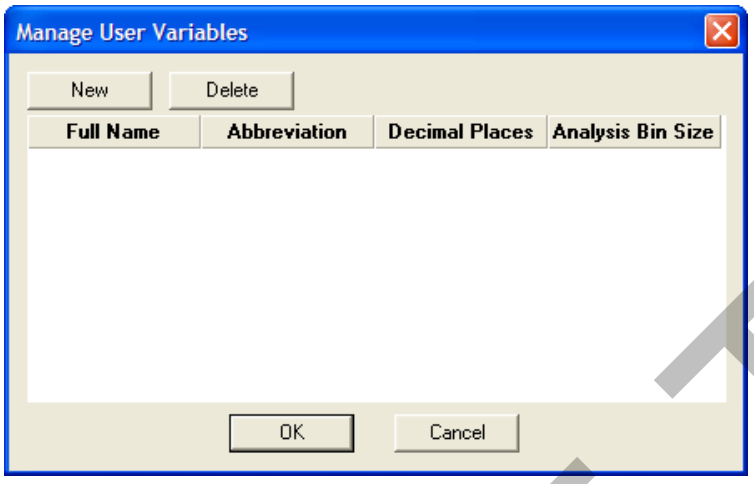
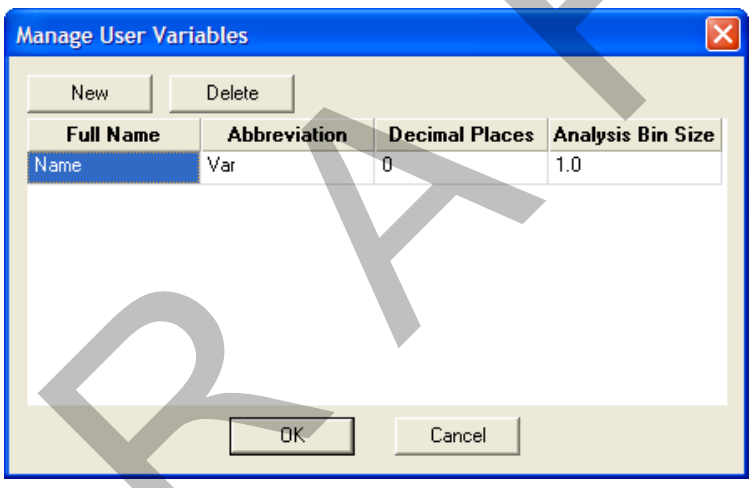


3 Click on **New** and select variables as shown below:



4 Add the full name of the variable you wish to enter (maximum of 30 characters) in the first box and then select an abbreviation (maximum of 20 characters). Choose an appropriate value for **Decimal Places**.

5 **Analysis Bin Size** is used to collect numbers in the cumulative list. Only values of 0.1, 1.0, and 10 should be used. If the daily value of the variable you have selected ranges from 0 to 10 and if the variable has decimal places (for example, precipitation), use an analysis bin size of 0.1. If your daily variable ranges from 0 to 500 and has no decimal places, then select a bin size of 1.0. If your expected range may be greater than 500 for a daily value (i.e. Keetch-Byrum Drought Index) use a bin size of 10.

6 Click **OK**.

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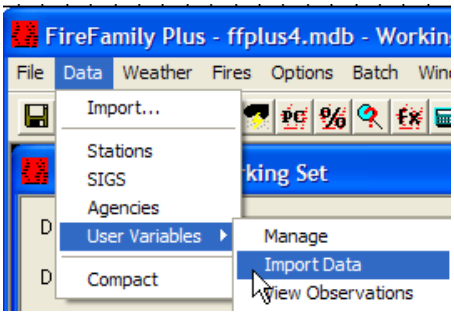
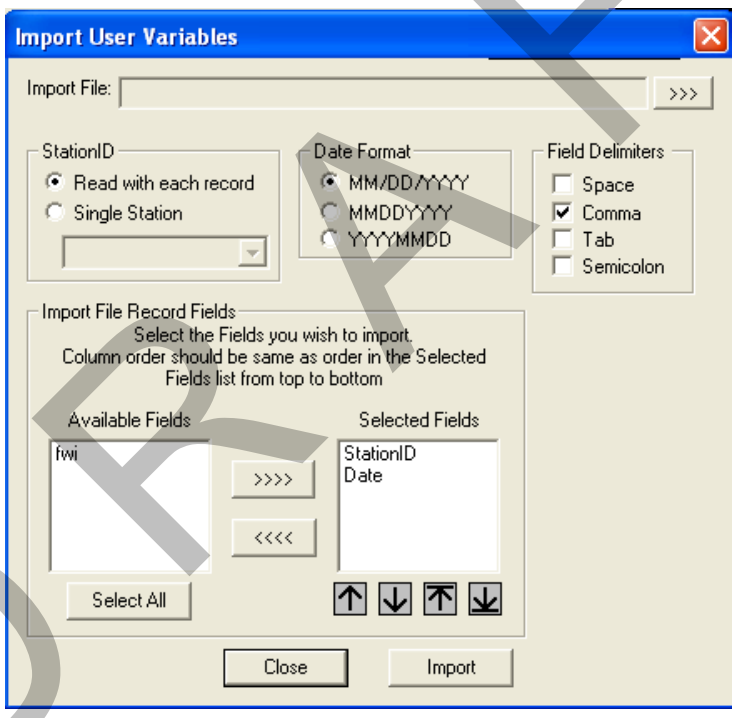
Importing user variables

1 Next click **Import Data**. If the station does not exist, a new station will be added to the station catalog.



You will see a screen similar to the following example:



2 Select an appropriate **Date Format** and **Field Delimiters** and choose the variable or variables you have created from the **Available Fields** column.

User variables should generally be associated with an existing weather station.

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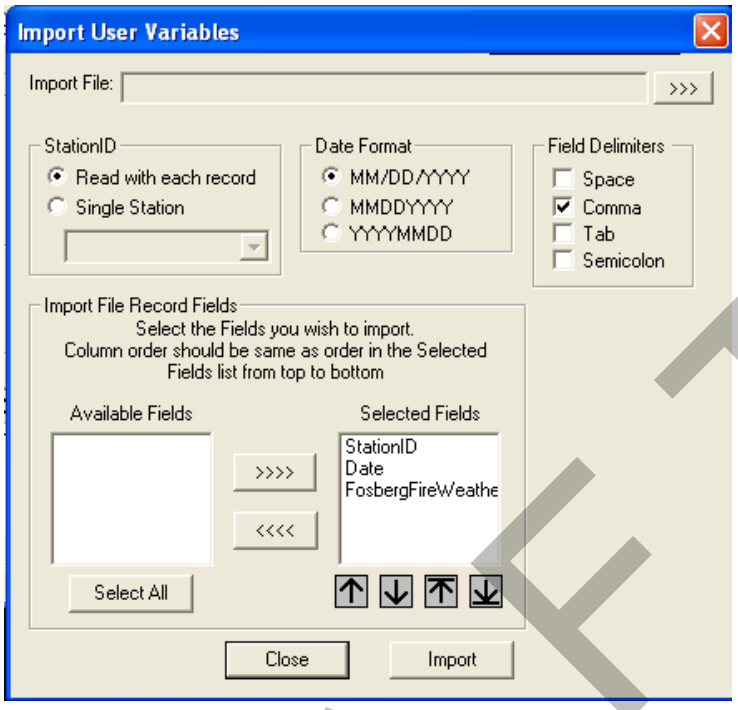
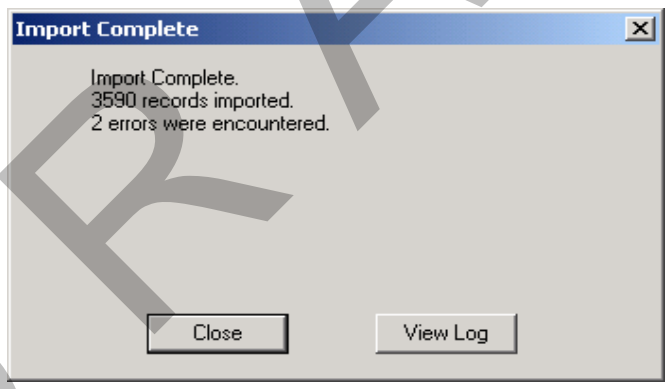


3 Click **Import.** You should see the following screen:



Viewing observations

1 Next choose **Data -> User Variables -> View Observations**.

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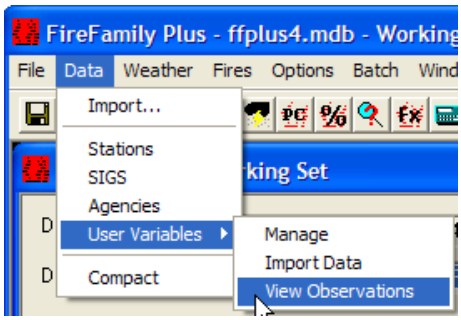
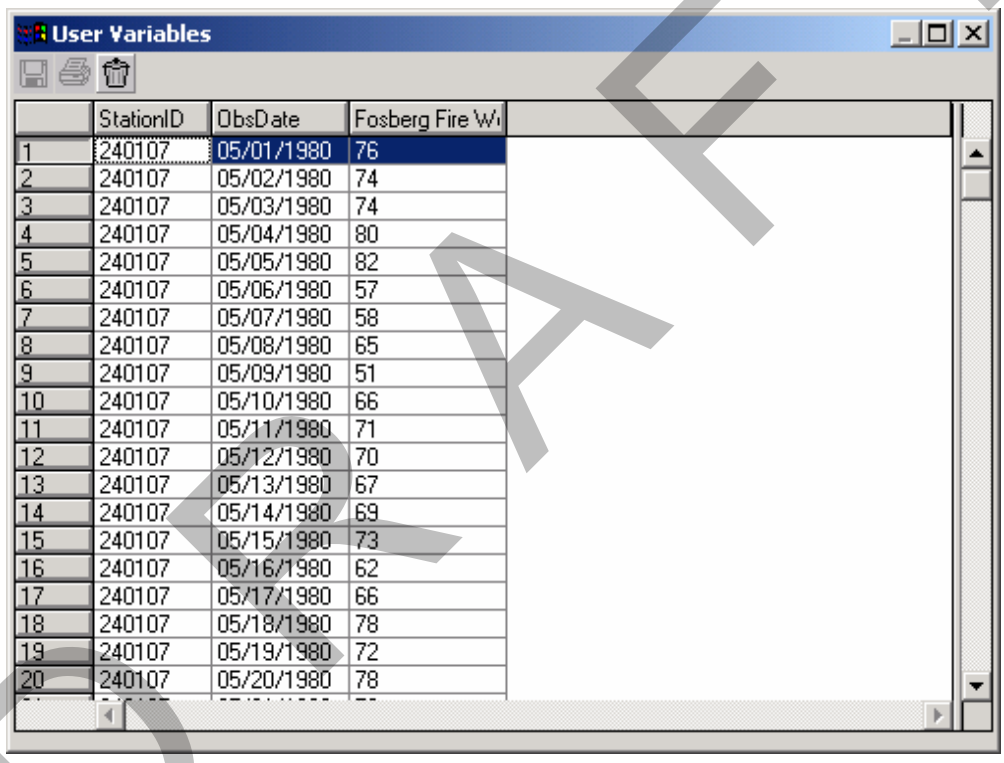


You should see a screen similar to the following diagram. Each row defines a column of data in the input file.



User Variables

	StationID	ObsDate	Fosberg Fire Wi
1	240107	05/01/1980	76
2	240107	05/02/1980	74
3	240107	05/03/1980	74
4	240107	05/04/1980	80
5	240107	05/05/1980	82
6	240107	05/06/1980	57
7	240107	05/07/1980	58
8	240107	05/08/1980	65
9	240107	05/09/1980	51
10	240107	05/10/1980	66
11	240107	05/11/1980	71
12	240107	05/12/1980	70
13	240107	05/13/1980	67
14	240107	05/14/1980	69
15	240107	05/15/1980	73
16	240107	05/16/1980	62
17	240107	05/17/1980	66
18	240107	05/18/1980	78
19	240107	05/19/1980	72
20	240107	05/20/1980	78

Your new variable is available for use in various FFP Weather applications including **Climatology, Event Locator, Pocket Card,** and many of the **Season Reports**. A few examples are shown below:

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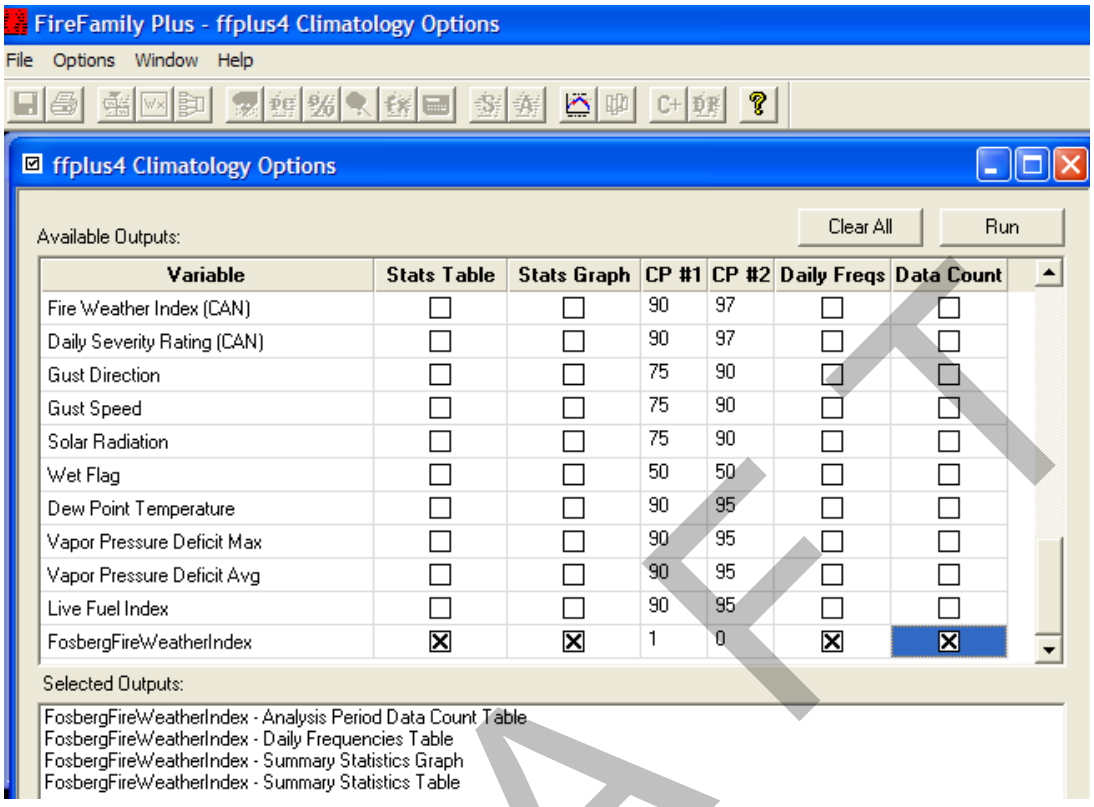

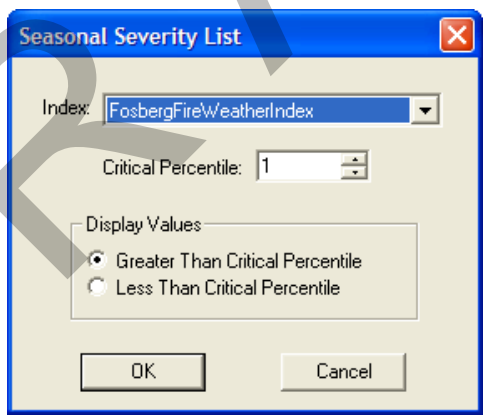

User-defined variables are also available for use in Fires Analysis as shown in the following **Fire Analysis Options** dialog box:

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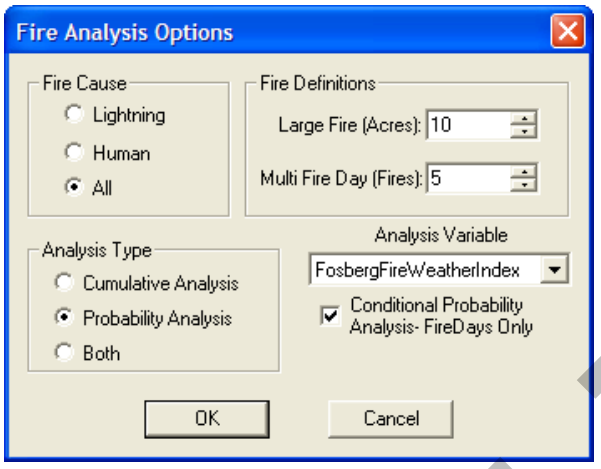
Fire Analysis Options
Fire Cause
Lightning
Human
All
Fire Definitions
Large Fire (Acres): 10
Multi Fire Day (Fires): 5
Analysis Type
Cumulative Analysis
Probability Analysis
Both
Analysis Variable
FosbergFireWeatherIndex
Conditional Probability Analysis- FireDays Only
OK
Cancel

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Chapter 5. Working with FireFamily Plus

This chapter explains how to perform some common operations within FireFamily Plus. Topics include:

- Defining an active working set.
- Working with Station Metadata.
- Working with Special Interest Groups (SIGs).

Defining an active working set

This section explains how to define an active working set and how to set fire associations. FireFamily Plus allows you to create and populate new databases. Multiple databases can be open, but only one database is “active” at any one time.

Think of the “working set” as a filter of the active database. You may not be interested in all of the weather or fire data in a database. By filtering the database, you can use the data that pertains only to your specific fire danger analysis needs. For example, you may choose to analyze the potential for the fall fire season or be interested in determining the window for the spring prescribed fire season. For these examples and in most analyzes in FireFamily Plus, you need to carefully consider how to define the Active Working Set.

Setting fire associations allows you to define which fires are associated with the weather station or stations in the working set. You can also blend fires from different agencies.

All FireFamily Plus output directly relates to the configuration of the working set. Therefore, be sure that each of the required elements in the working set accurately reflects your data requirements.

Problems with output are usually caused by an incorrect working set.

To define the Active Working Set

1 On the **SIG/Station** box, select the Station ID or Special Interest Group (SIG) of your choice.

In the following example, Station 240107, located at the Libby Ranger Station on the Kootenai National Forest is selected, as seen in the SIG/Station menu window.

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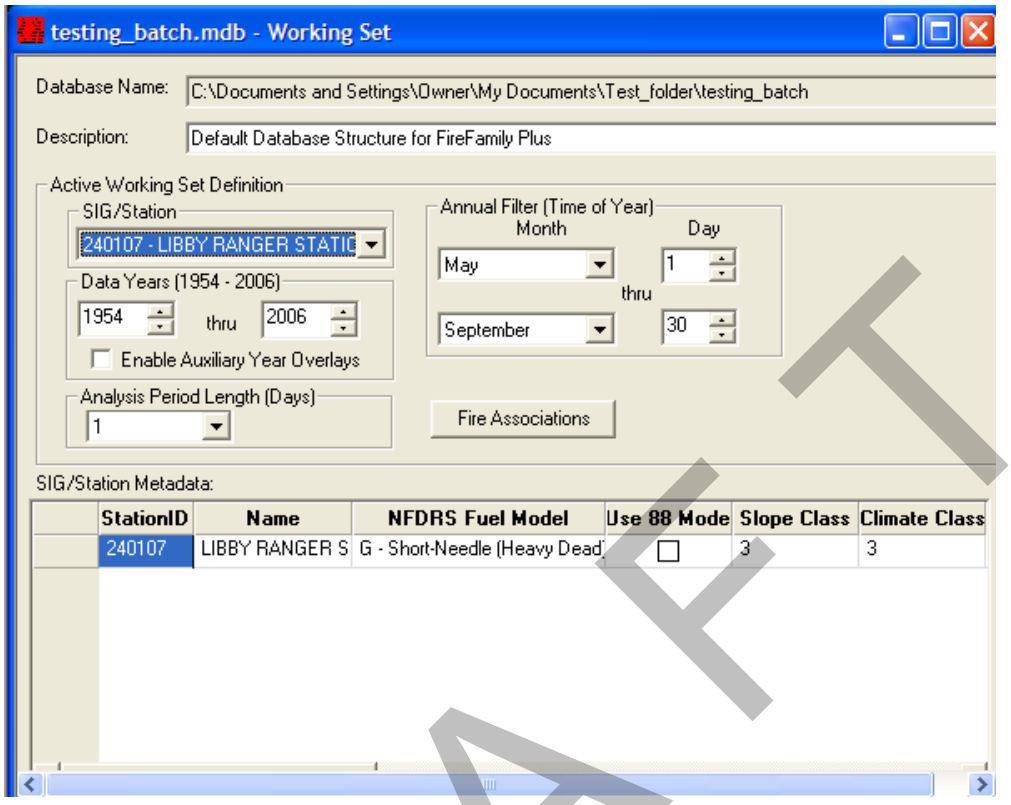

2 Change the remaining Active Working Set Definition fields as needed. Using the scroll buttons on the **Data Years** selection allows you to select the years of interest available with a particular station. The **Annual Filter** allows you to select the time of year (month and days) to include in the analysis. The **Analysis Period Length** controls the number of days used to define the data grouping. Finally, the **Fire Associations** button allows you to select the fires that will be associated with the weather station's data.

Note: Fires Analysis is a term we use when comparing indices to fire occurrence.

In the example shown above, the following inputs have been selected:

- Station or Special Interest Group (SIG) **240107 - LIBBY RANGER STATION**.
- Data years **1954** through **2006**.
- Annual Filter (time of year to analyze) **May 1** through **September 30**.
- Analysis Period Length (number of days averaged into analysis) **1.**
- SIG/Station Metadata (edit site data or change fuel model). The example shows defaults.

The analysis period lengths are bins, not moving averages.

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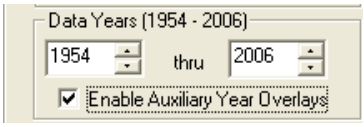
About the Enable Auxilliary Year Overlays checkbox

The **Enable Auxiliary Year Overlay** box allows you to overlay years of data outside of the Data Years you selected. Checking the **Enable Auxiliary Year Overlay** box will allow you to add specific fire season information to your graphs (see Chapter 6 "Working with reports and graphs" for more information).



*You must select the **Enable Auxiliary Year Overlays** check box on the Active Working Set before you can create an overlay from a data year outside the working set. Statistics (average, max., min., etc.) will only be computed from years within the "Data Years."*

To set fire associations

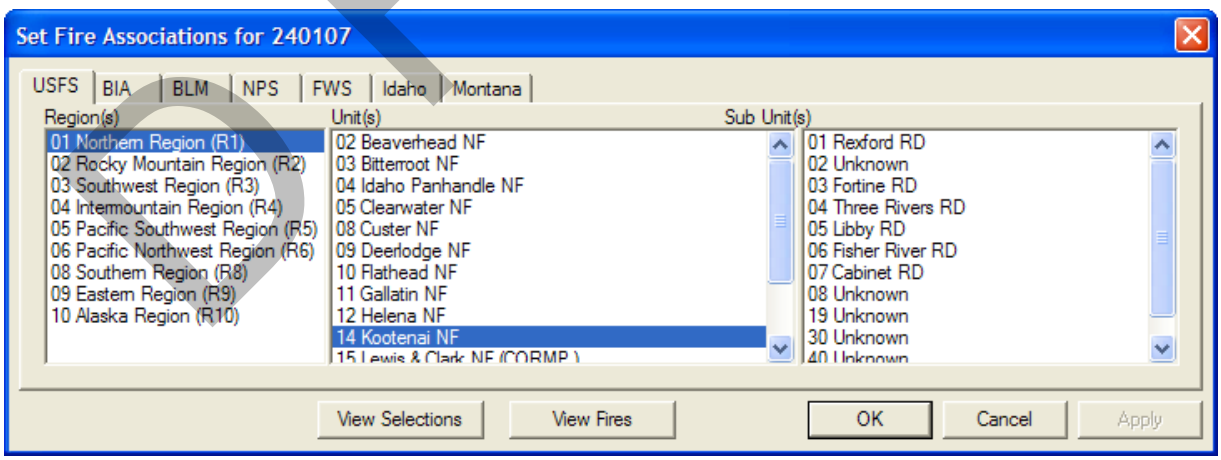
1 Click **Fire Associations**.

2 On the **Set Fire Associations** dialog box, click the tab of your choice.

3 Select the **Region**(s), **Unit**(s), and **Sub Unit**(s) of your choice.

In the example, the following selections were made:

- **USFS**
- **Northern Region (R1)**
- **Kootenai NF**



It is important to remember that only highlighted choices are included in the fire association selection. Items that are not highlighted will not be included.

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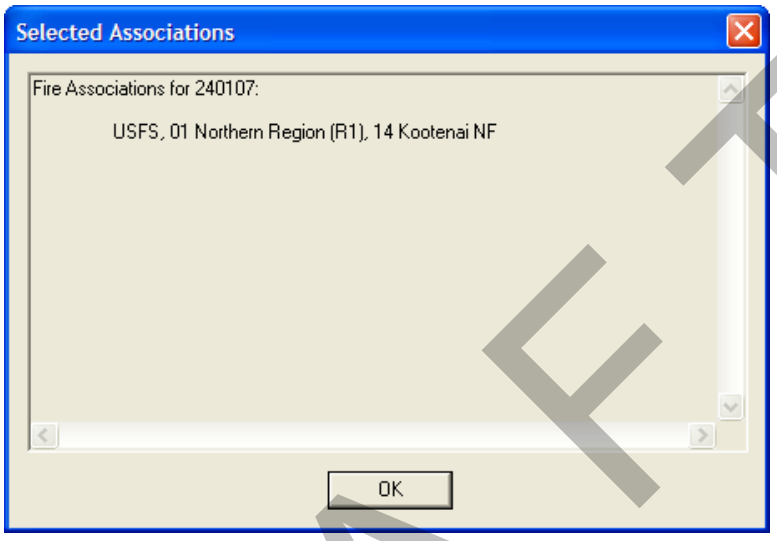
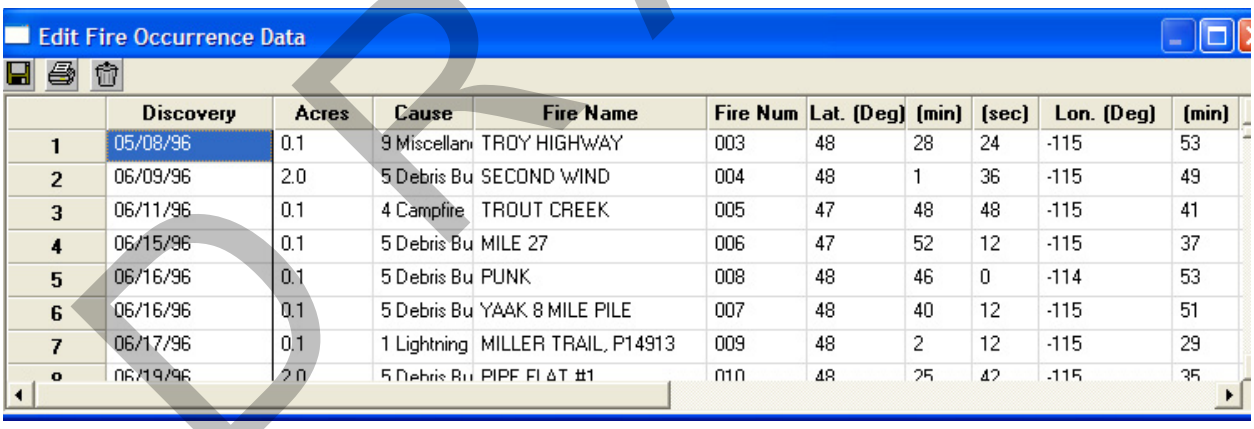
Fire Unit and Subunit identifiers have been changed. The BIA, NPS, and BLM now use NWCG Unit Identifiers.

4 To verify that only the desired fire associations are selected, click **View Selections**, then click **OK**.



5 If you want to review fire data, click on **View Fires**. A table with the fire data (date, size class, cause, etc.) will open. An example is shown below.



	Discovery	Acres	Cause	Fire Name	Fire Num	Lat. (Deg)	(min)	(sec)	Lon. (Deg)	(min)
1	05/08/96	0.1	9 Miscellan	TROY HIGHWAY	003	48	28	24	-115	53
2	06/09/96	2.0	5 Debris Bu	SECOND WIND	004	48	1	36	-115	49
3	06/11/96	0.1	4 Campfire	TROUT CREEK	005	47	48	48	-115	41
4	06/15/96	0.1	5 Debris Bu	MILE 27	006	47	52	12	-115	37
5	06/16/96	0.1	5 Debris Bu	PUNK	008	48	46	0	-114	53
6	06/16/96	0.1	5 Debris Bu	YAAK 8 MILE PILE	007	48	40	12	-115	51
7	06/17/96	0.1	1 Lightning	MILLER TRAIL, P14913	009	48	2	12	-115	29
8	06/19/96	2.0	5 Debris Bu	PIPE FLAT #1	010	48	25	42	-115	35

Working with Station Metadata in the Station Catalog

There are three changes to the station catalog in Version 4.0 of FireFamily Plus.

- The latitude and longitude are now GIS friendly.
- Brush Dormant Date: To support areas where freezes do not generally occur, the capacity to allow shrubs to go into dormancy is supported by a new **Use Brush Dormant Date** box. This was requested by Russ Gripp

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and allows FFP to better emulate user control in WIMS. The default value for this field is unchecked. If the following conditions are met ('78 model only), the brush dormant date will apply:

- the brush dormant date is selected.
- a valid date is entered.
- the vegetation has cured.
- the observation date is greater than the dormant date.
- the live vegetation state is put into a dormant state so that woody fuel moistures do not increase with fall rains.

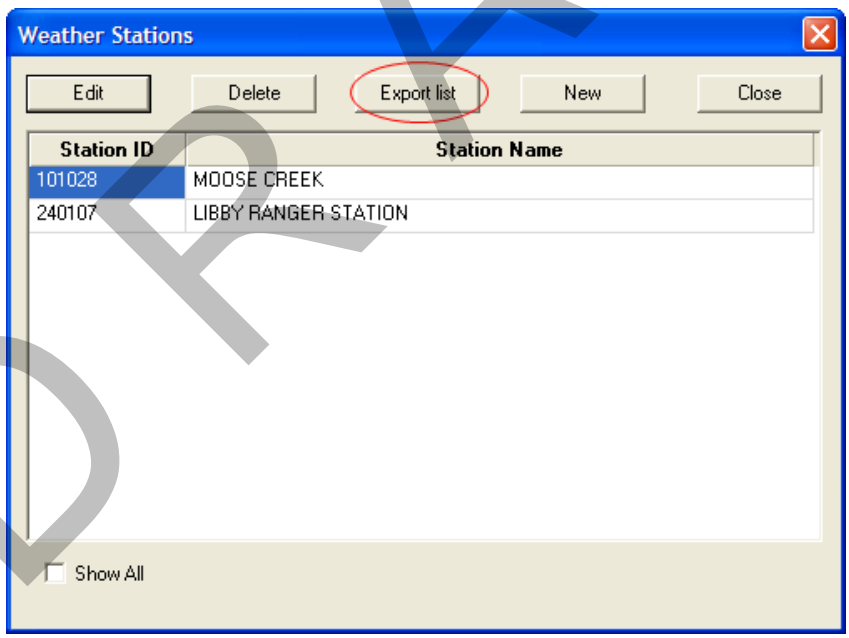
If selected, a **Use-Weighed 10-HR Sticks** check box enables FFP to ignore weighed sticks and compute the 1- and 10-hour moisture by algorithm for the period of record. This allows for a consistent climatology for stations that may have some years of weighed sticks and some years without.

To export metadata for all stations

Station metadata can be exported to a text file.

1 Click on the **Data** drop-down menu and select **Stations**.

2 Select a station of interest and click **Export list**.



The following **Export Station Metadata** dialog box will open.

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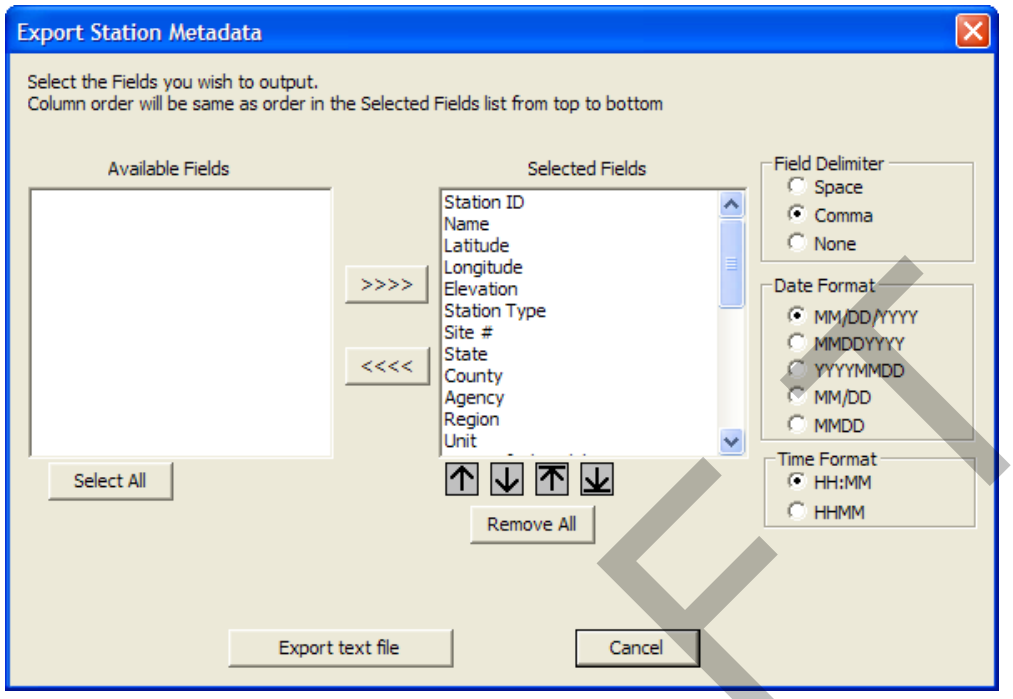

3 Select the fields and formats you would like to export.

4 Click **Export Text file**.

The following shows an example of station metadata export.

```
FireFamily Plus Station Metadata Export
   printed on: 04/19/2007   at  03:04:25 PM  (from run # 34)
   using database: C:\Documents and Settings\lbradsha\My Documents\ffp4_data\ffp4_default

Station ID,Name,Latitude,Longitude,Elevation,Station Type,Site
#,State,County,Agency,Region,Unit,NFDRS fuel model,Use 88?,Climate class,Slope
class,Aspect,Position on slope,Herb annual?,Greenup date,Freeze date,Herb moisture,Shrub
moisture,Initial KBDI,Deciduous?,Avg. precip,Initial 1000h,FM 1=10 ?
015902,OPNPND,  31.09444, -86.54861,275,4,1,AL,Covington,USFS,09 Eastern Region
(R9),CONECUH,C,Y,3,1,4,,N,,,,,624,Y, 62.00, 25.00,Y
040611,REDDING,  40.51579,-122.29220,500,4,1,CA,Shasta,,,NWS,B,N,2,1,0, ,Y,04/24,11/01,,,
33.00, 15.00,N
245410,RED ROCKS,  44.69917,-111.82330,6690,4,1,MT,Beaverhead,USFS,01 Northern Region
```

Since the file shown above is comma delimited, you can bring it into an Excel spreadsheet as shown:

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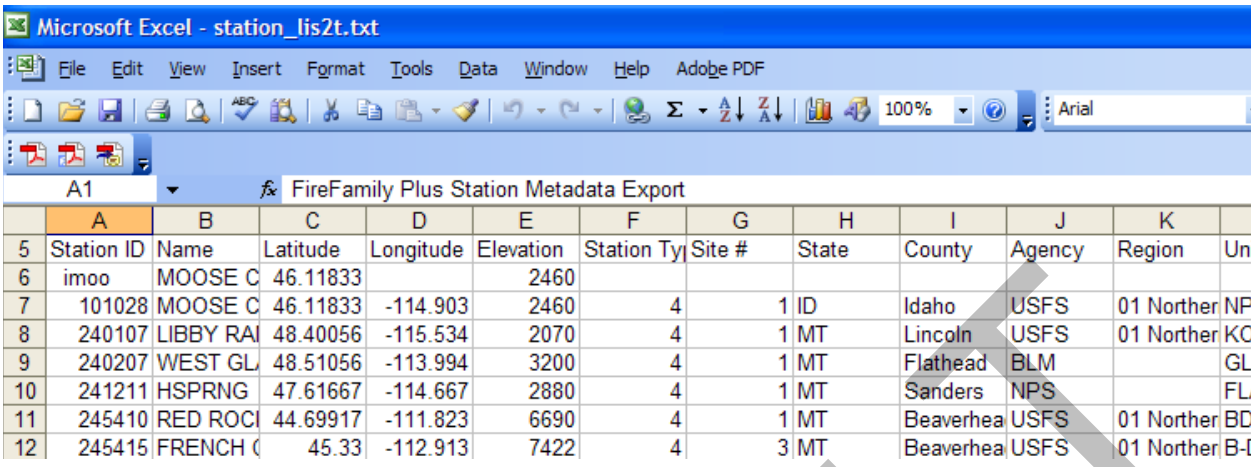
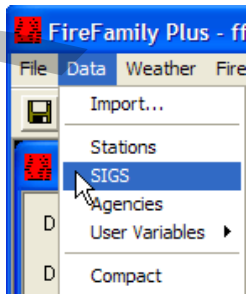


	A	B	C	D	E	F	G	H	I	J	K	
5	Station ID	Name	Latitude	Longitude	Elevation	Station Ty	Site #	State	County	Agency	Region	Un
6	imoo	MOOSE C	46.11833		2460							
7	101028	MOOSE C	46.11833	-114.903	2460	4	1	ID	Idaho	USFS	01 Norther	NF
8	240107	LIBBY RAI	48.40056	-115.534	2070	4	1	MT	Lincoln	USFS	01 Norther	KC
9	240207	WEST GL/	48.51056	-113.994	3200	4	1	MT	Flathead	BLM		GL
10	241211	HSPRNG	47.61667	-114.667	2880	4	1	MT	Sanders	NPS		FL
11	245410	RED ROCI	44.69917	-111.823	6690	4	1	MT	Beaverhea	USFS	01 Norther	BD
12	245415	FRENCH (	45.33	-112.913	7422	4	3	MT	Beaverhea	USFS	01 Norther	B-I

Working with Special Interest Groups (SIGS)

A Special Interest Group (SIG) is a collection of weather station catalogs that can be grouped together to analyze fire danger climatology. You can group as many stations as you wish, then weigh the importance of each station within the SIG. In this way, you can adjust the influence of each station when performing FireFamily Plus calculations.

FireFamily Plus creates new pseudo ("averaged") weather records for each day using all available data from every station in the SIG. If any station within the SIG has a data record for a particular day, the SIG will have a weather record for that day. If no stations have a data record for a particular day, the SIG will not have a weather record for that day.



To create a SIG

1 On the **Data** menu, click **SIGS**, and then click **New**.

2 In the **SIG Name** box, type a meaningful name for the SIG.

Although you can delete and recreate a SIG, once you save it you cannot change its name.

3 In the **Description** box, type a description that identifies the SIG and its purpose.

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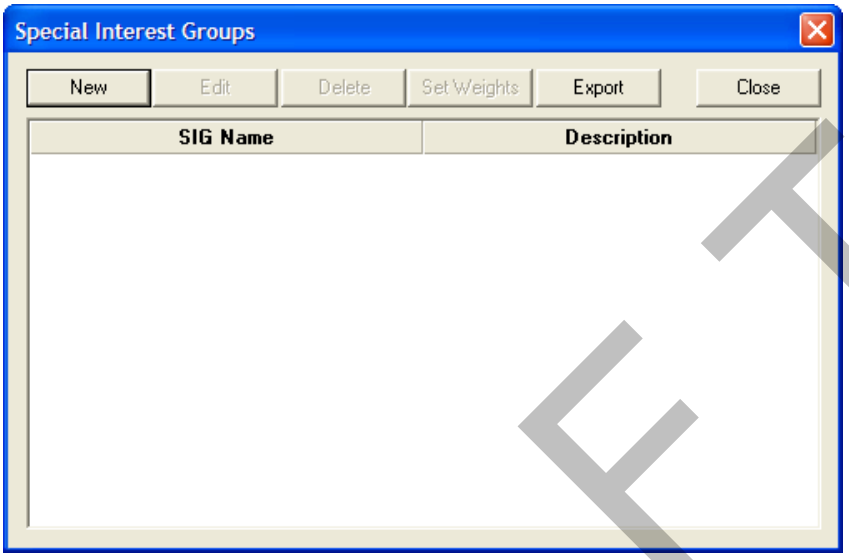
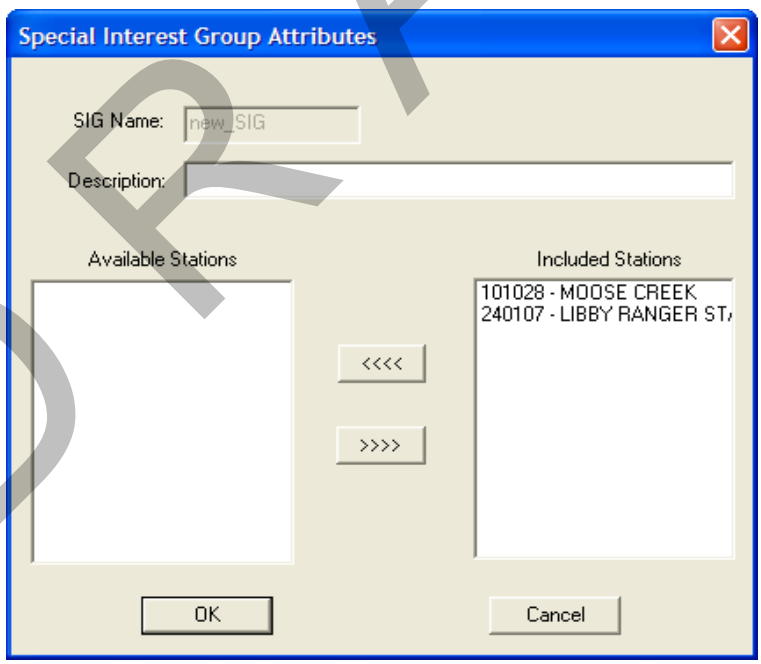
4 Under **Available Stations**, select the station of your choice, then click >>>> to include that station in the SIG.

5 When finished adding stations to the SIG, click **OK**.

The following diagram shows the **Special Interest Groups** dialog box.



The following diagram shows the **Special Interest Group Attributes** dialog box. From here, you can include or remove station catalogs in the SIG that have been imported into your database.



Only station catalogs with weather data will display in this dialog box. To import additional catalogs or weather data, see "To import a station catalog" in Chapter 4.

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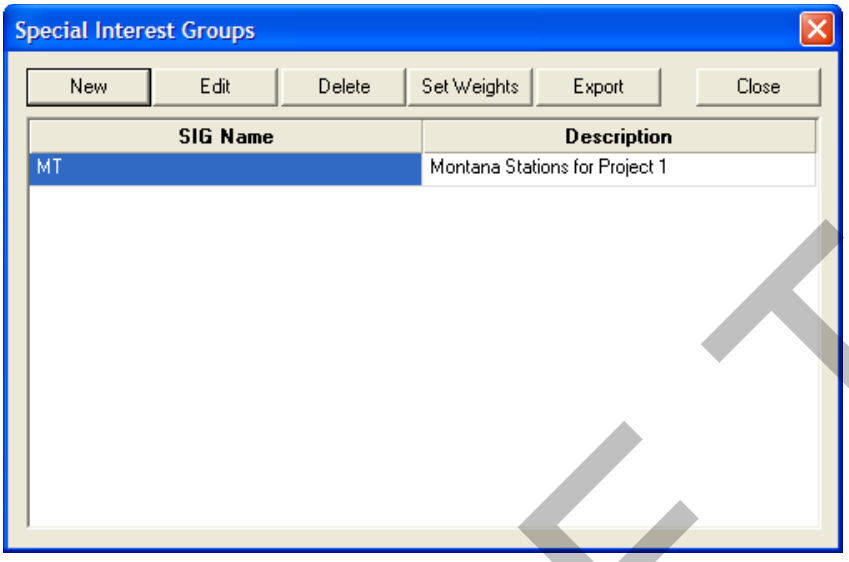
The following diagram shows the new SIG as it appears in the **Special Interest Groups** dialog box.



To set weights of stations in a SIG

Weight factors are relative in FireFamily Plus. Initially, every station in the SIG is assigned a weight factor of "1.0," denoting equal weight for all stations. To increase a station's weight for your analysis, simply increase its weight. Weights are ratios.

---

*In the following example, station 40611 has twice the weighting as the other stations when computing the single value from the three stations. For example on a given day, if the Burning Indices (BI's) were 10, 20, and 30 at stations 040510, 040611, and 040628 respectively, the weighted BI would be: (1*10 + 2*20 + 1*30/3 = 26.7). If the stations were equally weighted, the value would be (10 + 20 + 30) /3 = 20.*

---

1 To set weights, from the **Special Interest Groups** dialog box, select the **SIG Name** of your choice, and then click **Set Weights**.

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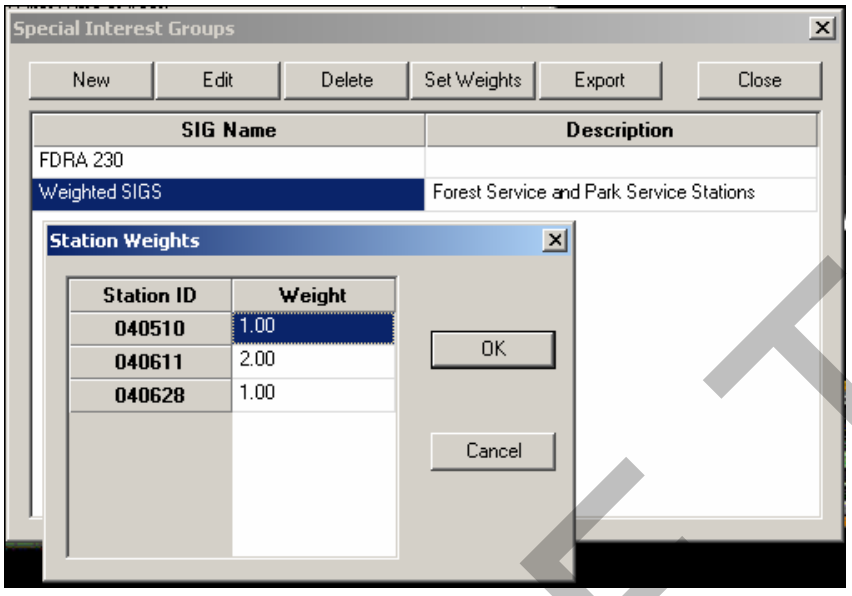
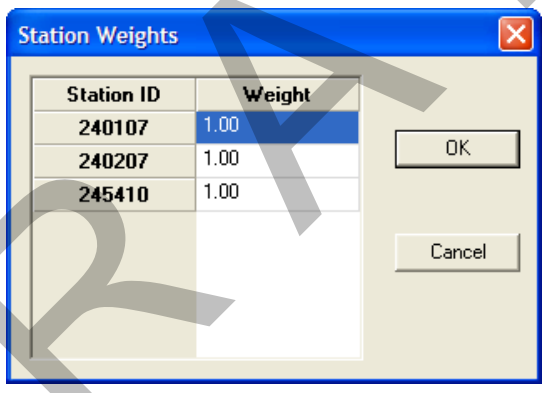


The following diagram shows the **Set Station Weights** dialog box.



2 For each station, type the appropriate weight, and then click **OK** when finished.

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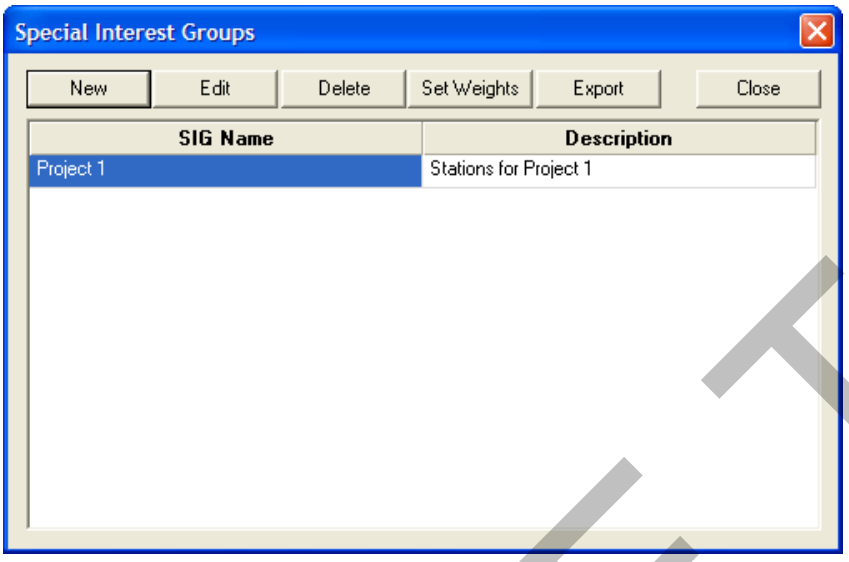


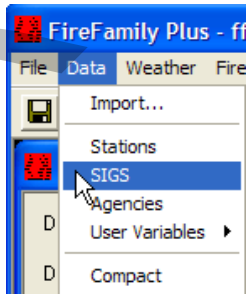
To save a SIG

1 When finished adding stations and setting weights to each station to the SIG, click **OK.**

2 To exit the **Special Interest Group** dialog box, click **Close**.

To edit a SIG

1 On the **Data** drop-down menu, click **SIGS**.



2 From the **Special Interest Groups** dialog box, select the **SIG Name** of your choice, and then click **Edit**.

3 Add and remove the station(s) of your choice, then click **OK** when finished.

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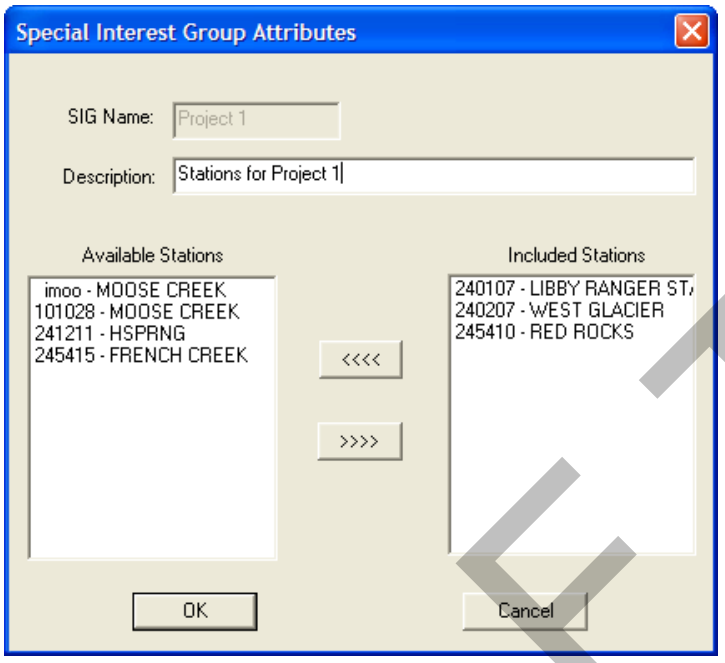
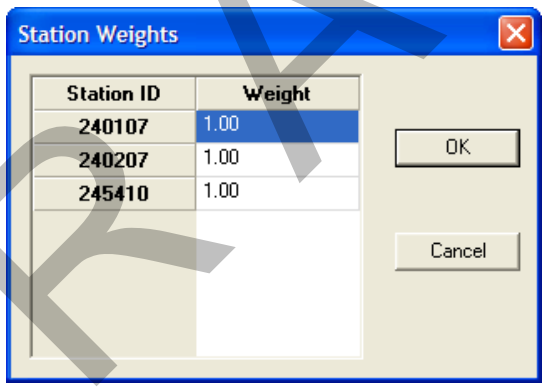


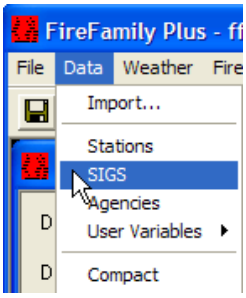
4 Click **Set Weights**, type the appropriate weights for each station included in your SIG, and then click **OK**.



5 To exit the **Special Interest Group** dialog box, click **Close**.

To delete a SIG from the database

1 On the **Data** menu, click **SIGS**.



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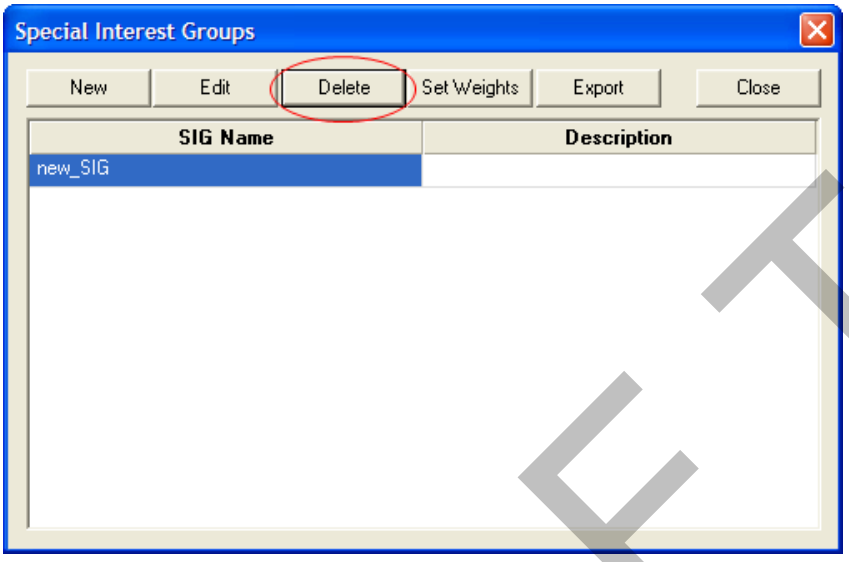
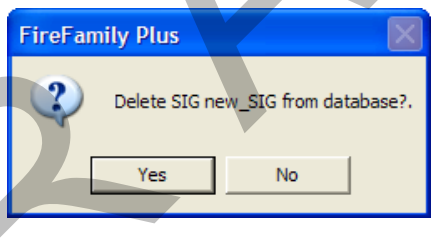
2 From the **Special Interest Groups** dialog box, select the **SIG Name** of your choice, and then click **Delete**.



3 Click **Yes** to confirm or **No** to cancel.

The following diagram shows the delete confirmation dialog box.



4 To exit the **Special Interest Group** dialog box, click **Close**.

To export metadata for stations in a SIG

SIG metadata can be exported in the same way that station data can be exported. Select **Data > SIGS** from the top menu bar. Choose a SIG and click **Export list** to open the **Special Interest Groups** dialog box.

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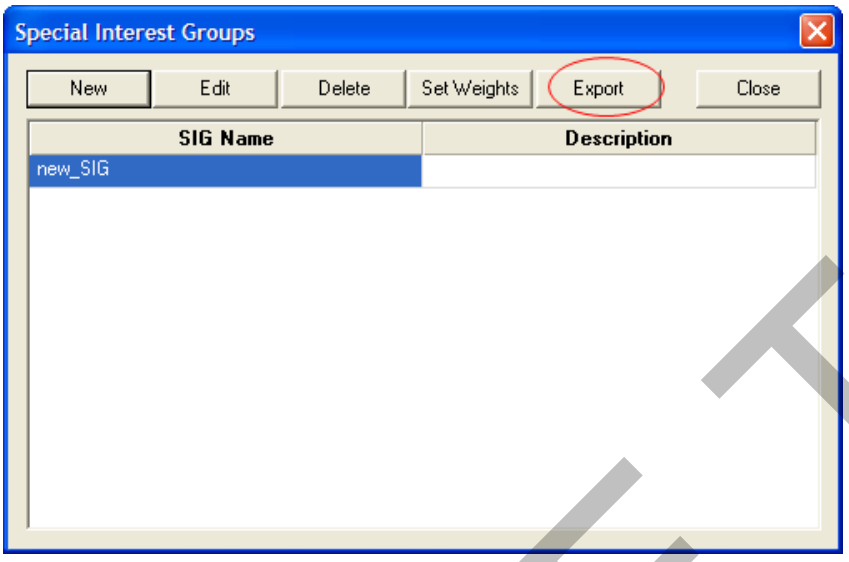
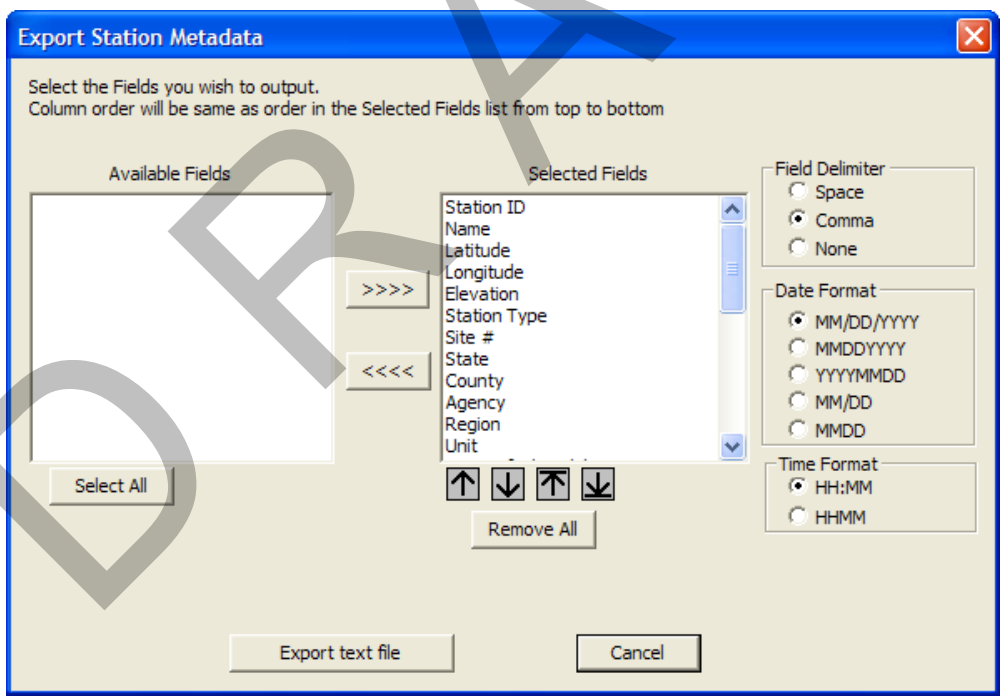


The **Export Station Metadata** box opens, allowing you to select the fields you would like to include in the SIGS export.

1 Select the fields to include.

2 Click the **Export text file** box.



Refer to page 5.6 for an example of station metadata export. When you export station metadata for your SIG, one record will be exported for each station . As discussed in the section "To export metadata for all stations," a comma-delimited file can be brought into an Excel spreadsheet (page 5.7).

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Chapter 6. Working with reports and graphs

This chapter explains how to work with reports and graphs in FireFamily Plus. Topics include:

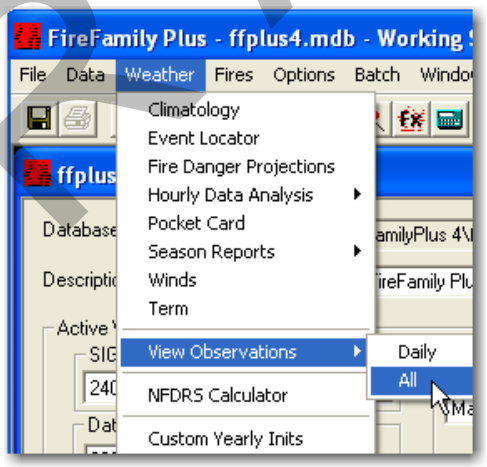
- Reviewing weather data and generating reports and graphs
- Working with overlays
- Merging graphs
- Changing the look of your statistical graphs
- Display options
- Working with season reports
- Working with weather data
- Reviewing fire occurrence data
- Using the event locator
- Using the NFDRS calculator

Reviewing weather data and generating reports

This section explains how to review weather data and generate Climatology statistical tables and graphs.

To review weather observations

1 On the **Weather** drop-down list, point to **View Observations**, and then click **All**.



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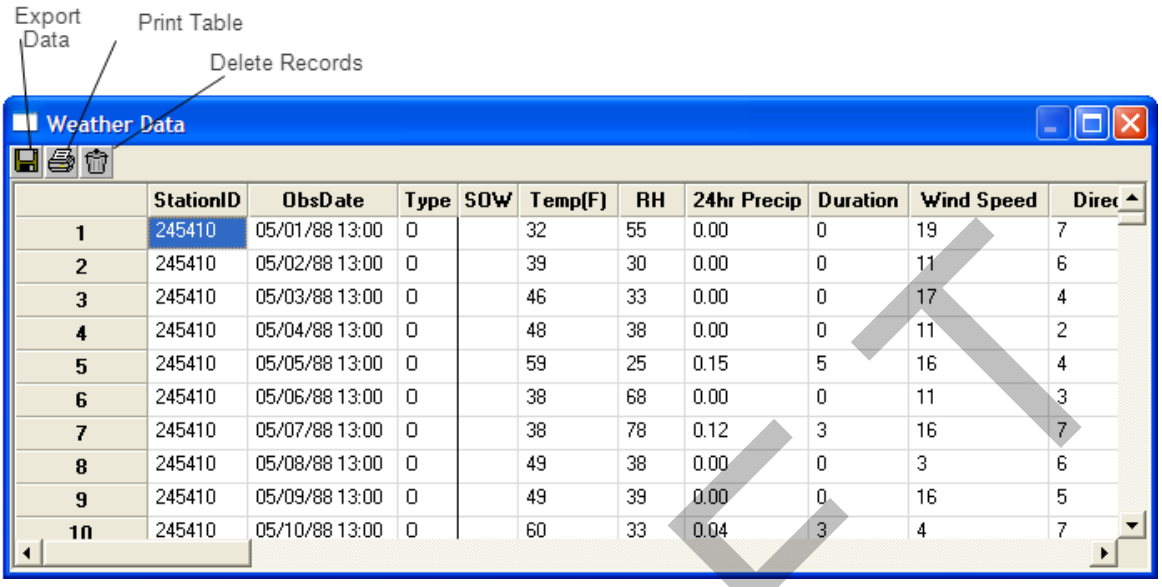
The following **Weather Data** screen lists the weather observations for station "245410."



	StationID	ObsDate	Type	SOW	Temp(F)	RH	24hr Precip	Duration	Wind Speed	Direc
1	245410	05/01/88 13:00	0		32	55	0.00	0	19	7
2	245410	05/02/88 13:00	0		39	30	0.00	0	11	6
3	245410	05/03/88 13:00	0		46	33	0.00	0	17	4
4	245410	05/04/88 13:00	0		48	38	0.00	0	11	2
5	245410	05/05/88 13:00	0		59	25	0.15	5	16	4
6	245410	05/06/88 13:00	0		38	68	0.00	0	11	3
7	245410	05/07/88 13:00	0		38	78	0.12	3	16	7
8	245410	05/08/88 13:00	0		49	38	0.00	0	3	6
9	245410	05/09/88 13:00	0		49	39	0.00	0	16	5
10	245410	05/10/88 13:00	0		60	33	0.04	3	4	7

To sort by any field, right-click on the column heading of your choice. To adjust column width, drag the column heading to the desired width.

To review weather data by generating a statistical table

1 On the **Weather** drop-down list, click **Climatology**.

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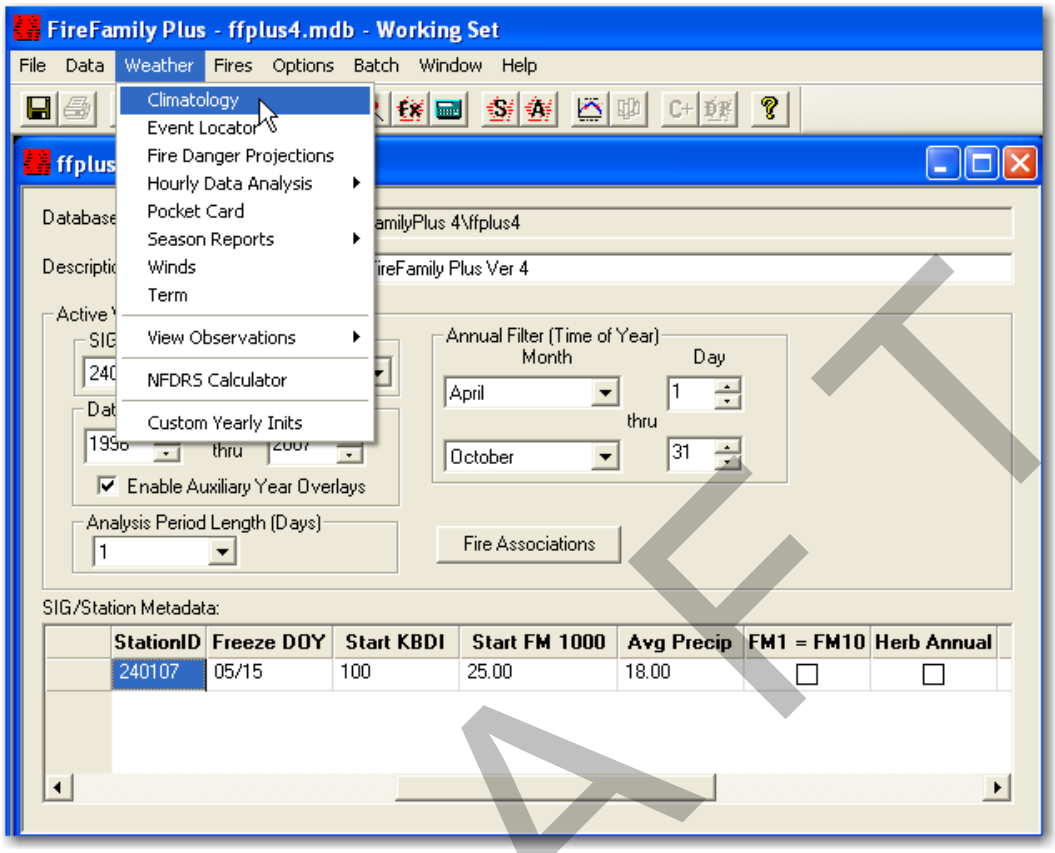

2 Select the **Stats Table** check boxes of your choice. In the following example, output for "Burning Index" is shown.

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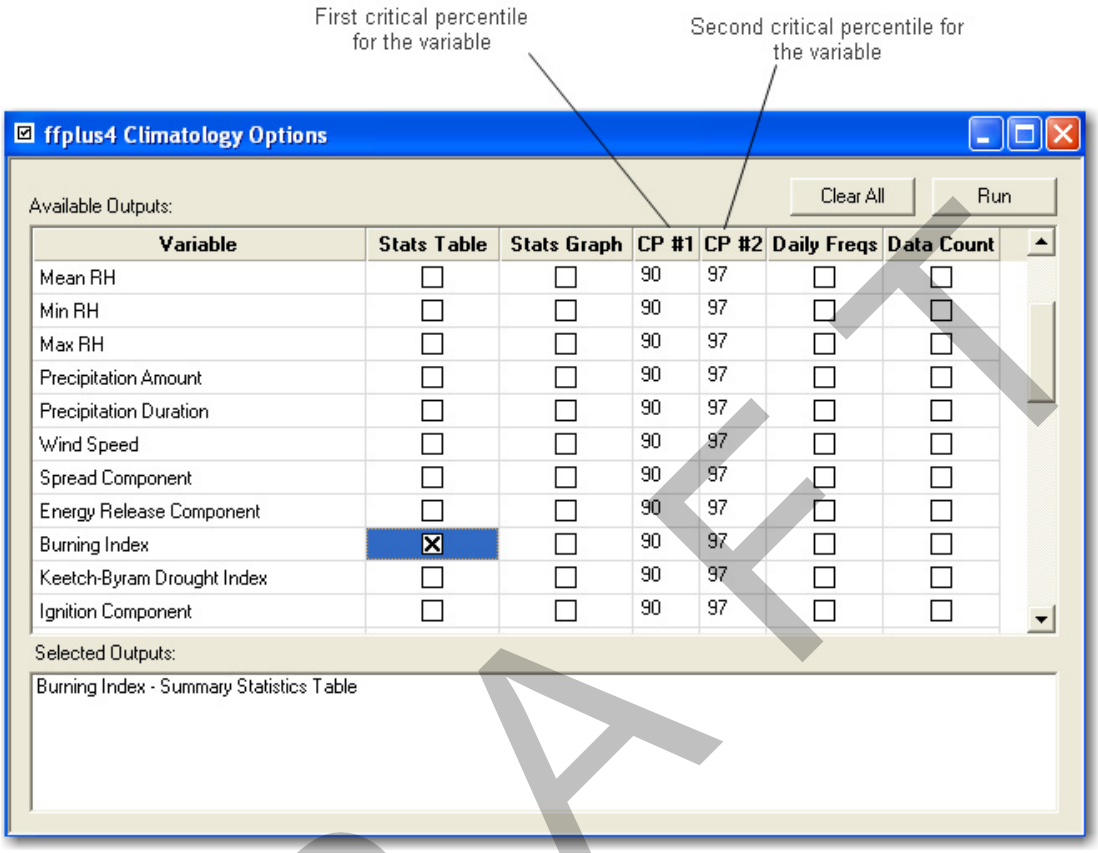

3 Click **Run**.

The CP #1 and CP #2 columns identify the critical percentiles that are used to generate statistical tables, graphs, daily frequencies, and pocket cards.

The following example shows the Statistical Table for Burning Index at the Libby Ranger Station. As shown in the previous diagram, the 90th critical percentile (CP #1) was used to generate this table.

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240107 - Burning Index - Statistics Table

```
   printed on: 07/08/2009   at  01:37:00 PM  (from run # 9)
   using database: C:\Program Files\FireFamilyPlus 4\ffplus4

-----------------------------------------------------
Active Working Set:
   Station: 240107  - LIBBY RANGER STATION
   Data years:  1996 - 2007
   Analysis Period Length: 1 days
   Annual filter dates:  May 1  thru  October 31
-----------------------------------------------------
Station Details:
   240107 LIBBY RANGER STATION   Fuel model: G   (Use 88?: N)

   Slope class: 3   Climate class: 3   Greenup: 05/15   Freeze: 05/15
   Start KBDI: 100  Start FM1000:25   Avg. Precip: 18.00
   FM1 = FM10?  N   Herb Annual?   N   Deciduous?  N
   Aspect:      0   Slope posit.:     Elevation: 2070
   Latitude:   48.40   Longitude: -115.53
   Weighed Stick Moistures Used:   Yes
-----------------------------------------------------

Variable: Burning Index
                                        Mean, Median, Standard Deviation and Extreme Values

         1-Day and Monthly Period Means                                        1-Day and Monthly Extreme

Period   No.          Std.  Critical Highest      Lowest     |                Avg.    Std  Median
Begins  Years  Mean   Dev.  Pcntile  Avg, Year    Avg, Year  |   High, Year   High    Dev.  High    Low,
-------------------------------------------------------------------------------------------------------
 05/01    12   30.3   10.9   47.0   48.0  2005   16.0  1996      48.0  2005   30.3   10.9   30.0   16.0
 05/02    12   29.9   10.3   43.0   49.0  2005   16.0  2000      49.0  2005   29.9   10.3   28.0   16.0
 05/03    12   28.7   15.5   43.0   44.0  2004    0.0  1999      44.0  2004   28.7   15.5   28.0    0.0
 05/04    12   29.4   12.0   41.0   43.0  2006    0.0  2003      43.0  2006   29.4   12.0   29.0    0.0
```

Column headings (from left to right) are described as follows:

- **No.Years**: The number of years for each period.
- **Mean**: The arithmetic mean for ***the period***.
- **Std. Dave.**: The standard deviation about the mean for ***the period***.
- **Critical Pcntile**: The value of the 1st critical percentile (CP #1) in the **Climatology Options** screen.
- **Highest Avg, Year**: The highest mean for ***the period*** and the year of occurrence.
- **Lowest Avg, Year**: The lowest mean for ***the period*** and the year of occurrence.
- **High, Year**: The highest daily value in ***the period*** and the year it occurred.
- **Avg. High**: The average of the maximum ***daily*** values in each period/year.
- **Std. Dev**.: The standard deviation of the maximum ***daily*** values in each period/year.
- **Median High**: The median of the maximum ***daily*** values in each period/year.
- **Low, Year**: The lowest ***daily*** value in the period and the year it occurred.
- **Avg. Low**: The average of the minimum ***daily*** values in each period/year.

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- **Std. Dev**.: The standard deviation of the minimum ***daily*** values in each period/year.
- **Median Low**: The median of the minimum ***daily*** values in each period/year.

Column Name	On Line Graph?	On Bar Graph?
No. Years	No	No
Mean	Yes	Yes
St. Dev	No	Yes
Critical Pcntile	Yes	Yes-Pitle Tics
Highest Avg/Yr	Yes	Yes-Range Tics
Lowest Avg/yr	Yes	Yes-Range Tics
High, Year	No	No
Avg. High	No	No
Sd. Dev.	no	No
Median High	No	No
Low, Year	No	No
Avg. Low	No	No
Std. Dev.	No	No
Median Low	No	No

Only the data defined by the active working set is included in the statistics table.

To review weather data by generating a statistical graph

1 On the **Weather** drop-down menu, click **Climatology**.

2 Select the **Stats Graph** check boxes of your choice (use "Burning Index" for this example).

*In this example, clear any check boxes such as "Burning Index" in the **Stats Graph** column.*

3 Click **Run**.

The following Burning Index Statistical Graph is produced and both CP #1 and CP #2 are displayed.

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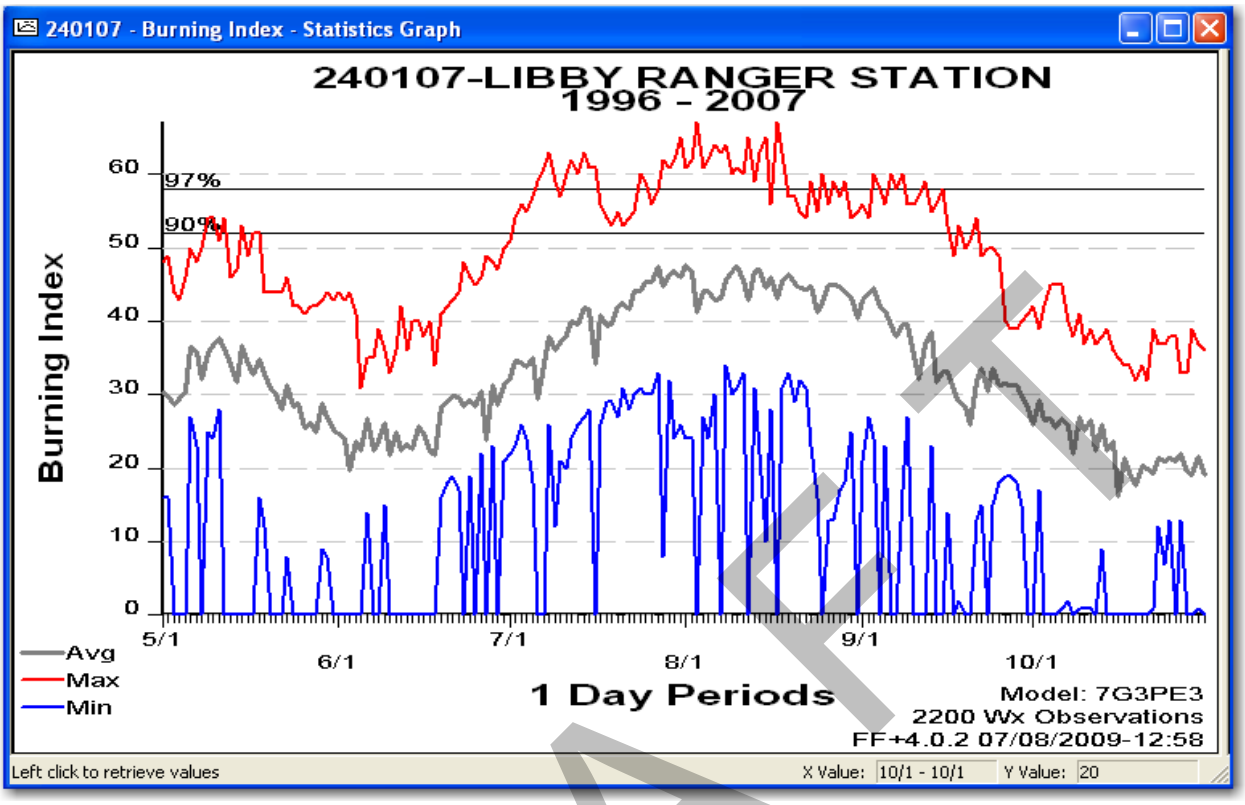
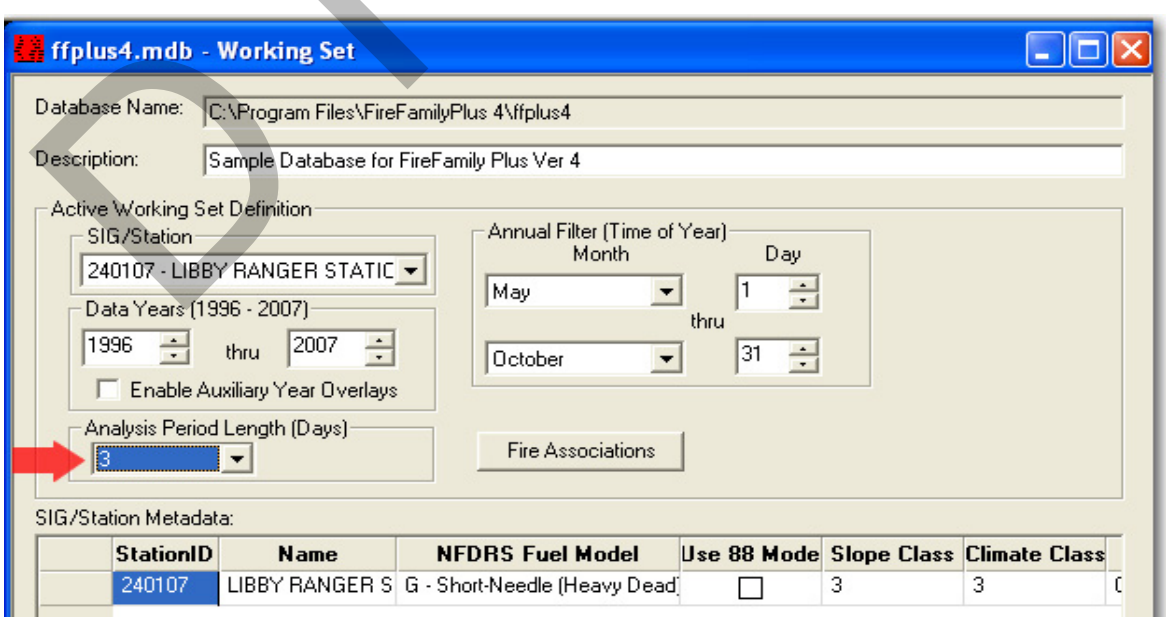


To smooth out the curve by grouping days in larger bins:

1 **Close** the open windows until you get back to the **Working Set** database window.

2 In the **Working Set** window change the **Analysis Period Length (Days)** from **1** to **3.**



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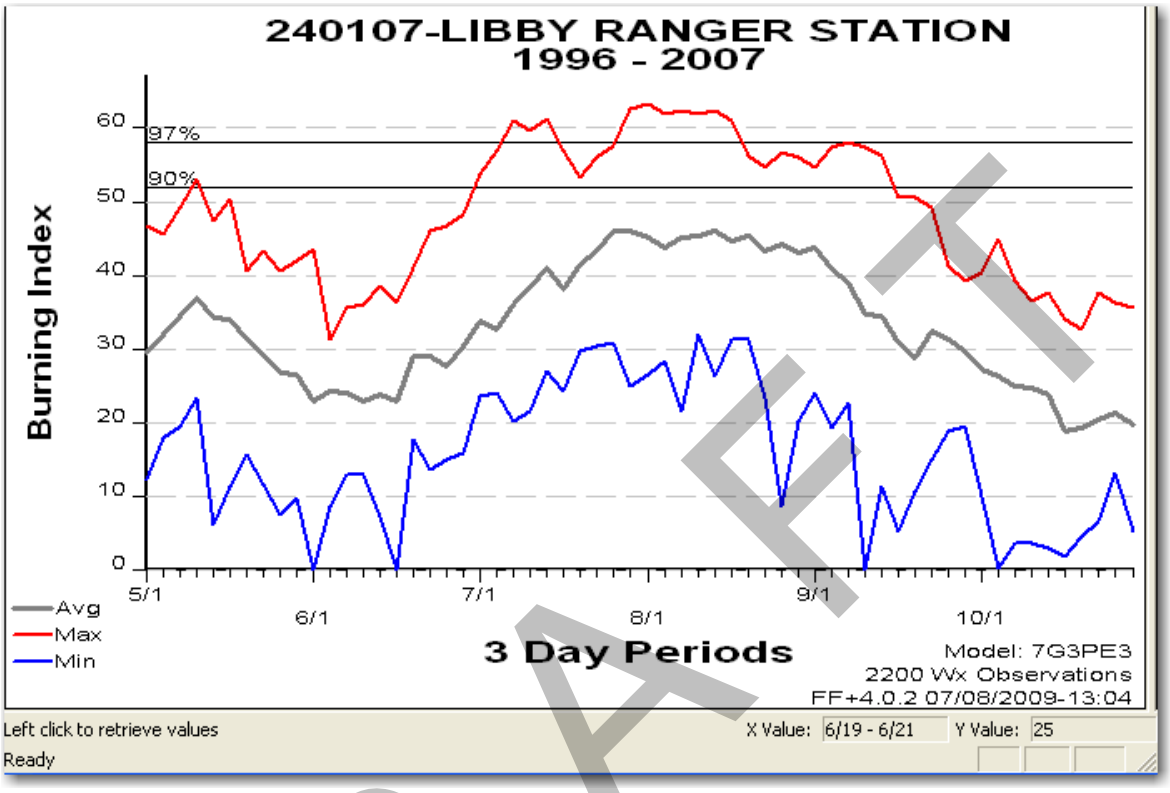
3 On the menu bar, click **Weather -> Climatology**.

4 Click **Run** to create the Burning Index graph again.



Notice the difference in the graph's appearance and how the numbers for Burning Index no longer reach the levels seen in the one day analysis.

To resize a statistical graph

1 To maximize the statistical graph of your choice, double-click anywhere on that graph.

2 Slide the graph to the left or right for the view you prefer.

The following diagram shows how to adjust the size of the statistical graphs. You can click and hold the bar that separates the two statistical graphs, then slide the bar to the right or left to obtain the desired size.

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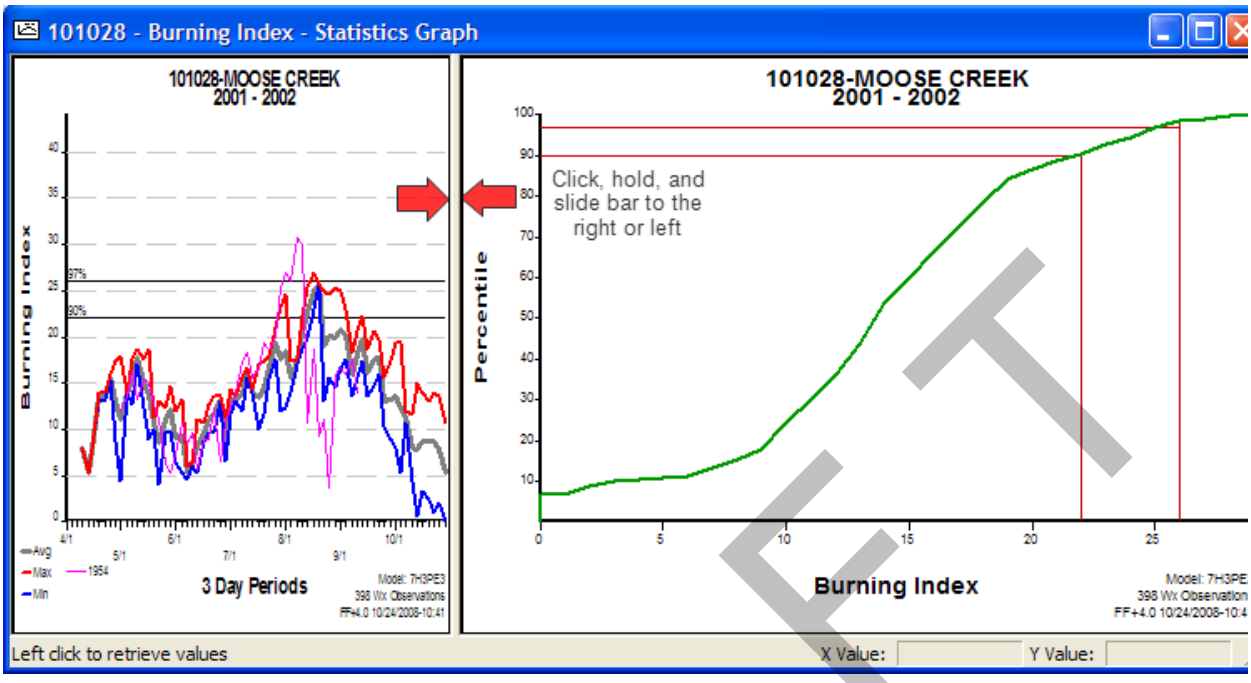

To determine a specific value on a statistical graph

If you click anywhere on either of the graphs, the values of that point appear in the lower right corner of the window in the **X Value** and **Y Value** boxes.

1 Click the point of your choice.

2 The values are displayed in the boxes at the lower right corner.

The following diagram shows the X value and Y values of a particular point on a statistical graph.

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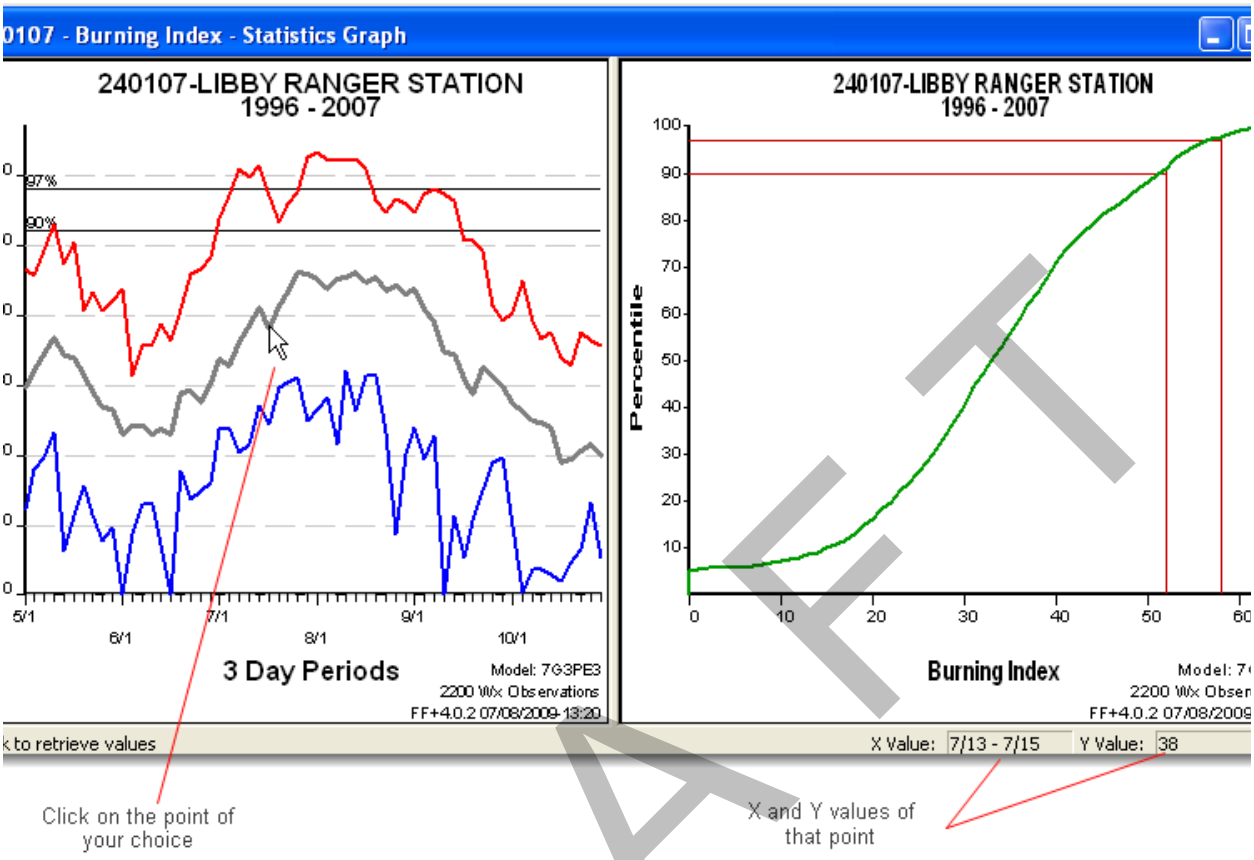
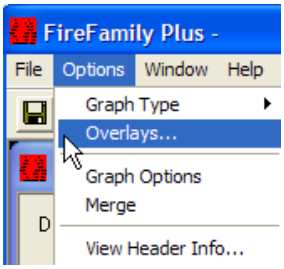


Working with overlays

After you create a statistical graph, you can add an overlay to highlight up to three specific years of interest.



Using the Enable Auxiliary Year Overlays check box

The **Enable Auxiliary Year Overlays** check box allows you to overlay years of data outside the Data Years specified for the Working Set. The following

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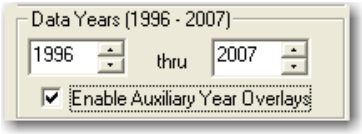
diagram shows the location of the **Enable Auxiliary Year Overlays** check box.

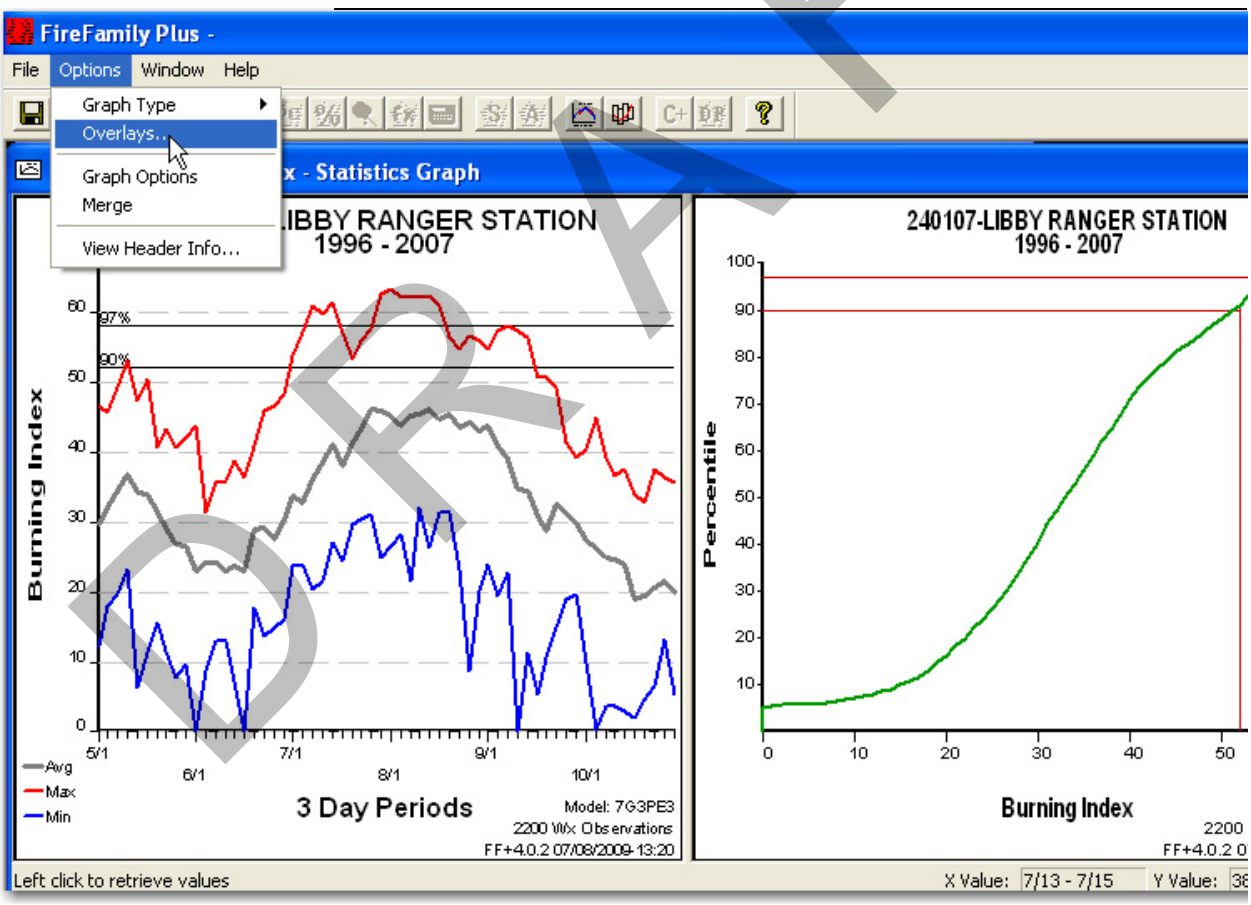


*You must select the **Enable Auxiliary Year Overlays** check box on the active Working Set screen before you can create an overlay from a data year that is outside the working set.*

To create an overlay on a statistical graph of your choice

1 Be sure that the **Enable Auxiliary Year Overlay** box is checked in the **Working Set** window.

2 On the **Options** drop-down menu, click **Overlays.**



3 Click **New**, then select the **Year**, **Color, Width**, and **Line Style** to chose a value for the overlay. (The following example shows the 2001 and 2003 seasons as overlays).

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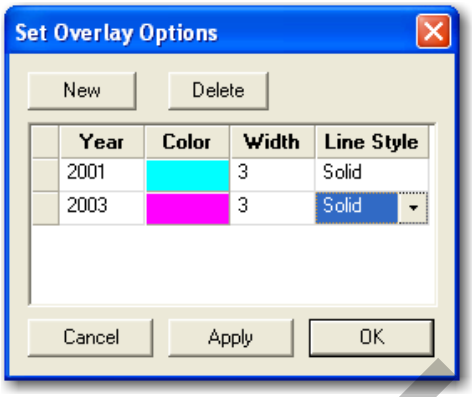
*A value of "**3**" in the **Width** column can make the lines easier to see.*



*You can adjust the **Color**, **Width**, and **Line Style** to enhance the appearance of your statistical graphs.*

4 Double-click in the **Color** box to bring up the color picker.

5 To review the appearance of the overlay, click **Apply**.

6 To delete an overlay year, click on that year and click **Delete**.

7 When finished adding new overlays, click **OK**.

If applying the options specified above, your **Statistics Graph** should resemble the following example.

You can select up to three possible overlays.

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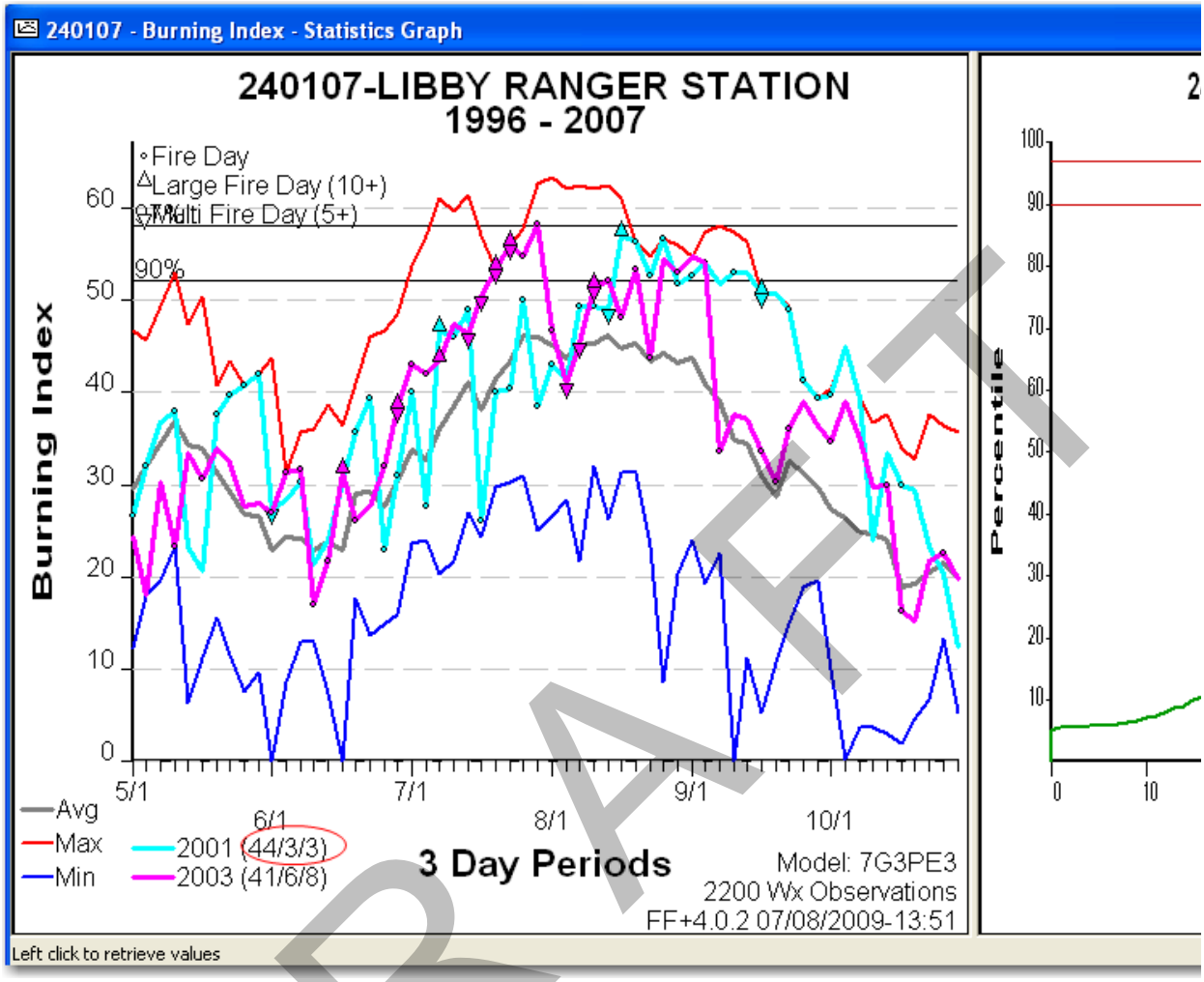

A Fire-Day symbol may be attached to each overlay year. The legend for these symbols is found in the upper left corner of the graph. Fire-Day symbols are only available on overlay years. Fire-Day symbols can be controlled in ***Options -> Graph Options -> Fires****.*

The three (shown as circled above) numbers following the "Year Overlay" legend at the lower left, represent the number of Fire-Days, Large Fire-Days, and Multiple Fire-Days.

The following diagram shows the Burning Index statistics graph and weather percentile graph for the Redfeather Station. Note the added overlays for the 1977 and 1978.

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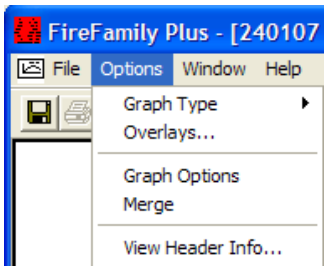
Legend for symbols
on the overlay

Each overlay legend shows the year and fire-days (number of fire-days/number of large fire-days/ **multiple** fire-days). In 1977, there were 26 Fire Days/ 2 Large Fire Days/ 0 Multiple Fire Days.

Merging graphs

The **Merge** selection on the **Options** drop-down menu allows you to merge up to three variables onto your base graph.



To merge additional variables onto your base graph

1 On the **Weather** drop-down menu, click **Climatology**.

2 Select the **Stats Graph** check boxes of your choice, and then click **Run**.

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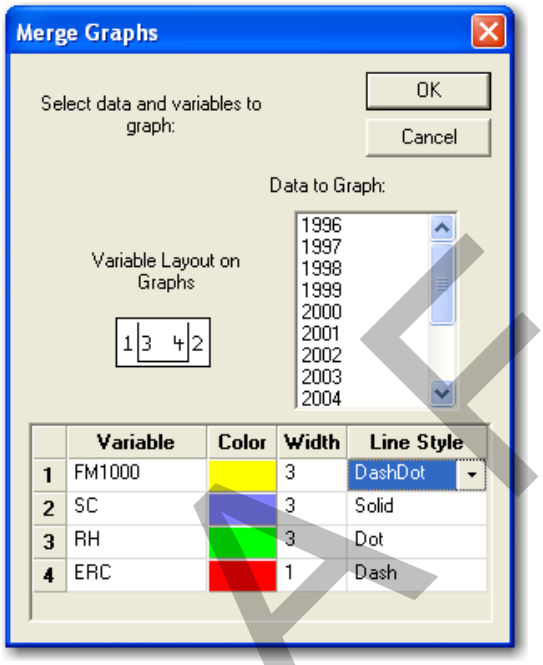
3 On the **Options** drop-down menu, click **Merge.**

4 In the **Merge Graphs** dialog box, select the years of **Data to Graph**, and then select the **Variable**, **Color**, **Width**, and **Line Style** for each variable of your choice.

The following diagram shows the **Merge Graphs** dialog box.

.



5 When finished, click **OK**.

The following diagram shows a resulting Merge Graph for "FM1000" (1000-hour fuel moisture), "SC" (spread component), "RH" (relative humidity), and "ERC" (energy release component).

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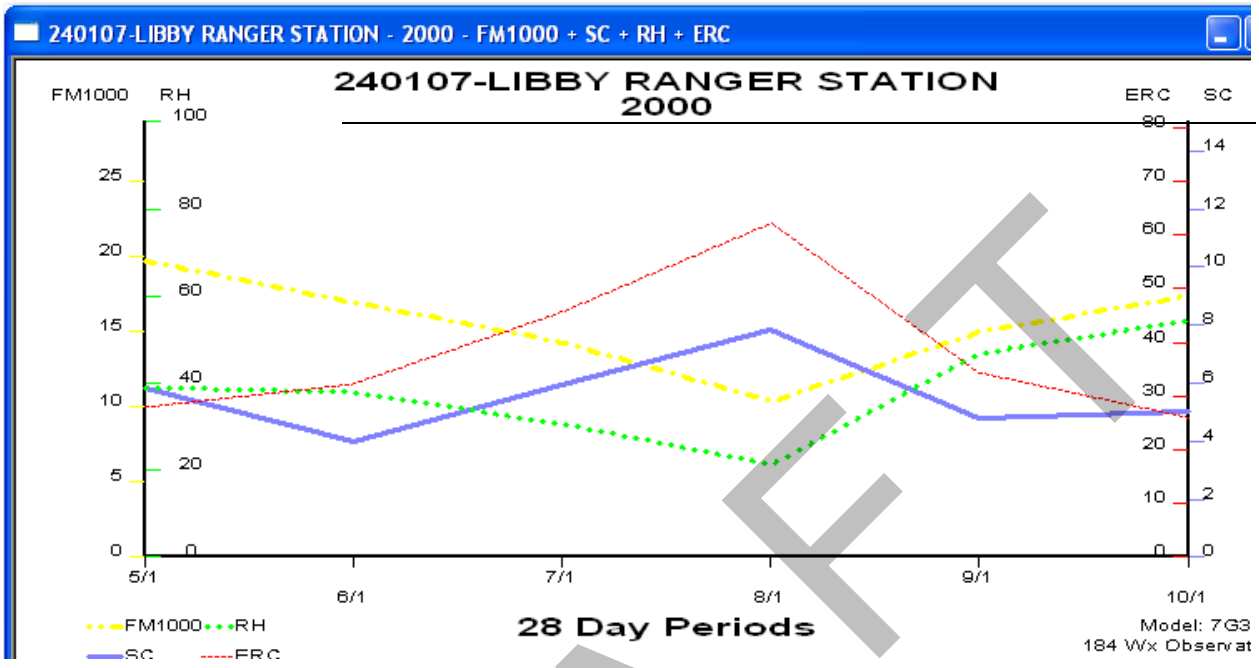
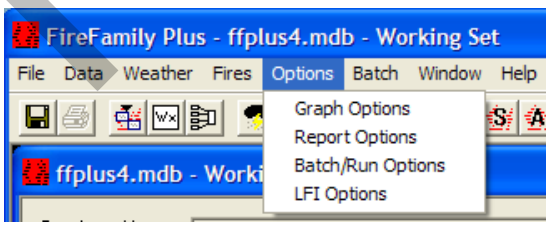


Note that each variable has its own Y-axis scale.

Changing the look of your statistical graphs

Graph Options on the **Options** drop-down menu opens a dialog box that allows you to modify the appearance of your statistical graphs.



The **Graph Display Options** windows has the following six tabs **- General, Bar Graph**, **Line At Average**, **Fires**, **Fire Danger Projections**, and **Batch Auto Save**. When you are viewing the **Graph Options** window with one or more active graph windows open, you can apply your options to the viewed graph (**Apply**) or to all active graph windows (**Apply to All**).

If **Graph Options** is accessed without an open graph window, the **Apply** and **Apply to All** selections are dimmed and you can only set the configuration by using **Set as Default**. You can use the **Set as Default** selection button at any time.

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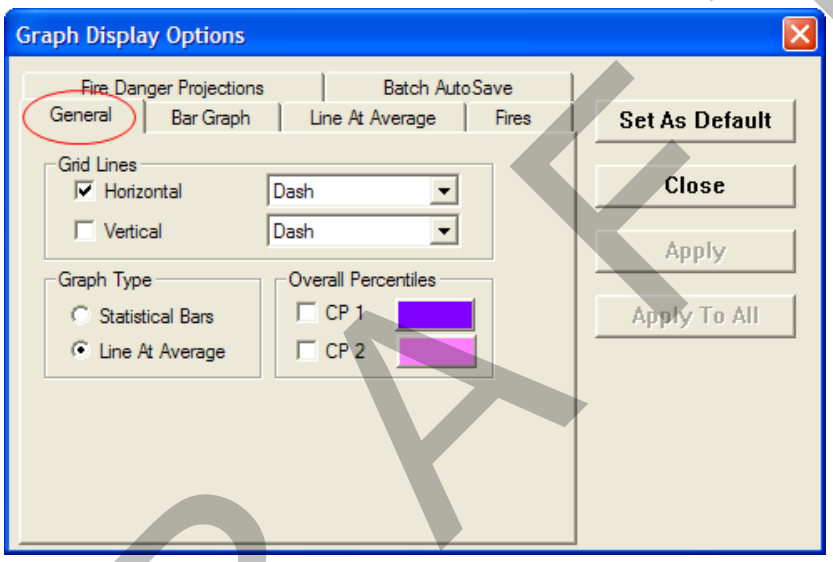
The **General** tab allows you to configure the appearance of graph grid lines, whether your default graph type is the **Statistical Bars** or **Line at Average.** You can select none, one, or two overall critical percentile values on the graph "CP 1" and "CP 2" (see page 6.3). The overall percentiles are those for the entire working set (data years and annual filters) and appear as horizontal lines across the graph that do not change with seasonal dates.

*The CP 1 and CP 2 check boxes allow you to graph the critical percentile values that are defined on the **Climatology Options** dialog box. For more information, see "To review weather by generating a statistical graph," earlier in this chapter.*



The **Bar Graph** tab allows you to specify if you want to display maximum and minimum values (**Range Tics**) and/or critical percentile values (**Critical Percentile Tics**) for each bin of your analysis period. The following diagram shows the settings available on the **Bar Graph** tab.

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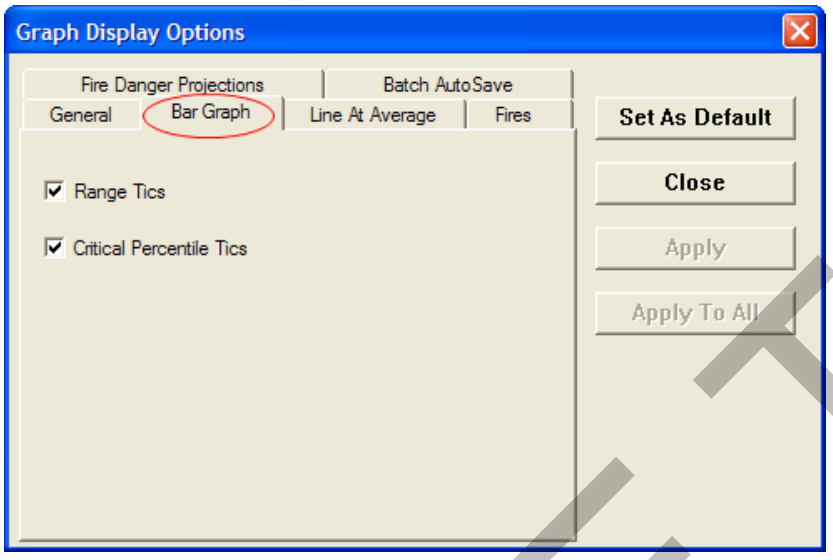
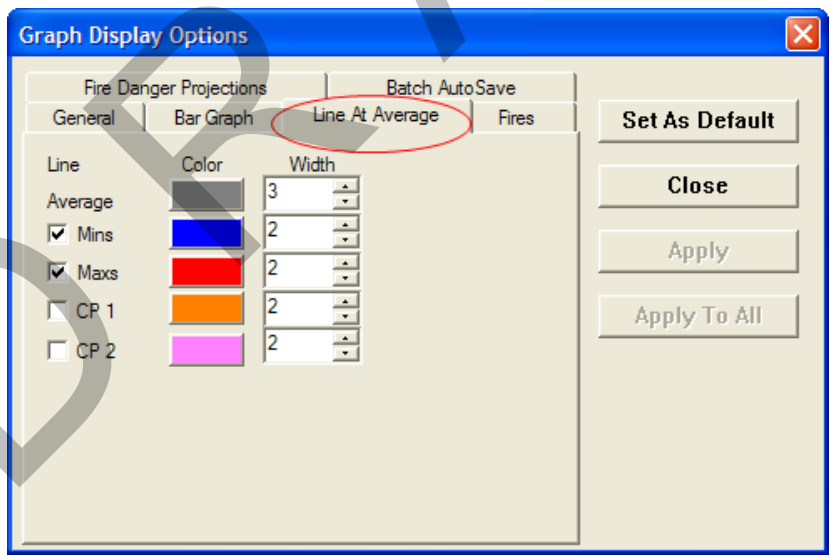


The **Line At Average** tab allows you to select and configure up to five graph lines. You can use this tab to change the color and width of the Average, Minimum (Min), Maximum (Max), CP 1, and CP 2 lines. You can also clear the Minimum, Maximum, CP 1, and CP 2 check boxes to eliminate those lines from your statistical graphs. CP values are for each "bin" of the analysis period. Values will change with the seasonal dates. The following diagram shows the settings available on the **Line At Average** tab.



Hint: You cannot remove the "average" line from the graph, but you can select the color "white" to hide it.

The **Fires** tab allows you to define which type of Fire Days, Large Fire Days, and Multiple Fire Days will be displayed on overlay years on either the line or Bar Graph. You can select which Fire Cause to display and can specify the

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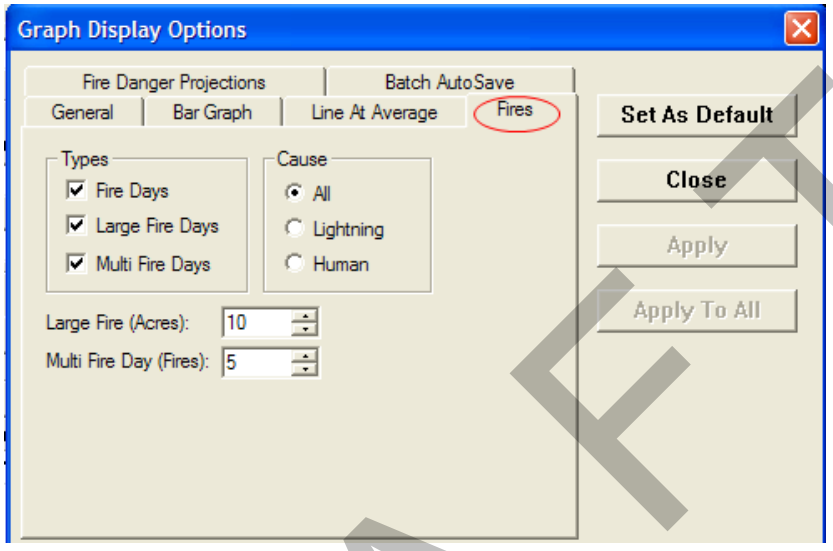
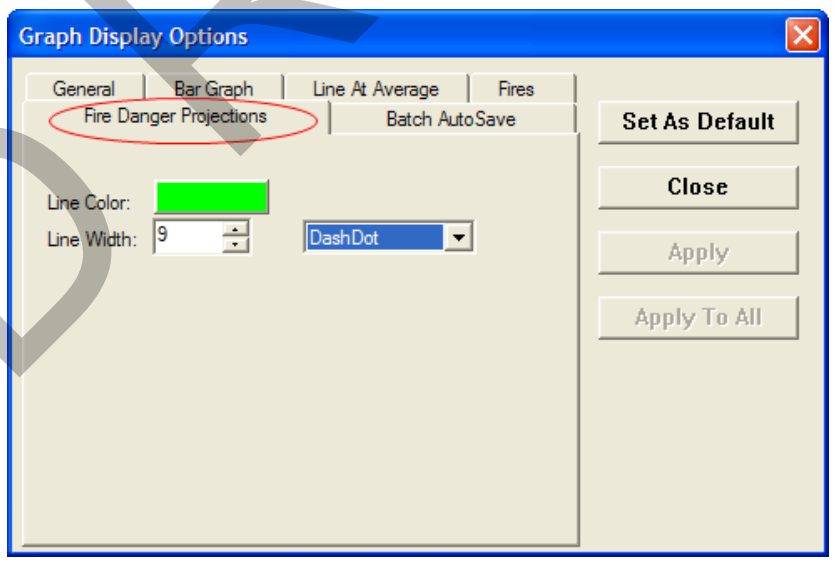
number of acres for Large Fires and the number of Fires for a Multiple Fire Day (for overlay years only). The following diagram shows the settings available on the **Fires** tab. In this example (the default), all fire days for all causes are shown with large- and multiple- fire day thresholds of ten acres and five or more fires.



The **Fire Danger Projections** tab allows you to modify the line color, width, and style of your fire danger projection. The following diagram shows the settings available on the **Fire Danger Projections** tab. (For more information about the changing the graph options on this tab, see Chapter 9, "Working with fire danger projections").



The **Batch Auto Save** tab allows you to save images at a specified resolution and specified file type (BMP, GIF, JPEG, or PNG) to a directory of your choice. The following diagram shows the settings available on the

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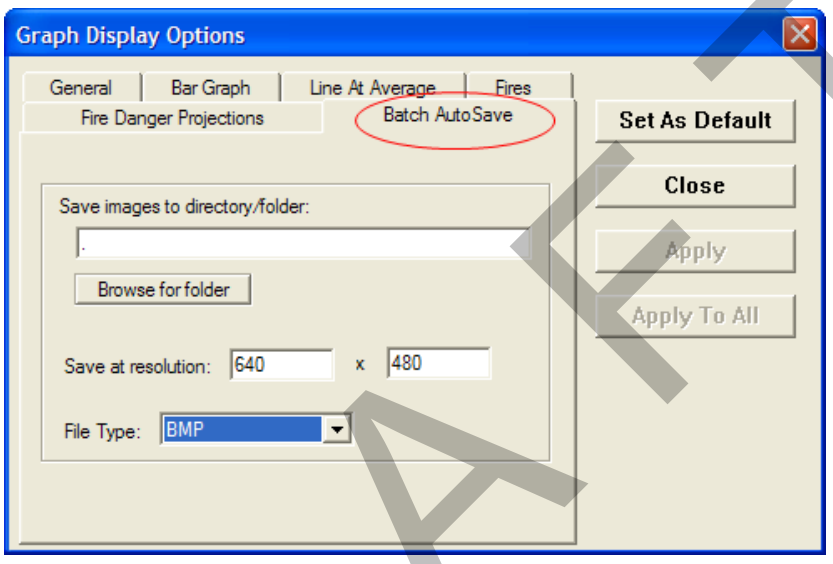
BatchAutoSave Tab where you can define the resolution, type, and location of graphic images created by Batch runs. Click the **Browse for folder** button to navigate to a directory/folder. A "**.**" in the window indicates the working directory of the current active database. (For more information on **BatchAutoSave**, see Chapter 11, "Batch functions").

Hint: Your directory must already exist; you cannot create a directory from here.



Introduction to annotations

Annotated versions of a Line at Average Graph, Statistical Bar Graph, and Percentile Graph are shown as follows.

The following diagram shows annotations for an example Line at Average Graph.

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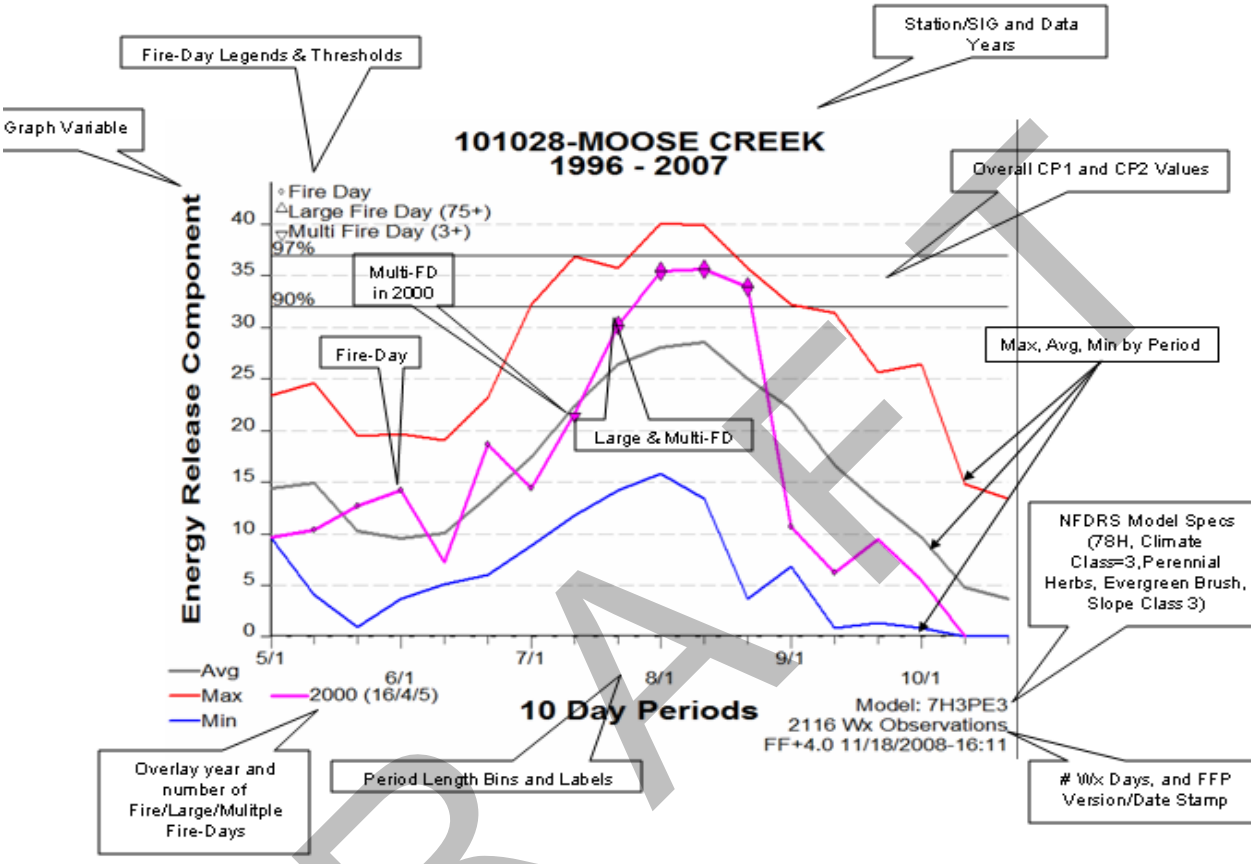

The following diagram shows annotations for the statistical bar graph.

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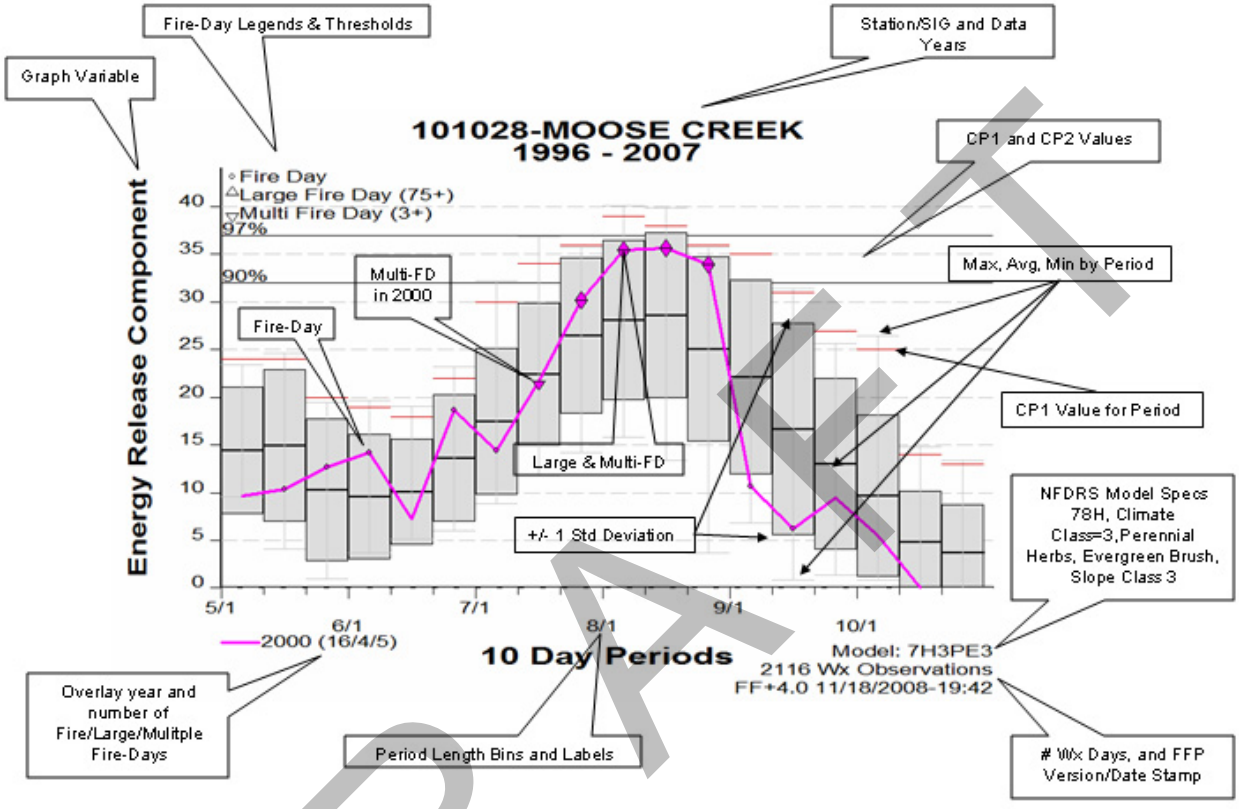

The following diagram shows annotations for the Percentile Graph.

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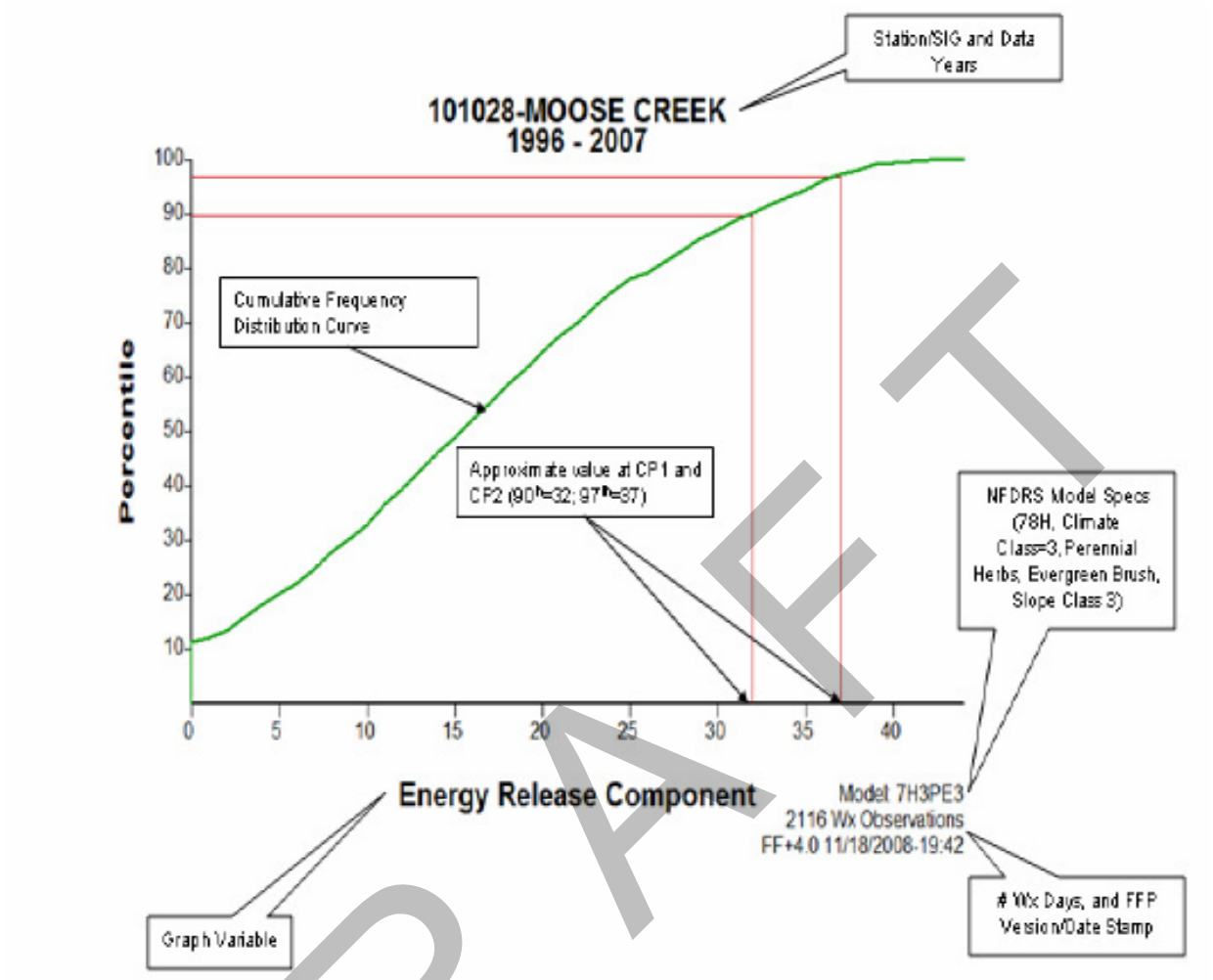
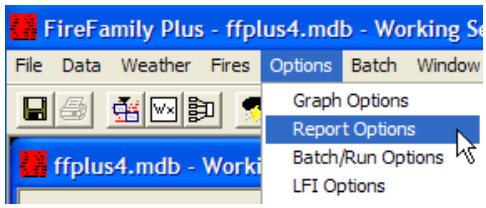


Report options

You can now control how information is displayed in reports by using the **Options** drop-down menu and selecting **Report Options**.



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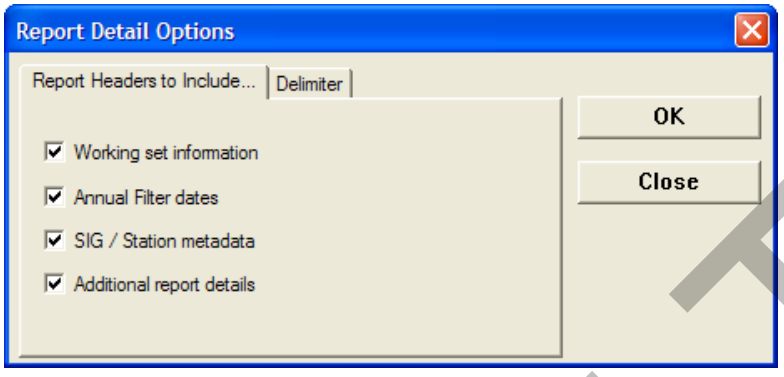
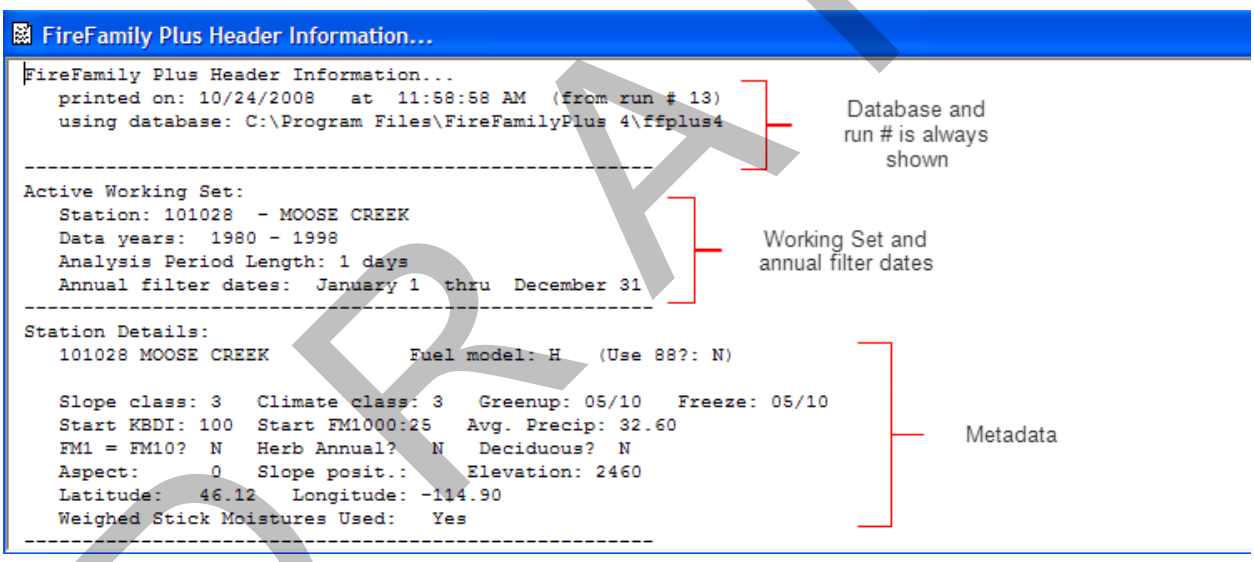
To configure information included in a report

1 Click on **Options -> Report Options**. The following **Report Detail Options** dialog box will open.



2 You can control the information included in the "Report Headers" by selecting any of the four levels of information on the **Report Headers to Include...** tab as shown above.



3 If you intend to save a report and then import into another program, you can set the delimiter of your choice by using the **Report Detail Options** dialog box and by clicking on the **Delimiter** tab as shown below.

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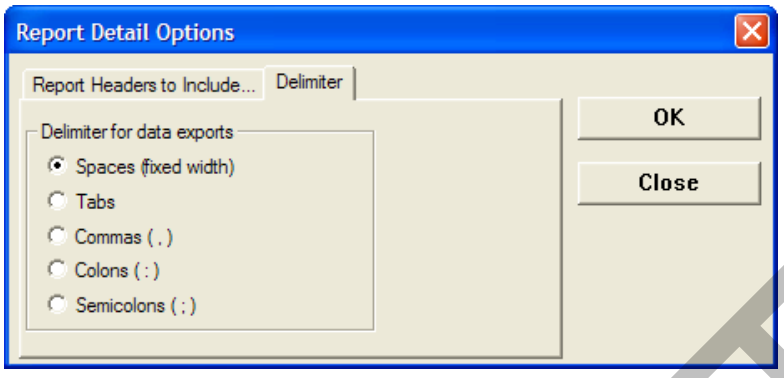
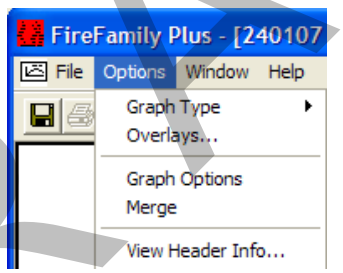


Note: The Delimiter controls the look of the daily list, (and hourly lists) so that the reports are easier to save and import into other programs such as spreadsheets or statistical analysis. Set the delimiter to "comma" to save and directly import into Excel programs.

To view additional header information while working with active graphs, click **Options -> View Header Info** as shown.



The **View Header Information** option will show the information selected on the **Report Detail Options** dialog box.

Working with Season Reports

Season Reports summarize the seasonal variations of fuel moistures, NFDRS indices, and components. You can generate the following:

- **Persistence Probability** - reports the chance that tomorrow's variable will be the same as today's. The higher the persistence, the less likely the weather will change.
- **Severity List** - ranks each year at a fire weather station in terms of a selected variable exceeding a user-defined percentile level.
- **Severity Summary** - summarizes the Severity List.
- **Probability Analysis**, - shows how often you can expect values of your adjective class to occur, and provides detailed information needed to perform fire management activities.

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- **Daily Listing** - lists weather records as daily values and optionally fire-day occurrence.
- **Percentile Weather** - identifies the frequency of occurrence of a particular variable of your choice.
- **FlamMap Fire Risk Export** - allows you to select wind records and parameter options to export to FlamMap.

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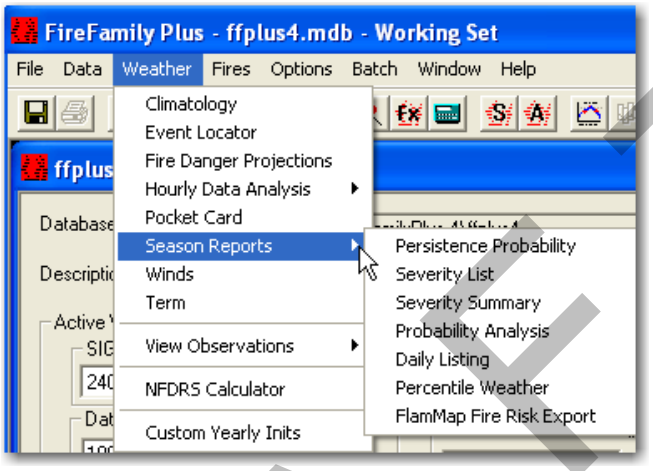
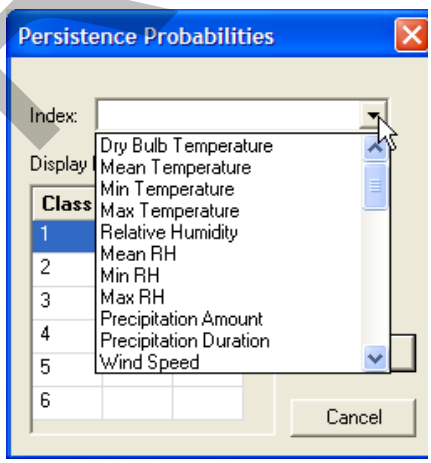


To generate a Persistence Probability report

1 On the **Weather** drop-down menu, click **Season Reports**, and then click **Persistence Probability**. The **Persistence Probability** dialog box will open.

2 Using the **Index** drop-down list, select the variable of your choice.



3 Type in the **Display Ranges** values (Min, Max) for each class, and then click **OK**.

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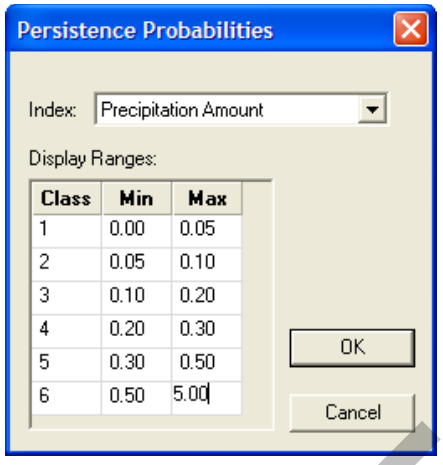
The following diagram shows the **Persistence Probabilities** dialog box for "Precipitation Amount".



The resulting "**Precipitation Amount - Persistence Probabilities**" report shows the probability and amount of precipitation to expect during the given period.

101028 - Precipitation Amount - Persistence Probabilities

```
FireFamily Plus Persistence Probability Report
   printed on: 07/08/2009   at  03:52:51 PM  (from run # 20)
   using database: C:\Program Files\FireFamilyPlus 4\ffplus4

-----------------------------------------------------
Active Working Set:
   Station: 101028  - MOOSE CREEK
   Data years:  1996 - 2007
   Analysis Period Length: 1 days
   Annual filter dates:  January 1  thru  December 31
-----------------------------------------------------
Station Details:
   101028 MOOSE CREEK              Fuel model: H   (Use 88?: N)

   Slope class: 3   Climate class: 3   Greenup: 05/10   Freeze: 05/10
   Start KBDI: 100  Start FM1000:25   Avg. Precip: 32.60
   FM1 = FM10?  N   Herb Annual?   N   Deciduous?  N
   Aspect:      0   Slope posit.:      Elevation: 2460
   Latitude:   46.12   Longitude: -114.90
   Weighed Stick Moistures Used:   Yes
-----------------------------------------------------

    Variable: Precipitation Amount

                                 Tomorrow's Precipitation Amount
-----------------------------------------------------------------------------------------
                            |    0.00  |    0.05  |    0.10  |    0.20  |    0.30  |    0.50  |
   Today's                  |      -   |      -   |      -   |      -   |      -   |      -   |
                            |    0.05  |    0.10  |    0.20  |    0.30  |    0.50  |    5.00  |
-----------------------------------------------------------------------------------------
   0.00 -    0.05           |    1529  |      65  |      75  |      37  |      43  |      43  |
   0.05 -    0.10           |      70  |      11  |      10  |       3  |      10  |       8  |
   0.10 -    0.20           |      74  |      10  |      18  |       6  |      12  |       9  |
   0.20 -    0.30           |      35  |       7  |       7  |       2  |       6  |       7  |
   0.30 -    0.50           |      47  |       9  |      10  |       5  |       4  |      11  |
   0.50 -    5.00           |      33  |      13  |       7  |      12  |      11  |      13  |
-----------------------------------------------------------------------------------------
                     Conditional Probability Table (%)
-----------------------------------------------------------------------------------------
   0.00 -    0.05           |   85.32  |    3.63  |    4.19  |    2.06  |    2.40  |    2.40  |
   0.05 -    0.10           |   62.50  |    9.82  |    8.93  |    2.68  |    8.93  |    7.14  |
```

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To generate a Severity List

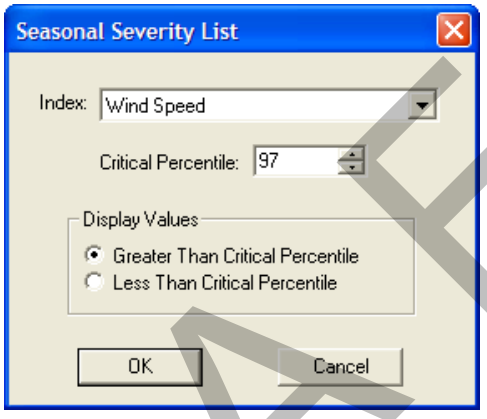
1 On the **Weather** drop-down menu, click **Season Reports**, and then click **Severity List**.

2 In the **Index** box use the drop-down menu to select the variable of your choice.

3 Type the **Critical Percentile** value, select the appropriate **Display Values**, and then click **OK**.

The following diagram shows the **Seasonal Severity List** dialog box for Wind Speed greater than the (critical) 97th percentile

.



The resulting **Wind Speed - Severity List** report shows the number of years that had high winds during the period from May 1st through December 31st.

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101028 - Wind Speed - Severity List

```
FireFamily Plus Seasonal Severity Report
   printed on: 07/08/2009   at  03:57:32 PM  (from run # 21)
   using database: C:\Program Files\FireFamilyPlus 4\ffplus4

-----------------------------------------------------
Active Working Set:
   Station: 101028  - MOOSE CREEK
   Data years:  1996 - 2007
   Analysis Period Length: 1 days
   Annual filter dates:  January 1  thru  December 31
-----------------------------------------------------
Station Details:
   101028 MOOSE CREEK            Fuel model: H   (Use 88?: N)

   Slope class: 3   Climate class: 3   Greenup: 05/10   Freeze: 05/10
   Start KBDI: 100  Start FM1000:25   Avg. Precip: 32.60
   FM1 = FM10?  N   Herb Annual?   N   Deciduous?  N
   Aspect:      0   Slope posit.:     Elevation: 2460
   Latitude:   46.12   Longitude: -114.90
   Weighed Stick Moistures Used:   Yes
-----------------------------------------------------

Variable: Wind Speed

    Wind Speed Values Greater Than 97.00th Percentile Value of 7.00

   Period                     Cumulative     Number of Days
   Begins         Value       Departure    Exceeded (per Year)
-------------------------------------------------------------
                             1996
-------------------------------------------------------------
 07/18/1996        9.00            2.00          1
 08/02/1996        8.00            3.00          2
 08/05/1996        8.00            4.00          3
 08/17/1996        8.00            5.00          4
 08/28/1996        8.00            6.00          5
 09/13/1996        9.00            8.00          6
-------------------------------------------------------------
                             1997
```

To generate a Severity Summary

1. On the **Weather** drop-down menu, click **Season Reports**, and then click **Severity Summary**.
2. In the **Index** box use the drop-down menu to select the variable of your choice.
3. Type the **Critical Percentile** value, select the appropriate **Display Values**, and then click **OK**.

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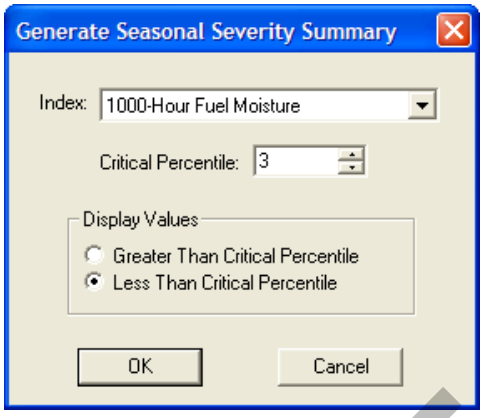
The following **Generate Seasonal Severity Summary** dialog box shows the 1000-Hour Fuel Moisture for days below the critical percentile of "**3**," (the driest days).



The resulting **1000-Hour Fuel Moisture - Severity Summary** report measures the number of days with large fuels below the critical percentile of "**3**."

101028 - 1000-Hour Fuel Moisture - Severity Summary

```
FireFamily Plus Seasonal Severity Report
   printed on: 07/08/2009   at  04:27:46 PM  (from run # 22)
   using database: C:\Program Files\FireFamilyPlus 4\ffplus4

-----------------------------------------------------
Active Working Set:
   Station: 101028  - MOOSE CREEK
   Data years:  1996 - 2007
   Analysis Period Length: 1 days
   Annual filter dates:  May 1  thru  December 31
-----------------------------------------------------
Station Details:
   101028 MOOSE CREEK              Fuel model: H   (Use 88?: N)

   Slope class: 3   Climate class: 3   Greenup: 05/10   Freeze: 05/10
   Start KBDI: 100  Start FM1000:25   Avg. Precip: 32.60
   FM1 = FM10?  N   Herb Annual?   N   Deciduous?  N
   Aspect:      0   Slope posit.:      Elevation: 2460
   Latitude:   46.12   Longitude: -114.90
   Weighed Stick Moistures Used:   Yes
-----------------------------------------------------

Variable: 1000-Hour Fuel Moisture

    1000-Hour Fuel Moisture Values Less Than 3.00th Percentile Value of 10.35

                                Departure Values Table
                        Cumulative Departure Values by Year by Month
-----------------------------------------------------------------------------------------------------------
 Year |     Jan     Feb     Mar     Apr     May     Jun     Jul     Aug     Sep     Oct     Nov     Dec
-----------------------------------------------------------------------------------------------------------
 1996 |    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
 1997 |    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
 1998 |    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
 1999 |    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
 2000 |    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.80    0.00    0.00    0.00    0.00
 2001 |    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
 2002 |    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00
```

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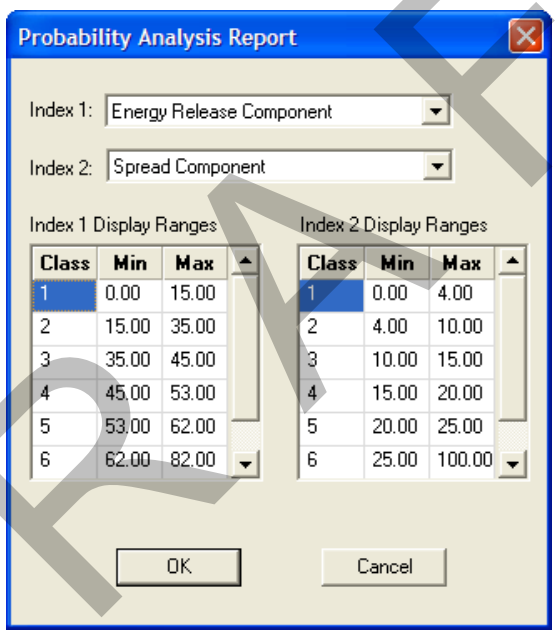
To generate a Probability Analysis

1. On the **Weather** drop-down menu, click **Season Reports**, and then click **Probability Analysis**.
2. From the **Index 1** drop-down list, select the variable of your choice.
3. From the **Index 2** drop-down list, select another variable of your choice.
4. Type in the **Index 1 Display Ranges**, type in the **Index 2 Display Ranges**, and then click **OK**.

The following diagram shows the **Probability Analysis Report** dialog box that determines the likelihood of a value of Energy Release Component given the value of Spread Component.



The resulting **Probability Analysis** report shows the probability of a high Spread Component value given a high Energy Release Component.

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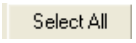
101028 - Spread Component - Probability Analysis

```
FireFamily Plus Probability Analysis Report
   printed on: 07/08/2009   at  04:37:11 PM  (from run # 23)
   using database: C:\Program Files\FireFamilyPlus 4\ffplus4

-----------------------------------------------------
Active Working Set:
   Station: 101028  - MOOSE CREEK
   Data years:  1996 - 2007
   Analysis Period Length: 1 days
   Annual filter dates:  May 1  thru  December 31
-----------------------------------------------------
Station Details:
   101028 MOOSE CREEK            Fuel model: H   (Use 88?: N)

   Slope class: 3   Climate class: 3   Greenup: 05/10   Freeze: 05/10
   Start KBDI: 100  Start FM1000:25   Avg. Precip: 32.60
   FM1 = FM10?  N   Herb Annual?   N   Deciduous?  N
   Aspect:      0   Slope posit.:     Elevation: 2460
   Latitude:   46.12   Longitude: -114.90
   Weighed Stick Moistures Used:   Yes
-----------------------------------------------------

    Energy Release Component vs Spread Component

                                          Spread Component
-----------------------------------------------------------------------------------------------
                            |    0.00  |    4.00  |   10.00  |   15.00  |   20.00  |   25.00  |
Energy Release Component    |      -   |      -   |      -   |      -   |      -   |      -   |
                            |    4.00  |   10.00  |   15.00  |   20.00  |   25.00  |  100.00  |
-----------------------------------------------------------------------------------------------
   0.00 -   15.00           |    1008  |       2  |       0  |       0  |       0  |       0  |
  15.00 -   35.00           |     988  |       8  |       0  |       0  |       0  |       0  |
  35.00 -   45.00           |     131  |      16  |       0  |       0  |       0  |       0  |
  45.00 -   53.00           |       0  |       0  |       0  |       0  |       0  |       0  |
  53.00 -   62.00           |       0  |       0  |       0  |       0  |       0  |       0  |
  62.00 -   82.00           |       0  |       0  |       0  |       0  |       0  |       0  |
-----------------------------------------------------------------------------------------------
                     Conditional Probability Table (%)
-----------------------------------------------------------------------------------------------
   0.00 -   15.00           |   99.80  |    0.20  |    0.00  |    0.00  |    0.00  |    0.00  |
  15.00 -   35.00           |   99.20  |    0.80  |    0.00  |    0.00  |    0.00  |    0.00  |
```

To generate a Daily Listing

1. On the **Weather** drop-down menu, click **Season Reports**, and then click **Daily Listing**.
2. Select the **Date Format**, **Time Format**, **Fire Outputs**, **Fire Cause Filter** and **General** heading information of your choice.
3. In the **Available Variables** list, highlight the variables of your choice, and then click **>>>> or Select All**.



4. When finished adding variables to the **Selected Variables** list, click **OK.**
5. The following diagram shows the selected variables for the Daily Listing.

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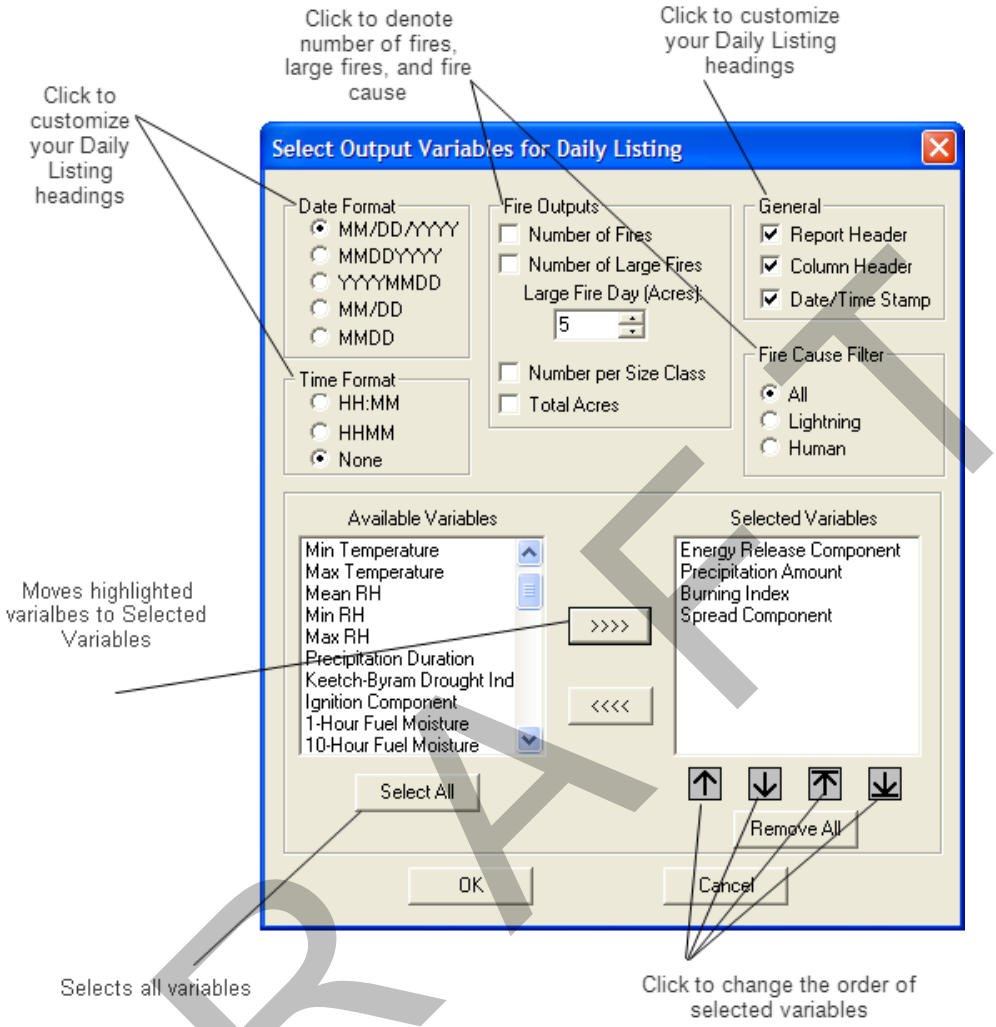

The resulting "Daily Listing" shows the recorded/calculated values for working set observations for Energy Release Component, and number of Fires, and Large Fires.

*Hint: Selecting "comma-delimited" allows you to save the file as a *.csv file which opens directly in Microsoft Excel.*

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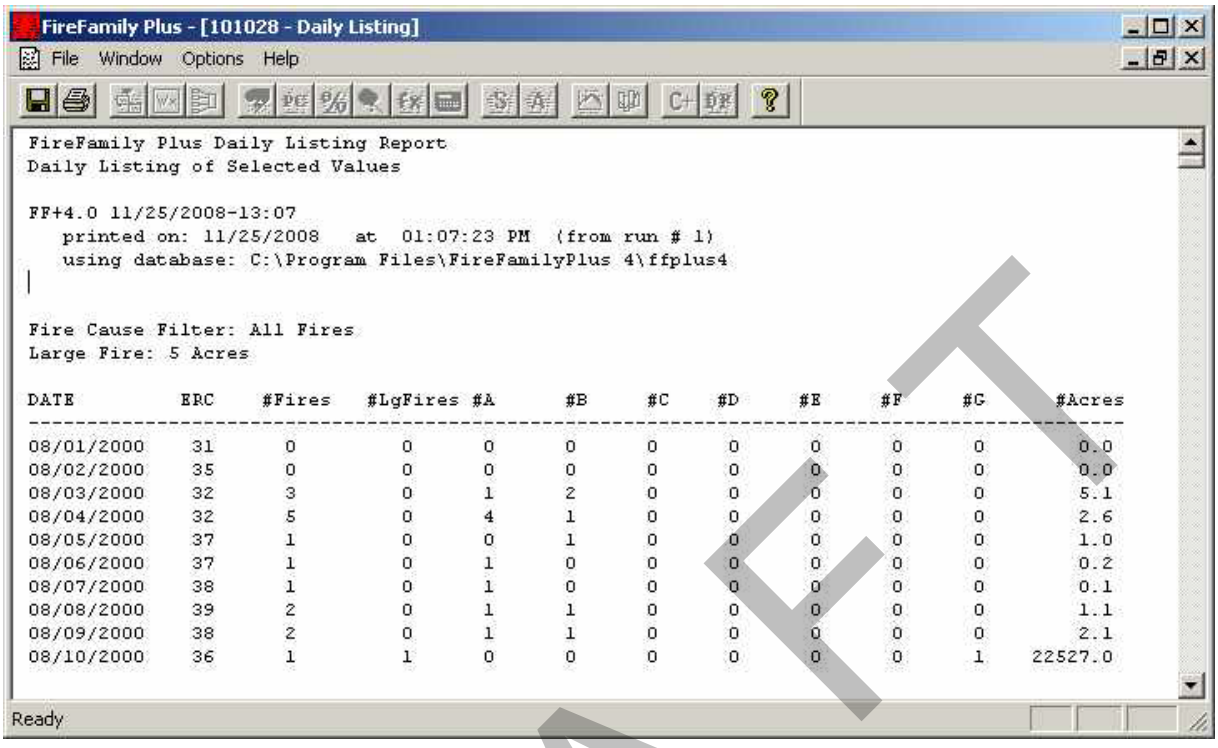


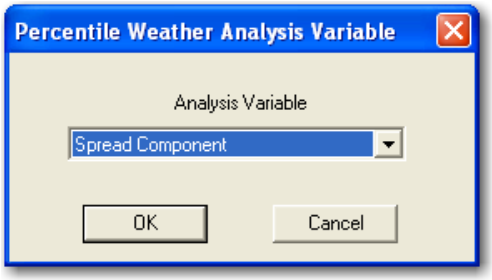
DATE	ERC	#Fires	#LgFires	#A	#B	#C	#D	#E	#F	#G	#Acres
08/01/2000	31	0	0	0	0	0	0	0	0	0	0.0
08/02/2000	35	0	0	0	0	0	0	0	0	0	0.0
08/03/2000	32	3	0	1	2	0	0	0	0	0	5.1
08/04/2000	32	5	0	4	1	0	0	0	0	0	2.6
08/05/2000	37	1	0	0	1	0	0	0	0	0	1.0
08/06/2000	37	1	0	1	0	0	0	0	0	0	0.2
08/07/2000	38	1	0	1	0	0	0	0	0	0	0.1
08/08/2000	39	2	0	1	1	0	0	0	0	0	1.1
08/09/2000	38	2	0	1	1	0	0	0	0	0	2.1
08/10/2000	36	1	1	0	0	0	0	0	0	1	22527.0

You can also save the Daily Listing as a .txt or.cvs file and import it into spreadsheet and/or graphics software applications.

To generate a Percentile Weather

1 On the **Weather** drop-down menu, click **Season Reports**, and then click **Percentile Weather**.

2 From the drop-down list in the **Percentile Weather Analysis Variable** dialog box, select the variable of your choice.



3 Click OK and the following dialog box will open.

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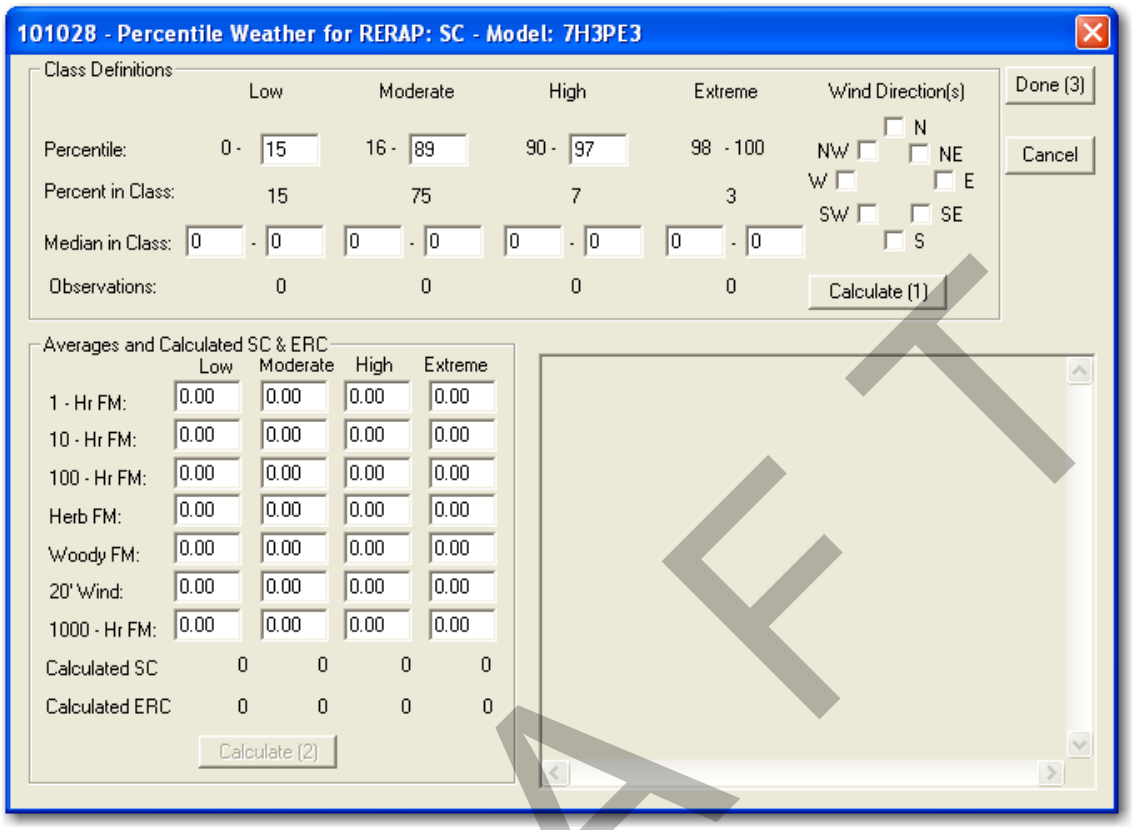

4 Select the wind direction and/or other class definition variables of your choice and click on **Calculate (1)**.

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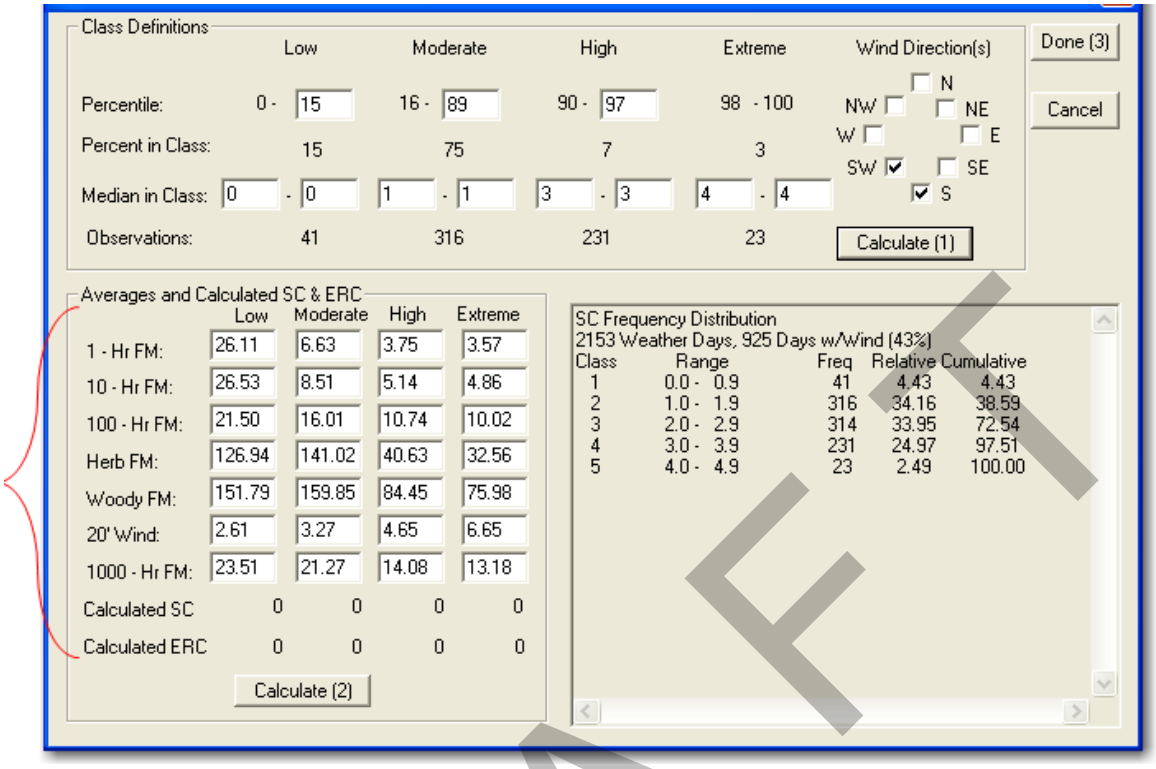
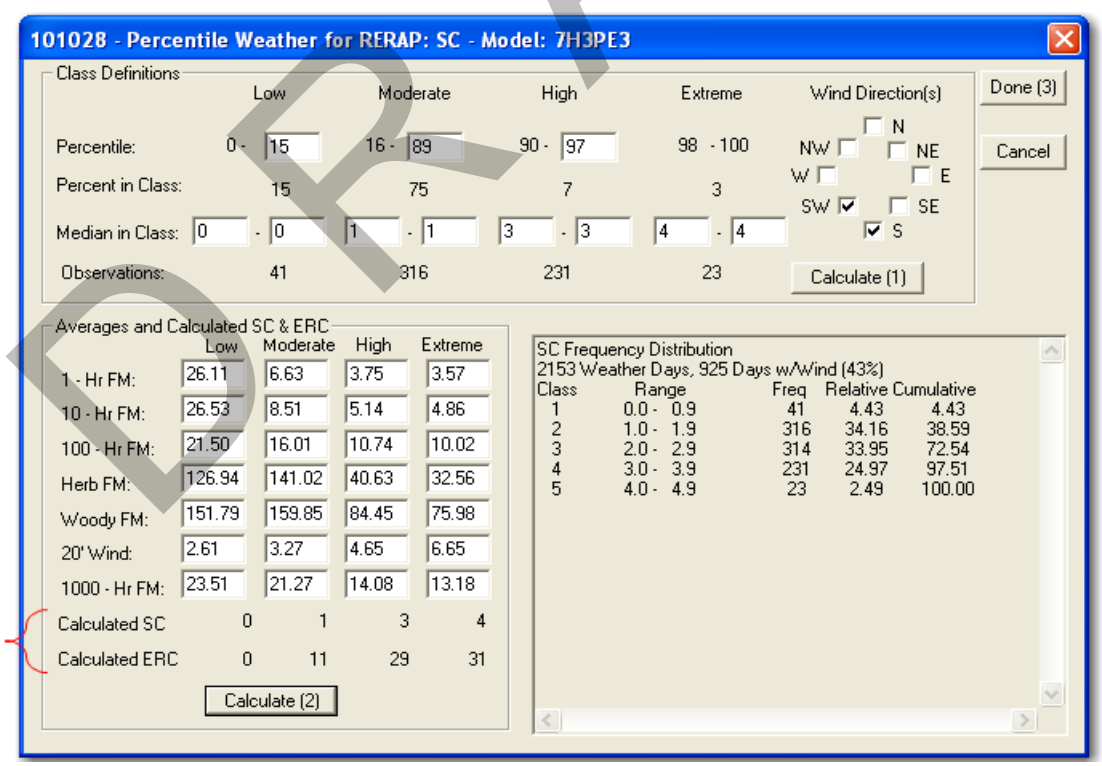


5 Averages and Calculated values are completed. Click **Calculate (2)**.



6 Calculated SC and ERC values are determined.

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7 Click Done (3) and the following **Percentile Weather for RERAP** dialog box is generated for the variables and wind directions you selected.

101028 - Percentile Weather for RERAP: SC - Model: 7H3PE3

```
FireFamily Plus Percentile Weather Report for RERAP

 Station: 101028: MOOSE CREEK            Variable: SC
 Model: 7H3PE3
         Data Years: 1996 - 2007
         Date Range: May 1 - December 31
Wind Directions: S, SW

Percentiles, Probabilities, and Mid-Points
    Variable/Component Range        Low       Mod       High      Ext
            Percentile Range     0 - 15    16 - 89    90 - 97    98 - 100
       Climatol. Probability        15        75         7          3
          Mid-Point      SC      0 -   0    1 -   1    3 -   3    4 -   4
           Num Observations        41       316       231         23
     Calculated Spread Comp.        0         1         3          4
              Calculated ERC        0        11        29         31

Fuel Moistures
        1 Hour Fuel Moisture      26.11      6.63      3.75       3.57
       10 Hour Fuel Moisture      26.53      8.51      5.14       4.86
      100 Hour Fuel Moisture      21.50     16.01     10.74      10.02
    Herbaceous Fuel Moisture     126.94    141.02     40.63      32.56
         Woody Fuel Moisture     151.79    159.85     84.45      75.98
              20' Wind Speed       2.61      3.27      4.65       6.65
     1000 Hour Fuel Moisture      23.51     21.27     14.08      13.18

 2153 Weather Records Used, 925 Days With Wind (42.96%)
```

FlamMap Fire Risk Export

FlamMap Fire Risk Export allows you to select wind records and specify parameter choices to export to FlamMap.

1 Select **Weather -> Season Reports -> FlamMap Fire Risk Export** and the following **Fire Risk Export Winds Parameters** dialog box will open.

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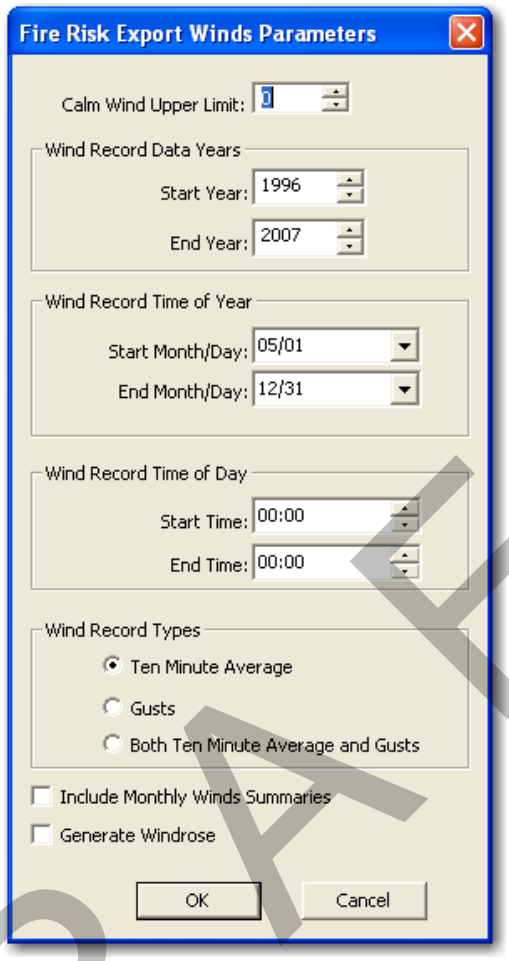

2 Type in a **Calm Wind Upper Limit** or use the spinner box to select a value.

3 Specify the **Wind Record Data Years** you would like to include.

4 Select the **Wind Record Time of Year** you are interested in (**Start Month/Day** and **End Month/Day**).

5 Select the **Wind Record Time of Day** (**Start Time** and **End Time**).

6 Choose the **Wind Record Type** (**Ten Minute Average**, **Gusts**, or **Both**) by checking a radio button.

7 Check the **Include Monthly Wind Summaries** and/or **Generate Windrose** boxes if desired.

8 Click **OK** to export the data to FlamMap.

FlamMap does not have to be open.

9 **Save** the file if desired (**File -> Save**).

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Working with weather data

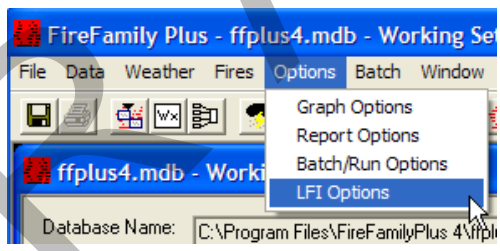
Variables

A number of new Climatology Option variables are included with FireFamily Plus version 4.0. These new variables include: Gust Direction, Gust Speed, Solar Radiation, Wet Flag, Dew Point Temperature, Vapor Pressure Deficit (Max and Avg), and Live Fuel Index (described below). Vapor Pressure Deficit and Live Fuel Index are used to calculate aspects of plant activity.

Live Fuel Index (LFI)

The Live Fuel Index is a bioclimatic index of plant activity and relates to the state of live vegetation. It is a relative index of plant functioning and can show events like greenup and sensecence of foliage as well as curing of herbaceous fuels.

LFI is calculated as the product of three indicators relating to the main drivers of plant activity: temperature, moisture, and light. The temperature indicator uses minimum temperature, the moisture indicator uses vapor pressure deficit (VPD) and the light indicator uses daylength. For each variable, limits are defined where plants are either unconstrained or fully constrained by a particular meteorological variable. These limits can be set using the **Options > LFI Options** menu selection.



You can select either maximum vapor pressure deficit or average vapor pressure deficit for the calculations. You can also set the LFI running average period for the index (expressed in days). The **LFI Options** dialog box is shown as follows:

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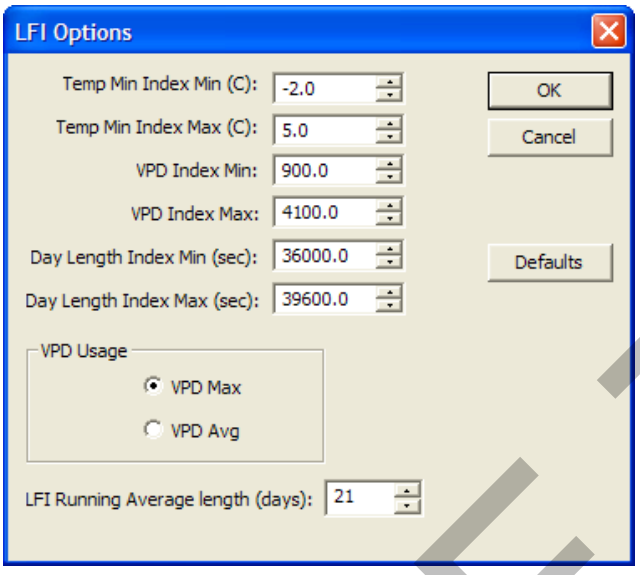

The default live fuel index values shown in the dialog box have been evaluated over a large range of ecosystems and are sufficiently general to use without modification but you have the option to control the limits.

Units for the values presented are in degrees Celsius for temperature limits, Pascals for the vapor pressure deficit (VPD) limits, and seconds for the day length limits.

Custom Yearly Initialization

To account for variable greenup dates, and to better support the Canadian System, the **Custom Yearly Initialization** (Custom Yearly Inits) function has been added to FireFamily Plus.

1 Click on the **Weather** drop-down menu.

2 Select **Custom Yearly Inits**.

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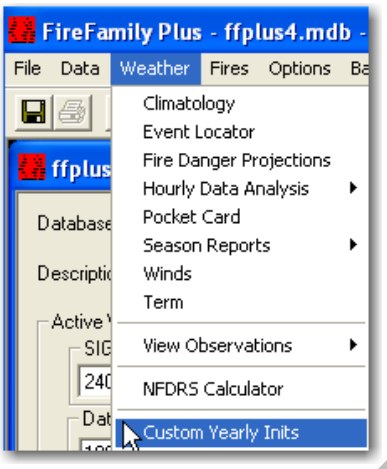
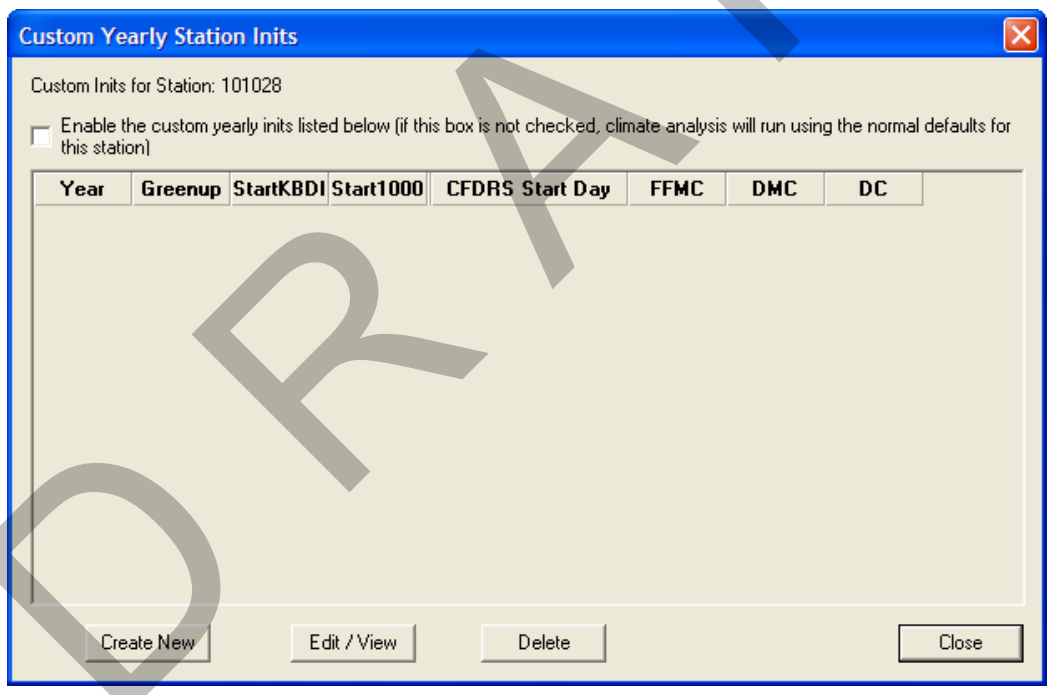


3 The following **Custom Yearly Station Inits** dialog box will open. Use this initial screen to manage the Custom Yearly Station Initialization (Custom Yearly Station Inits).



4 Click on **Create New** and the following screen will appear.

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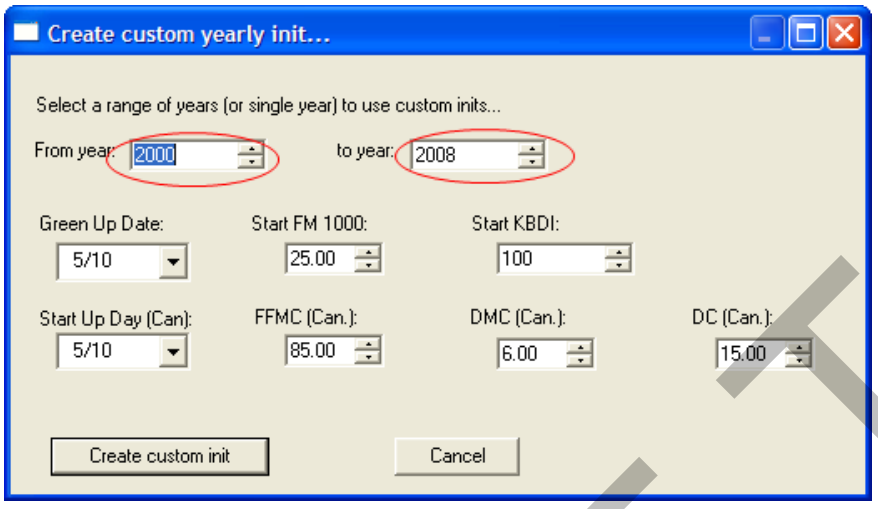
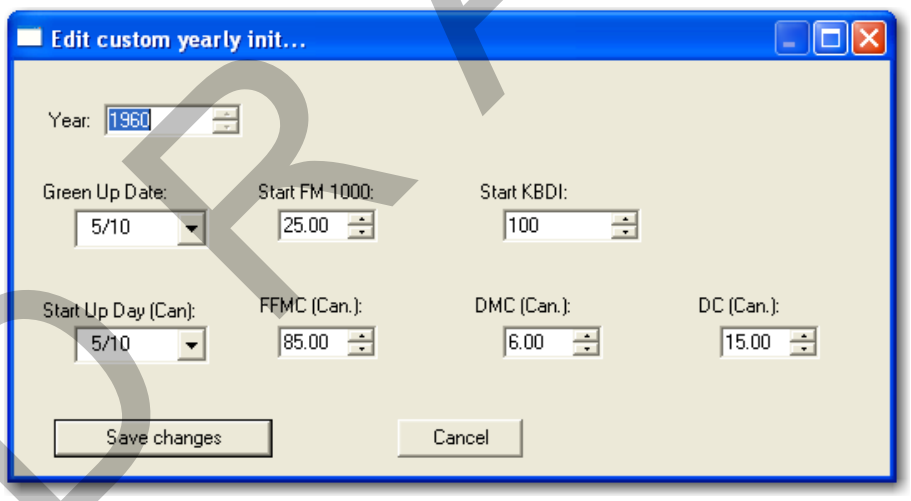


5 Select a range of years to use. The initial start up values, derived from the Station Catalog are already present.

6 Click on **Create custom init** and then check the **Enable the custom yearly inits...** box.

7 To edit, click **Edit/View.** Use the following dialog box to edit greenup dates as you wish.

.



8 **Save changes** as needed.

9 To delete a year, highlight and click **Delete**.

Years are deleted one record at a time.

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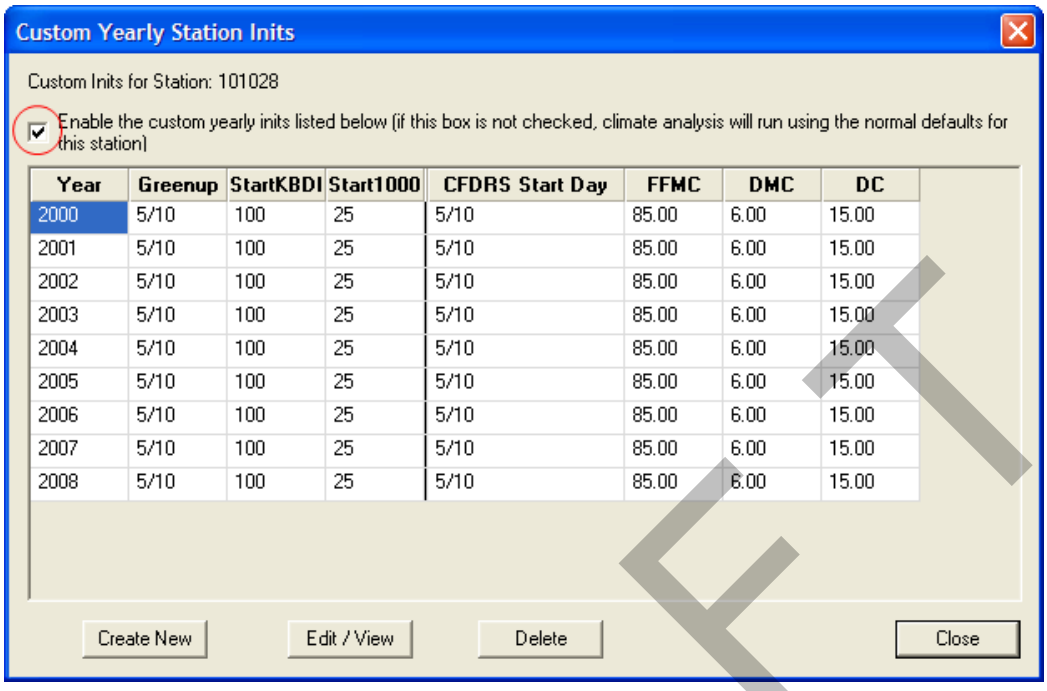
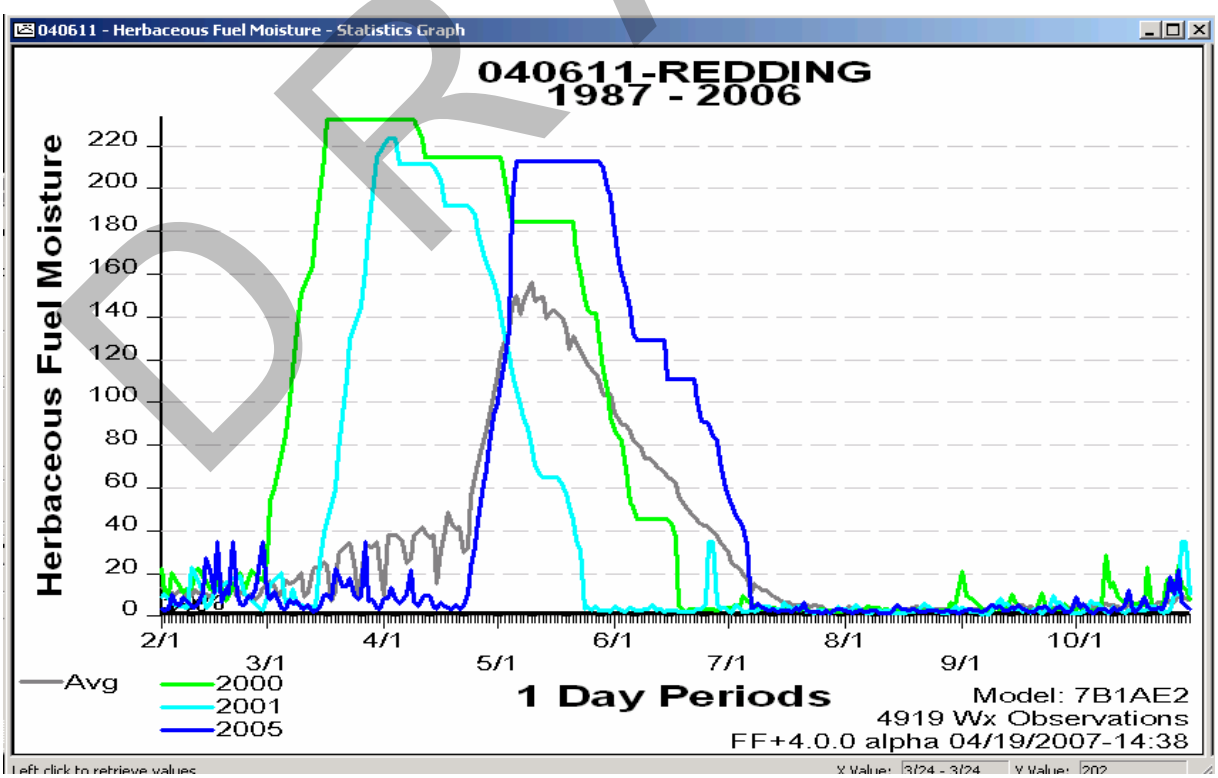


Year	Greenup	StartKBDI	Start1000	CFDRS Start Day	FFMC	DMC	DC
2000	5/10	100	25	5/10	85.00	6.00	15.00
2001	5/10	100	25	5/10	85.00	6.00	15.00
2002	5/10	100	25	5/10	85.00	6.00	15.00
2003	5/10	100	25	5/10	85.00	6.00	15.00
2004	5/10	100	25	5/10	85.00	6.00	15.00
2005	5/10	100	25	5/10	85.00	6.00	15.00
2006	5/10	100	25	5/10	85.00	6.00	15.00
2007	5/10	100	25	5/10	85.00	6.00	15.00
2008	5/10	100	25	5/10	85.00	6.00	15.00

The following example shows different greenup dates in 2000, 2001, and 2005.



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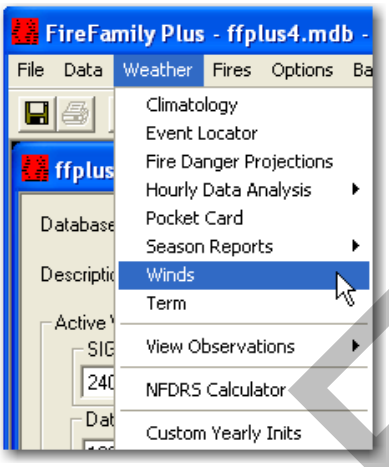
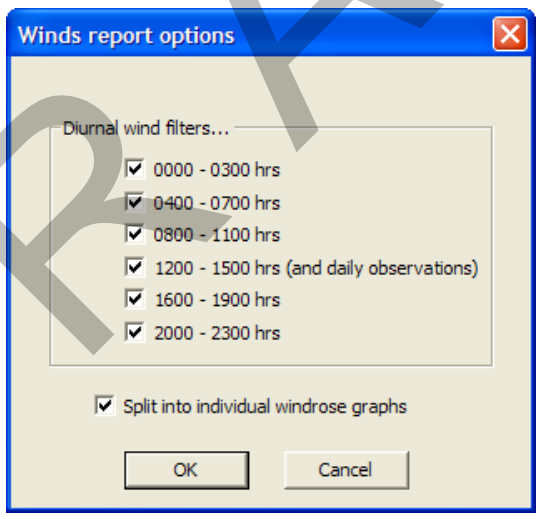
Winds

FireFamily Plus 4.0 includes more advanced sub-daily wind speed/directory display and analysis tools for datasets with hourly data. These tools remain as **Weather -> Winds** menu options.

.



1 Select **Winds** from the **Weather** menu and the following dialog box will open:



You can define six periods of interest for the wind analysis. These analysis periods are divided into the increments shown and can either be combined or split into groups.

2 After selecting the desired analysis period(s) and clicking **OK**, both tabular and graphical wind analyses will be displayed as follows.

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245410 - Wind Frequency Table

```
   Analysis Period Length: 1 days
   Annual filter dates:  April 1  thru  October 31
-----------------------------------------------------
Station Details:
   245410 RED ROCKS              Fuel model: T   (Use 88?: N)

   Slope class: 1   Climate class: 3   Greenup: 05/23   Freeze: 05/23
   Start KBDI:   0  Start FM1000:25   Avg. Precip: 10.00
   FM1 = FM10?  N   Herb Annual?   N   Deciduous?  N
   Aspect:      5   Slope posit.:     Elevation: 6690
   Latitude:   44.70   Longitude: -111.82
   Weighed Stick Moistures Used:   Yes
-----------------------------------------------------
```

Hourly Period: 0000 - 0300 hours

MPH	Direction																
Range	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	Total
1-4	6.0	6.2	5.9	4.3	2.7	1.9	1.6	1.3	1.4	1.1	1.3	1.3	2.1	2.7	3.6	4.9	48.3
4-8	4.1	8.1	5.6	3.7	1.7	1.1	0.8	0.8	0.5	0.5	0.6	1.3	2.0	1.7	1.0	1.3	34.8
8-13	0.4	1.4	0.3	0.3	0.2	0.3	0.4	0.3	0.2	0.1	0.2	0.8	0.8	0.5	0.5	0.3	7.0
13-19	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.1	0.0	0.2	0.1	0.2	0.1	0.1	1.5
19-25	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3
25-32	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
32-39	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
39-47	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
47 +	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total (%)	10.6	15.8	11.8	8.2	4.6	3.3	3.0	2.6	2.1	1.8	2.2	3.6	5.0	5.2	5.3	6.7	92.0
Calm (<1)																	8.0
Ave Speed (MPH)	3.3	4.2	3.5	3.4	3.1	3.6	4.4	4.7	3.3	3.7	3.4	5.2	4.4	4.0	3.5	2.9	3.7

15195 observation records used

This table is an example of the frequency listing of the **Winds** analysis. It shows the frequency of wind speeds binned into categories by both speed and direction.

Wind roses are also displayed using the **Weather -> Winds** option. The length of each bar shows the percentage of data falling into each category and the length of each colored bar within a particular wind direction shows the relative proportion of each wind speed within that category. The bar color/ thickness relates to Wind Speed Category and the bar segment lengths relates to the frequency.

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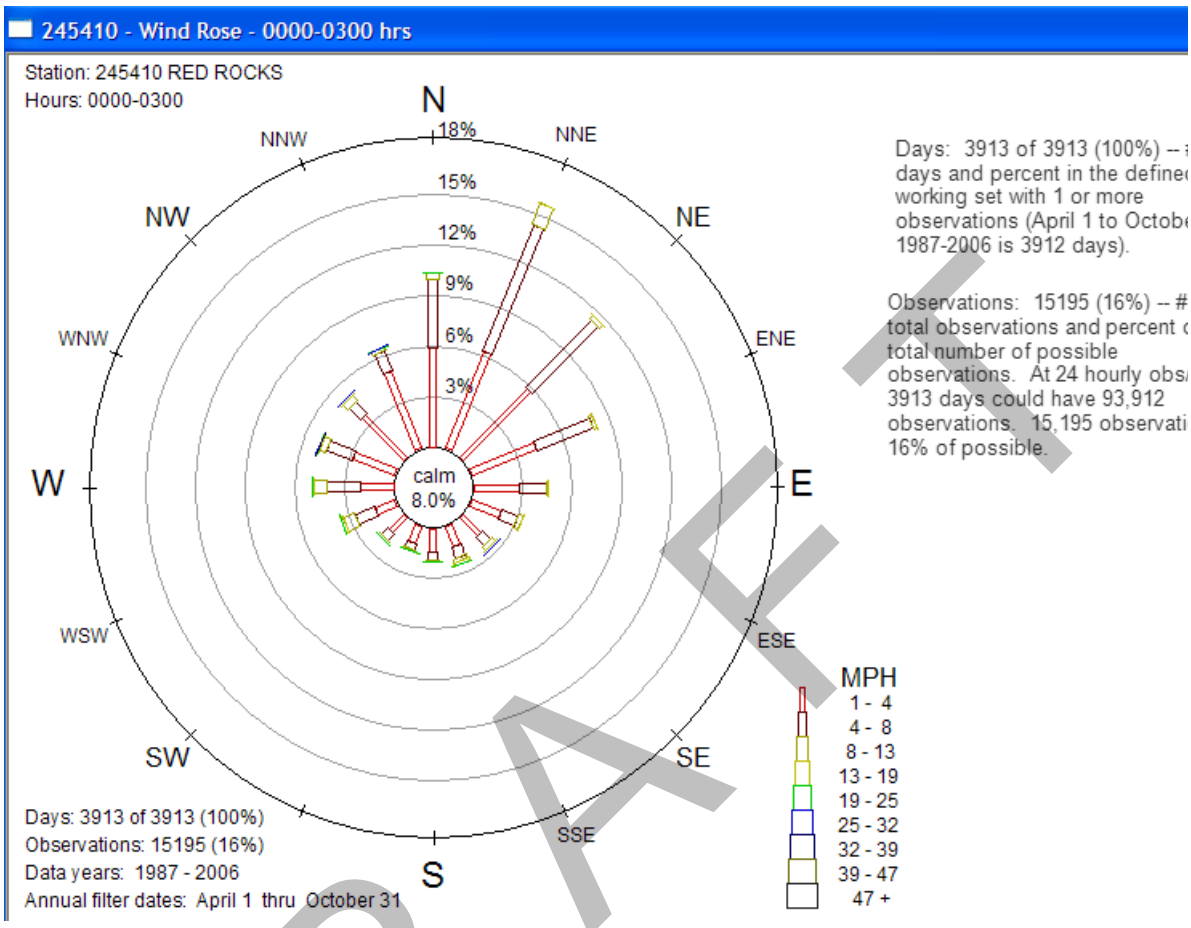

Wind roses generated from hourly data will be separated into 16 wind directions whereas those generated from daily data will use eight wind directions (N, NE, E, SE, S, SW, W, NW, and calm).

To generate a wind report by month

1 Change the **Analysis Period Length (Days)** to **28**.

2 On the **Weather** menu, click **Winds**.

The following **Wind Speed vs. Wind Direction** report shows the prevailing wind speed range and direction for the month of May. Use the scroll bar to review other months.

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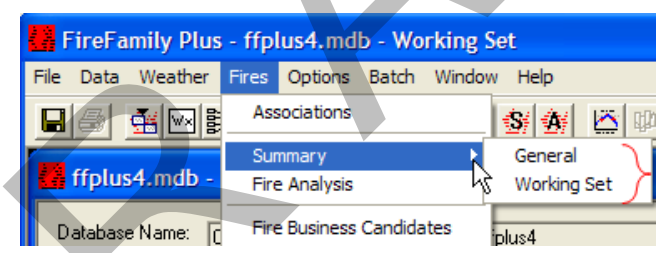
245410 - Wind Speed vs Wind Direction

28-Day Period Beginning 5/1

	Wind Speed, MPH																	
	0 - 3		4 - 7		8 - 12		13 - 18		19 - 24		>24		TOTAL		AVG
Dir	N	PCT	N	PCT	N	PCT	N	PCT	N	PCT	N	PCT	N	PCT	SPEED
NE	671	5.2	842	6.5	207	1.6	68	0.5	8	0.1	5	0.0	1801	13.9	5.1
E	512	4.0	544	4.2	194	1.5	33	0.3	6	0.0	3	0.0	1292	10.0	5.0
SE	360	2.8	514	4.0	305	2.4	196	1.5	35	0.3	11	0.1	1421	11.0	7.3
S	302	2.3	481	3.7	396	3.1	371	2.9	174	1.3	59	0.5	1783	13.8	10.1
SW	234	1.8	424	3.3	451	3.5	215	1.7	61	0.5	15	0.1	1400	10.8	8.7
W	296	2.3	510	3.9	386	3.0	214	1.7	60	0.5	15	0.1	1481	11.5	8.1
NW	367	2.8	273	2.1	302	2.3	220	1.7	54	0.4	18	0.1	1234	9.5	8.2
N	645	5.0	766	5.9	269	2.1	122	0.9	16	0.1	2	0.0	1820	14.1	5.6
CLM	702	5.4											702	5.4	0.0
TOT	4089	31.6	4354	33.7	2510	19.4	1439	11.1	414	3.2	128	1.0	12934	100.0	6.8

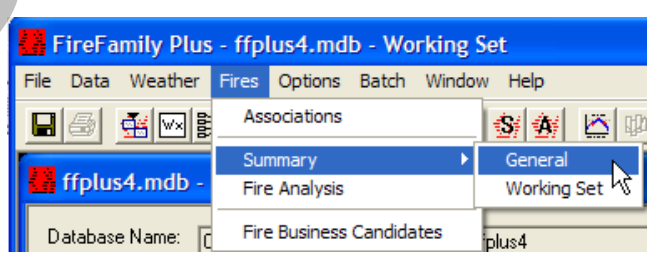
Reviewing fire occurrence data

This section explains how to generate a summary graph of fire occurrence data. You can generate a summary graph of imported fire occurrence data that is completely independent of your working set (**General**), or you can generate a summary graph of fire occurrence data that is contained in your working set (**Working Set**).



To review fire occurrence data by generating summary graphs

1 On the **Fires** menu, select **Summary** and then click **General**.



2 The **Select Fires and Year for General Summary** dialog box will open. Select a **Region**, and any **Units**, **Sub Units** and **Years**.

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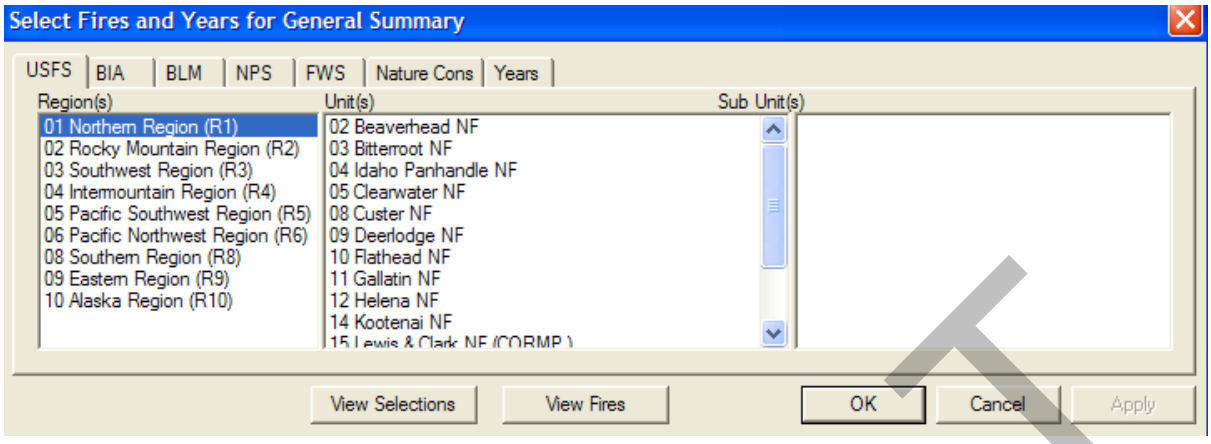
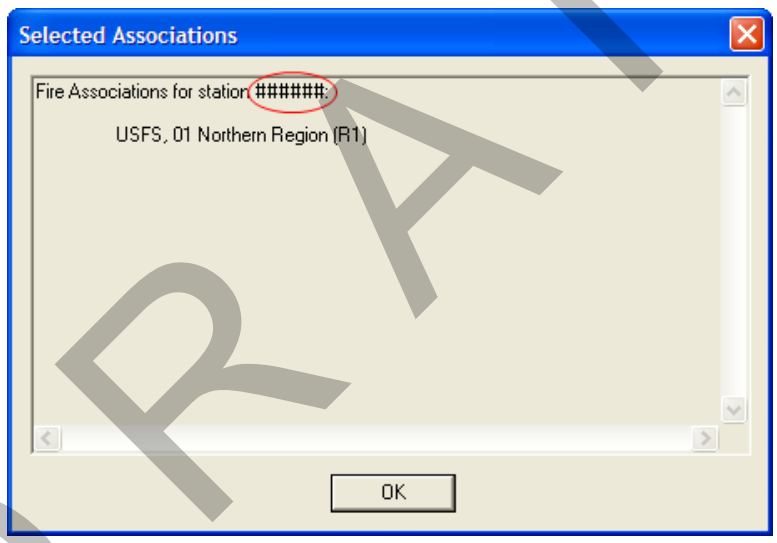


3 To verify that only the desired fire associations are selected, click on the **Fire Associations** button and select **View Selections.** The "#####" indicates that there is no working set association.



4 Click **OK**.

5 Click on the **Years** tab to open the **Select Fires and Years for General Summary** dialog box. Use the **Start Year** and **Finish Year** drop-down menus as shown to select the start and end years of your choice.

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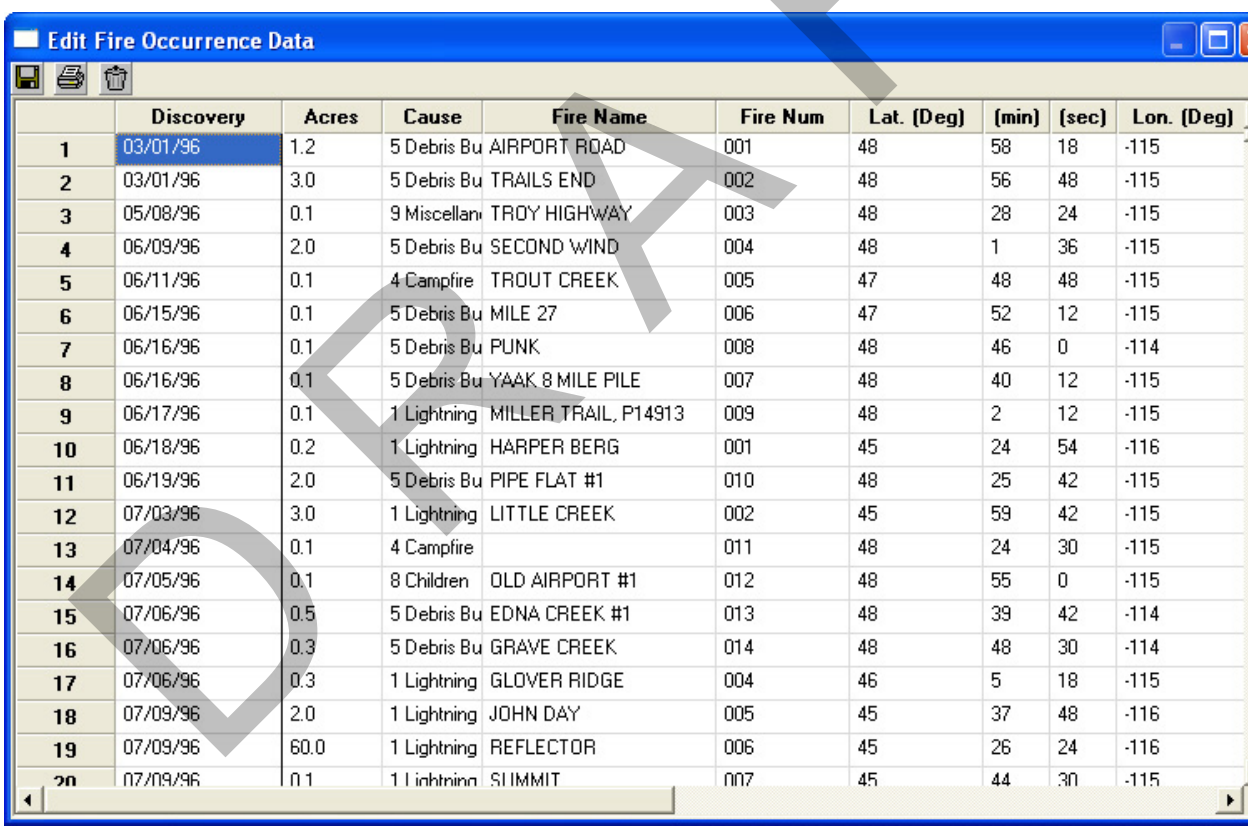
6 To review the fire occurrence data, click on the **View Fires** button.

The following diagram shows the fire occurrence data for 1996 through 2006.



	Discovery	Acres	Cause	Fire Name	Fire Num	Lat. (Deg)	(min)	(sec)	Lon. (Deg)
1	03/01/96	1.2	5 Debris Bu	AIRPORT ROAD	001	48	58	18	-115
2	03/01/96	3.0	5 Debris Bu	TRAILS END	002	48	56	48	-115
3	05/08/96	0.1	9 Miscellan	TROY HIGHWAY	003	48	28	24	-115
4	06/09/96	2.0	5 Debris Bu	SECOND WIND	004	48	1	36	-115
5	06/11/96	0.1	4 Campfire	TROUT CREEK	005	47	48	48	-115
6	06/15/96	0.1	5 Debris Bu	MILE 27	006	47	52	12	-115
7	06/16/96	0.1	5 Debris Bu	PUNK	008	48	46	0	-114
8	06/16/96	0.1	5 Debris Bu	YAAK 8 MILE PILE	007	48	40	12	-115
9	06/17/96	0.1	1 Lightning	MILLER TRAIL, P14913	009	48	2	12	-115
10	06/18/96	0.2	1 Lightning	HARPER BERG	001	45	24	54	-116
11	06/19/96	2.0	5 Debris Bu	PIPE FLAT #1	010	48	25	42	-115
12	07/03/96	3.0	1 Lightning	LITTLE CREEK	002	45	59	42	-115
13	07/04/96	0.1	4 Campfire		011	48	24	30	-115
14	07/05/96	0.1	8 Children	OLD AIRPORT #1	012	48	55	0	-115
15	07/06/96	0.5	5 Debris Bu	EDNA CREEK #1	013	48	39	42	-114
16	07/06/96	0.3	5 Debris Bu	GRAVE CREEK	014	48	48	30	-114
17	07/06/96	0.3	1 Lightning	GLOVER RIDGE	004	46	5	18	-115
18	07/09/96	2.0	1 Lightning	JOHN DAY	005	45	37	48	-116
19	07/09/96	60.0	1 Lightning	REFLECTOR	006	45	26	24	-116
20	07/09/96	0.1	1 Lightning	SUMMIT	007	45	44	30	-115

To sort by any field, right-click on the column heading of your choice. To adjust column width, drag the column heading to the desired width.

7 Close the **Edit Fire Occurrence Data** screen to return to the **Select Fires and General Summary** dialog box.

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8 To generate the Fires Summary graph, click **Fire Summary -> OK**.

The following diagram shows the frequency distributions of total fires and acres by year, fires by month, fires by size class, fires by cause class, and number of fires per fire-day for the Northern Region of the Forest Service.

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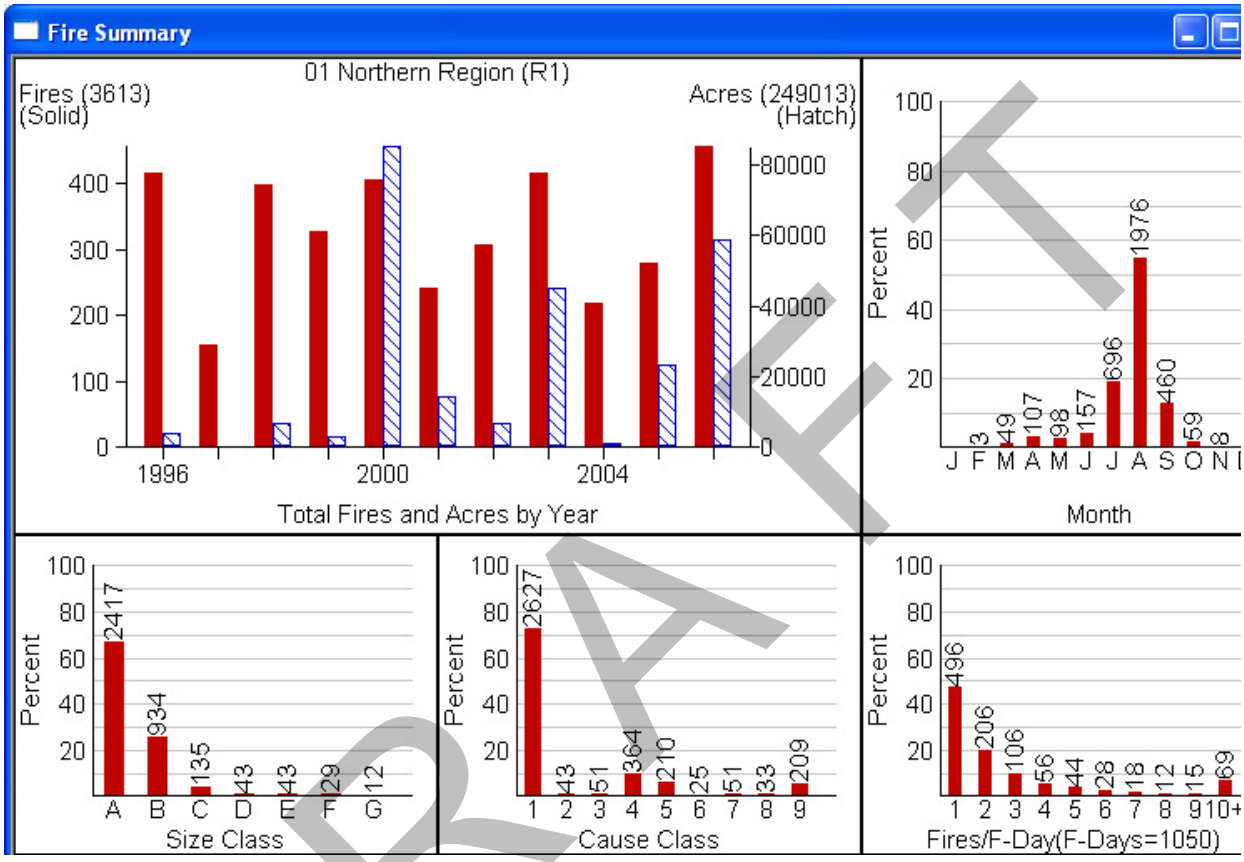

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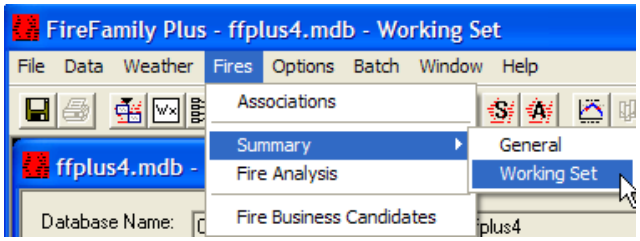
To review the working set fire occurrence data by generating summary graphs

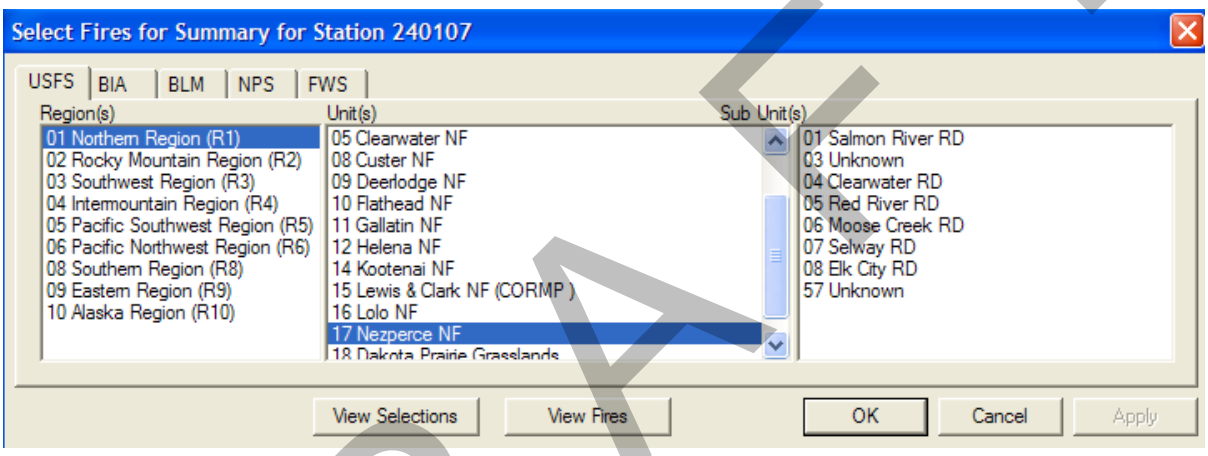
Verify the working set for years and annual filter.

1 From the main tool bar click **Fires -> Summary -> Working Set**.

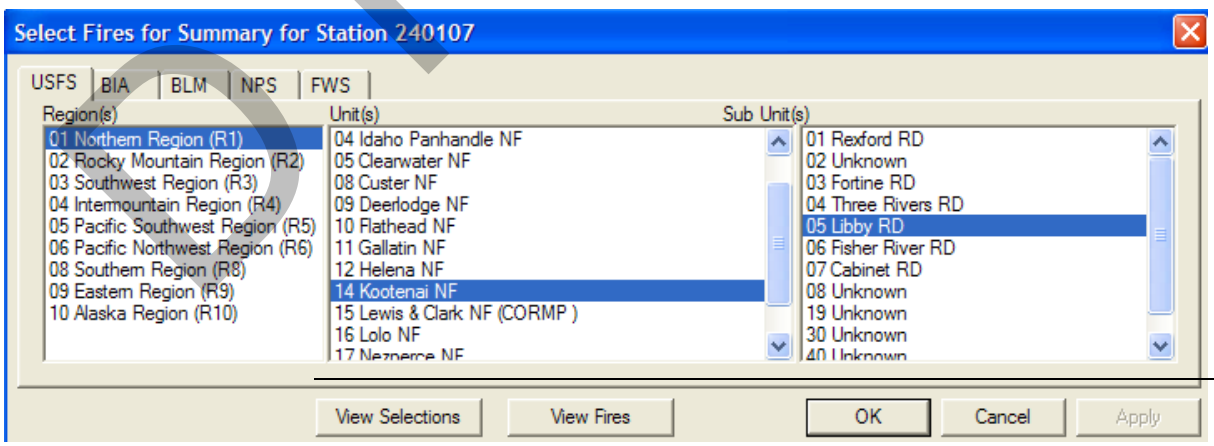


Or, alternately you can click on the **Fires Summary Working Set** icon on the main toolbar.

2 The **Select Fires for Summary** screen will open. In the **Region** column, at least one region must be highlighted for at least one agency. In the **Unit(s)** and **Sub Unit(s)** columns, if a unit is marked, only marked rows are selected. If no rows are marked, all rows associated with the parent region or unit are included. The following example shows selection of USFS, Northern Region, and Nezperce National Forest (all districts).



The example below shows the selection of USFS, Northern Region, Kootenai National Forest and only the Libby Ranger District.



3 To view your complete selection criteria and to verify that only the desired fire associations are selected, click **View Selections.** You should see a screen similar to the following. This example shows fire

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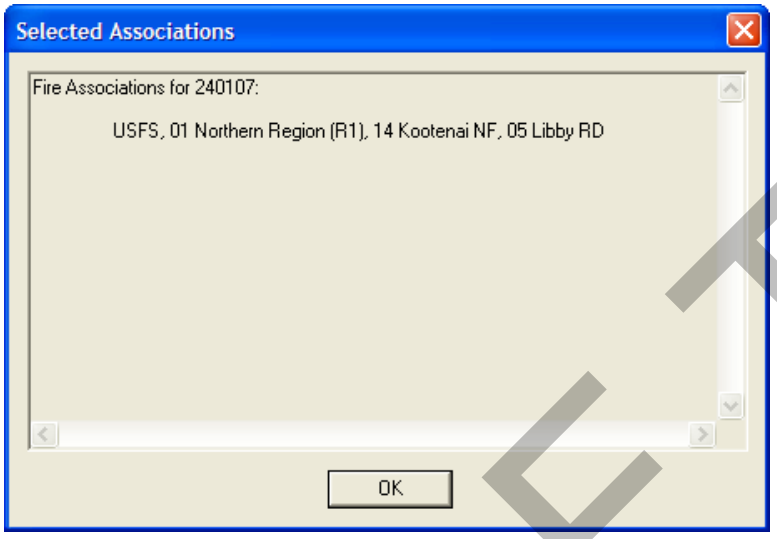
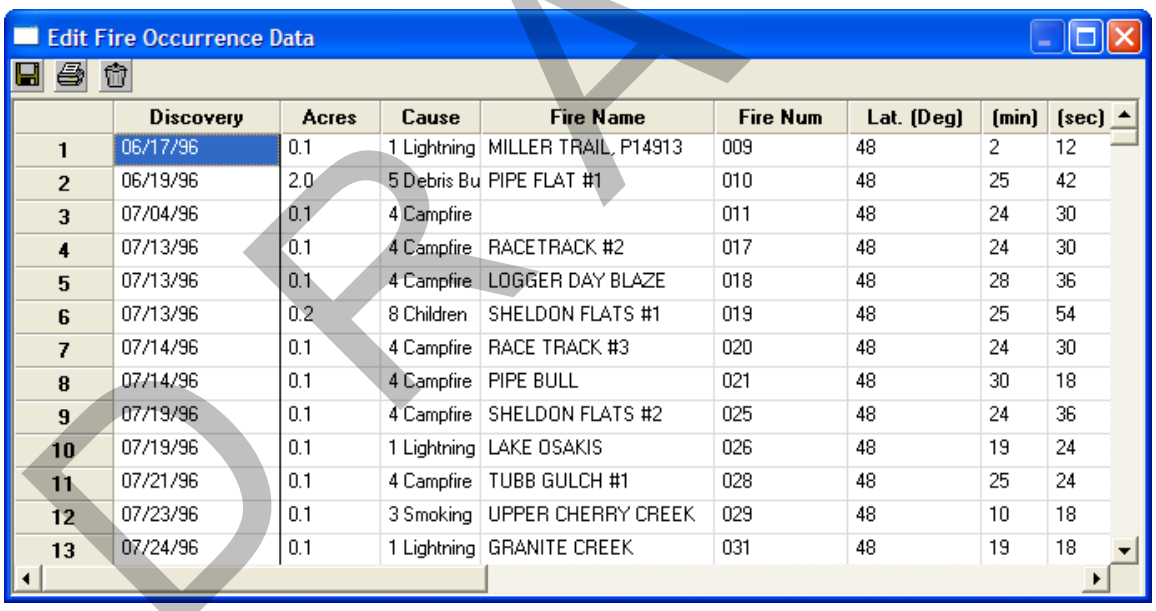
associations for USFS, Northern Region, Kootenai National Forest, and Libby Ranger District.



4 View fire occurrence data by clicking on the **View Fires** button.



	Discovery	Acres	Cause	Fire Name	Fire Num	Lat. (Deg)	(min)	(sec)
1	06/17/96	0.1	1 Lightning	MILLER TRAIL, P14913	009	48	2	12
2	06/19/96	2.0	5 Debris Bu	PIPE FLAT #1	010	48	25	42
3	07/04/96	0.1	4 Campfire		011	48	24	30
4	07/13/96	0.1	4 Campfire	RACETRACK #2	017	48	24	30
5	07/13/96	0.1	4 Campfire	LOGGER DAY BLAZE	018	48	28	36
6	07/13/96	0.2	8 Children	SHELDON FLATS #1	019	48	25	54
7	07/14/96	0.1	4 Campfire	RACE TRACK #3	020	48	24	30
8	07/14/96	0.1	4 Campfire	PIPE BULL	021	48	30	18
9	07/19/96	0.1	4 Campfire	SHELDON FLATS #2	025	48	24	36
10	07/19/96	0.1	1 Lightning	LAKE OSAKIS	026	48	19	24
11	07/21/96	0.1	4 Campfire	TUBB GULCH #1	028	48	25	24
12	07/23/96	0.1	3 Smoking	UPPER CHERRY CREEK	029	48	10	18
13	07/24/96	0.1	1 Lightning	GRANITE CREEK	031	48	19	18

5 You can sort by any column (right-click on the column header), or use the three icons at the upper left to export, print, or delete records.

Hint: The export button allows you to export to a text file or to an ESRI shapefile.

6 Finally, to generate the **Fires Summary** graph, click **OK**. A Fire Summary Graph is created as shown.

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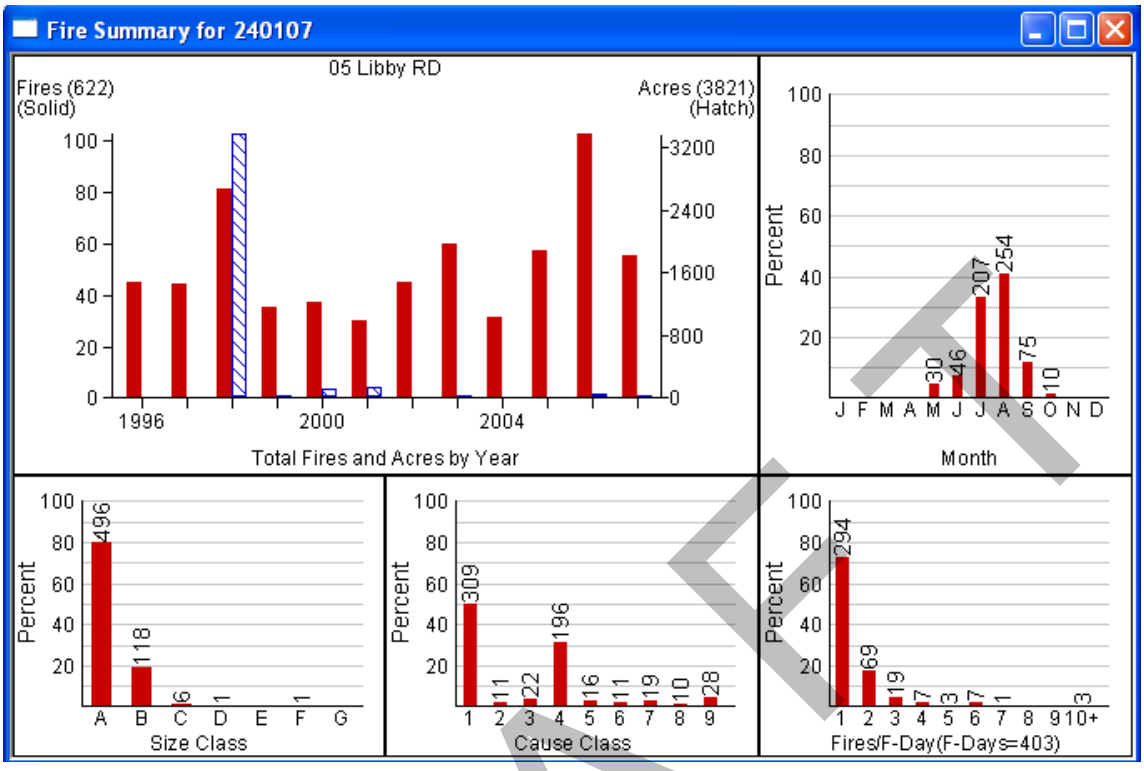
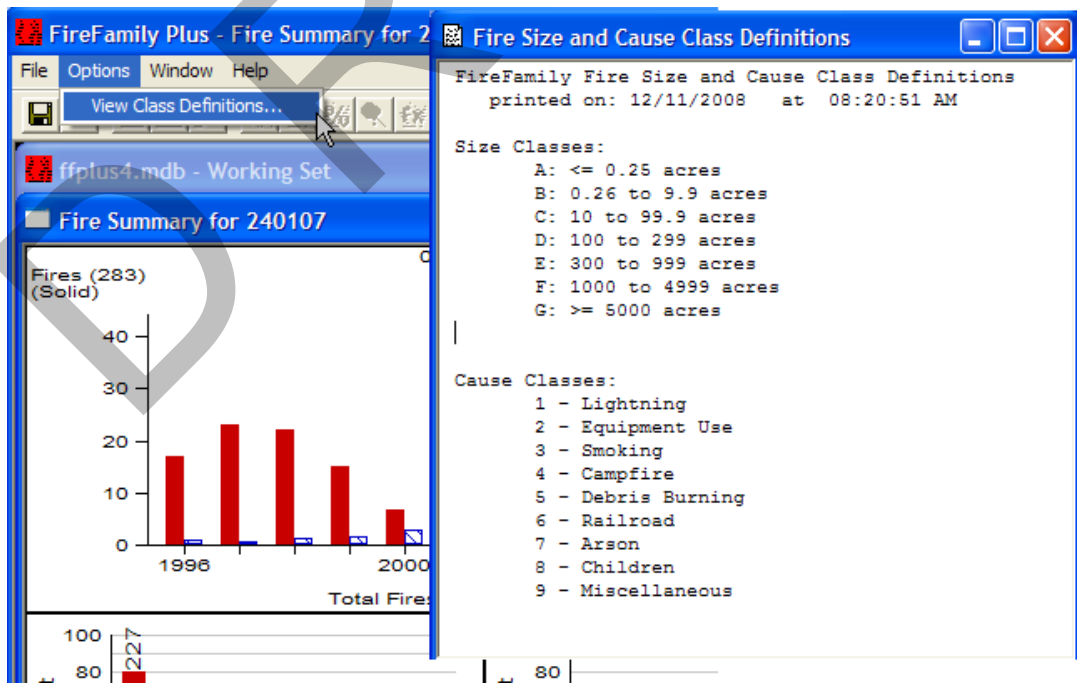


With the **Fire Summary** graph open, you can review fire size and cause by selecting **Options -> View Class Definitions**. The **Fire Size and Cause Class Definitions** report window will open as shown below.



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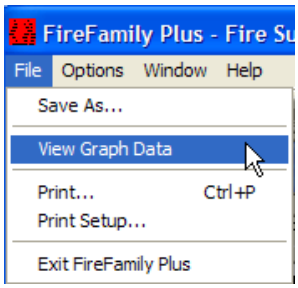
With focus on the **Fire Summary** graph window, you can review Graph Data by selecting **File->View Graph Data**.

Note: The information shown below is displayed diagramatically. The actual format of the information you will see on your screen differs somewhat from this example.



Fire Associations:
01 Rexford RD
05 Libby RD

Year	Fires	Acres
2000	79	26142.4
2001	46	158.0
2002	59	10.2
2003	77	59.2
2004	42	18.7
2005	68	844.2
2006	125	134.7
Total	496	27367.4

Month	Fires	Lightning	Human
1	0	0	0
2	0	0	0
3	0	0	0
4	0	0	0
5	27	4	23
6	43	18	25
7	151	41	110
8	224	157	67
9	38	14	24
10	13	0	13
11	0	0	0
12	0	0	0

(fires are tabulated by total/lightning/human)

Size Class	Fires
A	379
B	98
C	11
D	1
E	4
F	0
G	3

DRAFT

Cause Class	Fires
1	234
2	12
3	17
4	145
5	15
6	6
7	17
8	8
9	42

Num Fires	Fires per Day(297 Fire-Days)
1	205
2	62
3	12
4	2
5	4
6	4
7	4
8	1
9	0
10+	3

Fire Size Percentiles Distribution

Percentile	Size (Acres)
69	0.1
70	0.2
75	0.2
80	0.3
85	0.5
90	1.2
91	1.5
92	2.0
93	3.0
94	4.4
95	5.0
96	8.5
97	12.0
98	25.0
99	785.0
100	11115.0

*The **Fire Size Percentiles Distribution** (left panel) is not displayed graphically. It gives the fire size cumulative distribution for the current analysis set. Notice that the "low" percentile are ignored and do not start until fire sizes of 0.1 acres. From whatever that point may be, the results are tabulated by 5 percentile increments to the 90th percentile, then by 1 percentile increments from the 90th to 100th (largest fire). This is a way to assist in determining values to use for "candidate" large-fire thresholds.*

*Remember to use the **Data Years** drop-down menu in your **Working Set** window to match the desired years of fire data coverage.*

Using the Event Locator

The **Event Locator** allows you to locate, count, and list dates of specified weather events that occur on a single day or over consecutive strings of days. You can use the Event Locator to search for events or combinations of events based on weather values and/or calculated indices. The Event Locator is useful for searching for rare occurrences or for checking for bad or erroneous data.

For example, as a fire manager, and with the help of local expertise, you must decide what kind of weather will stop fire spread. An event is a single item or combination of weather and NFDRS parameters that meet your specified

DRAFT

conditions. You can define these conditions as those that occur on a single day, or those that occur over a string of consecutive days.

The Event Locator allows you to:

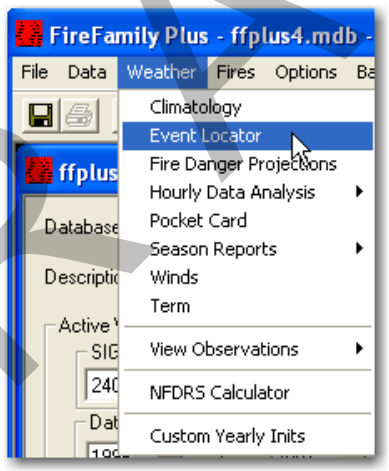
- Find dry spells, such as periods of time when there was no rainfall.
- Inspect the database for suspect data, such as listing the days when the wind exceeded 50 miles per hour.
- List five-day periods where .2 inches or more of rain fell, thus causing a fire-ending event.

The Event Locator allows you to use the following categories to identify particular values:

- **Sum:** The summed, or total, of the variable.
- **Avg:** The average of the variable for the period.
- **Min:** The minimum value in the string.
- **Max:** The maximum value in the string.
- **Daily:** The daily value in the string.

To use the Event Locator

1 Click on **Weather -> Event Locator**.



The **Event Locator** dialog box will open as shown.

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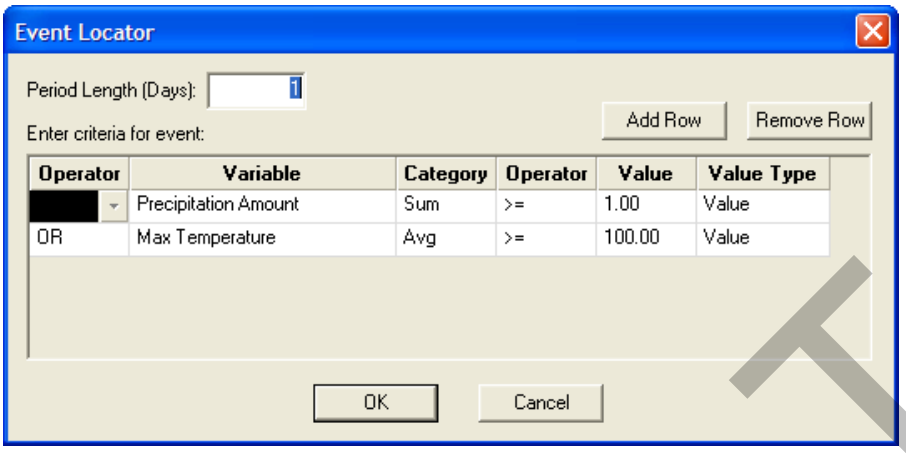

2 Set the **Period Length** by typing in a number in the box as shown. The **Period Length** is the length (in consecutive days) that is required to match the criteria in the query table. For this example, type in "**5**."

The Event Locator Period Length is independent from the Analysis Period Length of the Working Set. However, the Data Years and Annual Filter in the Working Set do limit data used by the Event Locator.

3 Fill in the first row of the **Event Locator** query table. (You may enter up to three rows). Each row is one condition on a Fire Family Plus analysis variable. Click in the field area to obtain a drop-down menu for each field option. In the following example, **Precipitation Amount** has been selected.

4 Select a **Category** from the drop-down menu provided. In this example, "**Sum**" has been selected.

5 Next, choose an **Operator** and **Value**. In the following example select >= and **2.00**.

6 Select a **Value Type** from the drop-down menu.

*The **Value Type** defines whether the value is a "fixed" value or the value of a variable at a fixed percentile level. Percentile values are dependent on the current working set definition (years, annual filter, fuel model, etc.).*

7 Click **Add Row**.

8 Finally choose an appropriate **Operator** for constructing your query. You must select either **AND** or **OR** to combine the conditions. Select **AND** and complete the **Event Locator** dialog box as shown.

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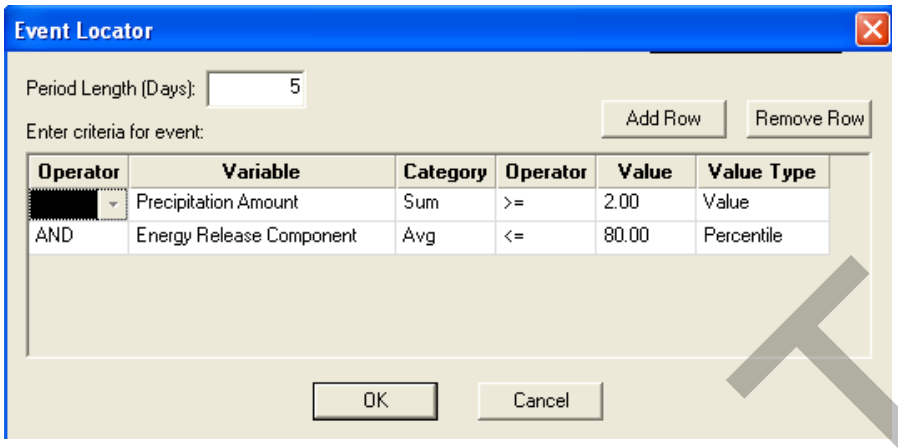
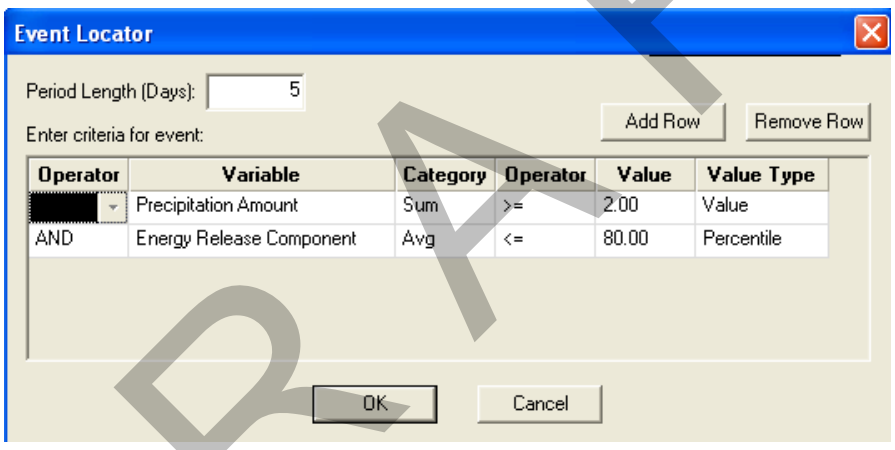


9 Click **OK** when the dialog box is complete.

This example searches for a 5-day total of 2.00 or more inches of rain and a 5-day average ERC below or equal to the 80th percentile.



For this Working Set, the 80th percentile is 18.00. As shown below, there are nine occurrences of these events.

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```
Event Definition:
    Sum(Precipitation Amount) >= 2.00
    AND Avg(Energy Release Component) <= 80.00 Percentile (18.00)

         5-Day Periods

DATE         Rain    ERC
--------------------------
05/31/1999    2.40   7.60
09/27/2000    2.49   7.00
10/09/2001    2.50   5.00
05/26/2004    2.03   0.00
07/15/2004    2.01  17.60
08/21/2004    2.09   4.20
09/10/2004    2.52   3.80
10/29/2005    2.23   0.20
11/02/2006    2.64   1.20

9 hits out of 4657
2391 rejects for no/missing observations

FF+4.0 11/06/2008-14:37
```

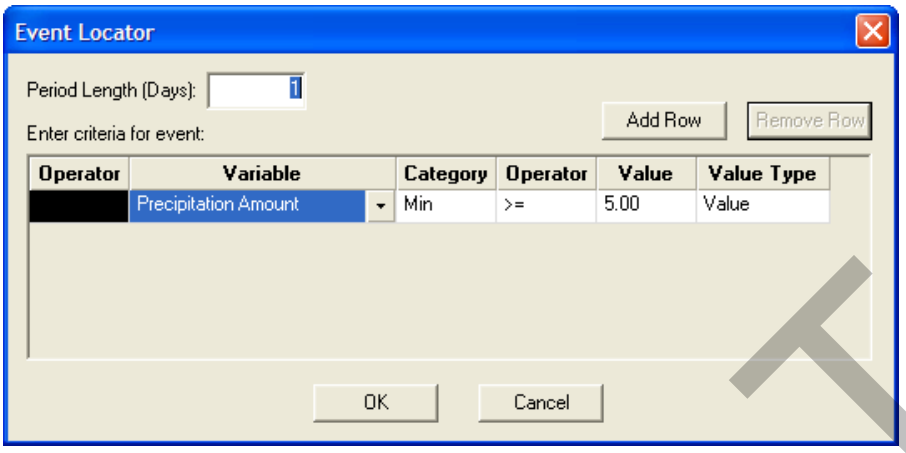
To search for erroneous data - an example

This example explains how to search for precipitation amounts greater than or equal to 5 inches per day.

1. On the **Weather** drop-down menu, click **Event Locator.**
2. In the **Period Length (Days)** box, type **1** and then press **TAB** twice.
3. In the **Variable** box, select **Precipitation Amount**, and then press **TAB.**
4. In the **Category** box, select **Min**, and then press **TAB.**
5. In the **Operator** box, select >=, and then press **TAB**.
6. In the **Value** box, type **5.0** and then press **TAB**.
7. In the **Value Type** box, select **Value**, and then click **OK**.

The following diagram shows the **Event Locator** dialog box for searching for daily precipitation amounts greater than 5 inches.

DRAFT



The following diagram shows the resulting FireFamily Plus **Events** report for weather station "101028."

101028 - Events

```
FireFamily Plus Event Locator Report
   Listing of Selected Events
   printed on: 10/24/2008   at  03:03:28 PM  (from run # 13)
   using database: C:\Program Files\FireFamilyPlus 4\ffplus4

-------------------------------------------------------
Active Working Set:
   Station: 101028  - MOOSE CREEK
   Data years:  1996 - 2006
   Analysis Period Length: 1 days
   Annual filter dates:  April 1  thru  October 31
-------------------------------------------------------
Station Details:
   101028 MOOSE CREEK          Fuel model: H   (Use 88?: N)

   Slope class: 3   Climate class: 3   Greenup: 05/10   Freeze: 05/10
   Start KBDI: 100  Start FM1000:25   Avg. Precip: 32.60
   FM1 = FM10?  N   Herb Annual?   N   Deciduous?  N
   Aspect:      0   Slope posit.:     Elevation: 2460
   Latitude:   46.12   Longitude: -114.90
   Weighed Stick Moistures Used:   Yes
-------------------------------------------------------


Event Definition:
    Min(Precipitation Amount) >= 5.00

         1-Day Periods

DATE         Rain
-------------------

0 hits out of 2354
309 rejects for no/missing observations
```

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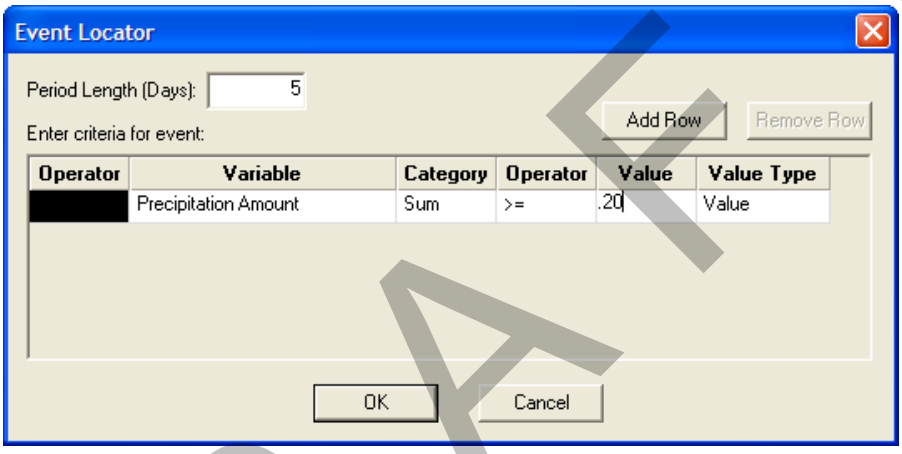
To search for a fire-ending event - an example

This example explains how to search for five-day periods with precipitation amounts greater or equal to .2 inches. The fire is assumed to start on August 5th on the Nez Perce National Forest, in an area that is well-represented by the Moose Creek weather station, "101028."

1 On the **File** drop-down menu, click **Open** and then select the active Working Set of your choice.

2 In the beginning **Month** and **Day** boxes, select **August 6**.

3 On the **Weather** menu, click **Event Locator**. The **Event Locator** dialog box shown below will open.



4 In the **Period Length (Days)** box, type **5**.

5 In the **Variable** box, select **Precipitation Amount**, and then press **TAB**.

6 In the **Category** box, select **Sum**, and then press **TAB**.

7 In the **Operator** box, select >=, and then press **TAB**.

8 In the **Value** box, type **.20** and then press **TAB**.

9 In the **Value Type** box, select **Value**, and then click **OK**.

The following diagram shows the **Event Locator** dialog box for determining five-day periods of precipitation amounts greater than or equal to .2 inches.

The following diagram shows the resulting **Events Report**.

DRAFT

101028 - Events

```
FireFamily Plus Event Locator Report
   Listing of Selected Events
   printed on: 10/24/2008   at  03:09:33 PM  (from run # 13)
   using database: C:\Program Files\FireFamilyPlus 4\ffplus4

-------------------------------------------------------
Active Working Set:
   Station: 101028  - MOOSE CREEK
   Data years:  1996 - 2006
   Analysis Period Length: 1 days
   Annual filter dates:  August 6  thru  October 31
-------------------------------------------------------
Station Details:
   101028 MOOSE CREEK            Fuel model: H   (Use 88?: N)

   Slope class: 3   Climate class: 3   Greenup: 05/10   Freeze: 05/10
   Start KBDI: 100  Start FM1000:25   Avg. Precip: 32.60
   FM1 = FM10?  N   Herb Annual?   N   Deciduous?  N
   Aspect:      0   Slope posit.:     Elevation: 2460
   Latitude:   46.12   Longitude: -114.90
   Weighed Stick Moisture Used:   Yes
-------------------------------------------------------


Event Definition:
    Sum(Precipitation Amount) >= 0.20

         5-Day Periods

DATE         Rain
-------------------
08/24/1996    0.21
09/01/1996    0.33
09/11/1996    0.48
09/16/1996    0.57
10/10/1996    0.41
```

1st day of five-day period

The rain may have all fallen on the first day, all on the last day, or somewhere in between. Note that several season-ending events have occurred within a single year.

Be certain of your active working set. If it defines only a subset of your data, the computed percentile may not reflect what you really want.

*To use the **Event Locator** on a data subset and a percentile-related value as your threshold criteria, generate a statistical table to determine that threshold, then enter it in the **Value** box in the **Event Locator** dialog box. For more information, see "Reviewing weather data and generating reports," earlier in this chapter.*

To perform a more complex query - an example

In this example, you will add ERC as a variable to check the season ending date, given that the maximum ERC during that five-day period with rain remains below the 67th percentile.

1 On the **Weather** menu, click **Event Locator**.

2 In the **Period Length (Days)** box, type **5**.

DRAFT

*To add a new row, click **Add Row**. To delete a row, press **REMOVE ROW**.*

3 Click the **Operator** arrow, select **AND**, and then press **TAB**.

4 In the **Variable** box, select **Energy Release Component**, and then press **TAB**.

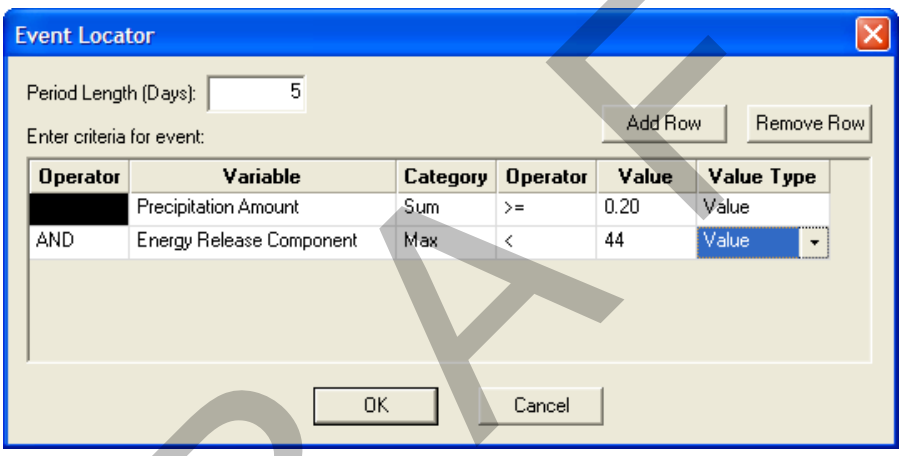
5 In the **Category** box, select **Max**, and then press **TAB**.

6 In the **Operator** box, select <, and then press **TAB**.

7 In the **Value** box, type **44** and then press **TAB.**

8 In the **Value Type** box, select **Value**, and then click **OK**.

The following diagram shows the completed **Event Locator** dialog box that allows you to determine five-day periods when ERC is no more than 44 and precipitation is .2 inches or more.



The following diagram shows the resulting **Events** report of Selected Events for weather station "101028" for the Annual Filter dates of May 1st through December 31st.

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.

101028 - Events

```
FireFamily Plus Event Locator Report
   Listing of Selected Events
   printed on: 10/24/2008   at  03:17:31 PM  (from run # 13)
   using database: C:\Program Files\FireFamilyPlus 4\ffplus4

-------------------------------------------------------
Active Working Set:
   Station: 101028  - MOOSE CREEK
   Data years:  1996 - 2006
   Analysis Period Length: 1 days
   Annual filter dates:  May 1  thru  December 31
-------------------------------------------------------
Station Details:
   101028 MOOSE CREEK            Fuel model: H   (Use 88?: N)

   Slope class: 3   Climate class: 3   Greenup: 05/10   Freeze: 05/10
   Start KBDI: 100  Start FM1000:25   Avg. Precip: 32.60
   FM1 = FM10?  N   Herb Annual?   N   Deciduous?  N
   Aspect:      0   Slope posit.:     Elevation: 2460
   Latitude:   46.12   Longitude: -114.90
   Weighed Stick Moistures Used:   Yes
-------------------------------------------------------


Event Definition:
    Sum(Precipitation Amount) >= 0.20
    AND Max(Energy Release Component) < 44.00

         5-Day Periods

DATE         Rain    ERC
--------------------------
06/19/1996    0.30  12.00
06/24/1996    0.89   8.00
08/24/1996    0.21  30.00
09/01/1996    0.33  23.00
09/11/1996    0.48  19.00
09/16/1996    0.57   6.00
10/10/1996    0.41  10.00
10/15/1996    1.65   1.00
```

If you are unsure whether the date represents the end of season or which date to use, generate an ERC graph and create an overlay of the year of your choice. If the ERC remains low, you have found the season ending date.

For more information about determining the ERC and weather percentile for the previous example, see Chapter 7, "Working with fire analysis tools," later in this guide.

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Using the NFDRS Calculator

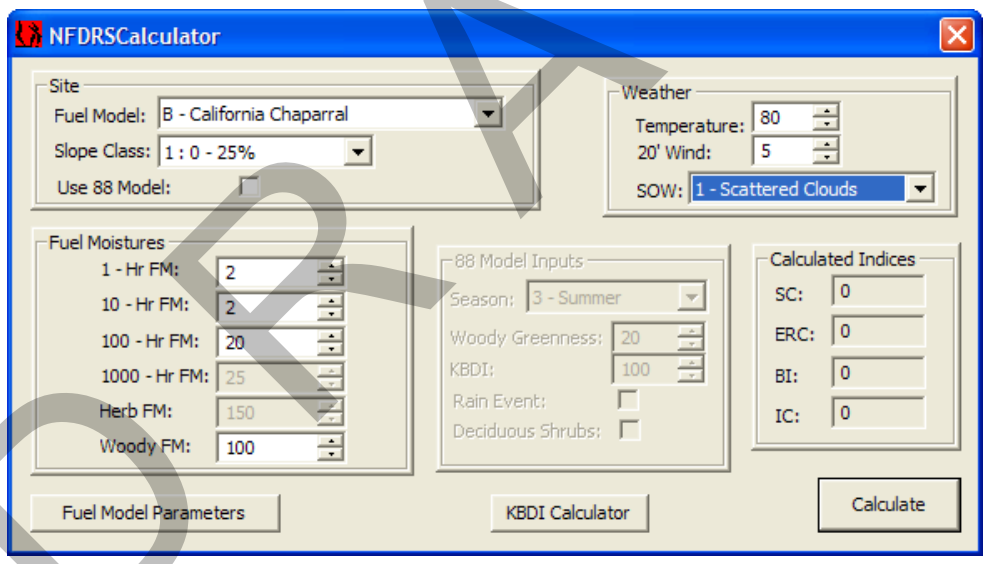
The NFDRS calculator is a tool that allows you to calculate NFDRS indices based on the information you enter. Although you must have FireFamily Plus version 4.0 installed on your computer, you can use the NFDRS calculator by itself or in conjunction with other fire analysis software applications. The NFDRS calculator allows you to:

- Perform NFDRS sensitivity analysis.
- Compare outputs between fuel models, such as comparing fuel model "A" to "B" or the years "78" with "88."
- Calculate Keetch-Byrum Drought Index (KBDI). Review and compare parameters among fuel models.

To use the NFDRS calculator

1 Click **NFDRS Calculator** on the **FireFamily Plus** toolbar.

*You can also click on the **NFDRS Calculator** on the **Weather** menu.*



2 Select the **Fuel Model** and **Slope Class** of your choice by using the drop-down menus provided.

3 Check the **Use 88 Model** box if appropriate.

4 Fill in the **Temperature** (in degrees F), **20' Wind** (mph), and **SOW** text boxes as appropriate.

Remember that Temperature and SOW (State of the Weather) affect Ignition Component, whereas 20' Wind affects Spread Component (SC) and Burning Index (BI).

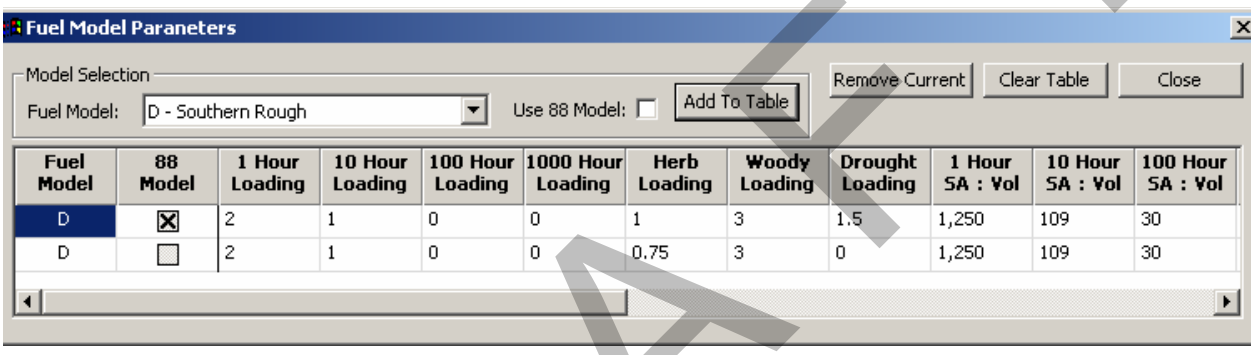
DRAFT

5 Type in the values or use the spinner to select the **Fuel Moistures** for the selected fuel model.

Moisture classes that are unavailable for the selected fuel model appear dimmed.

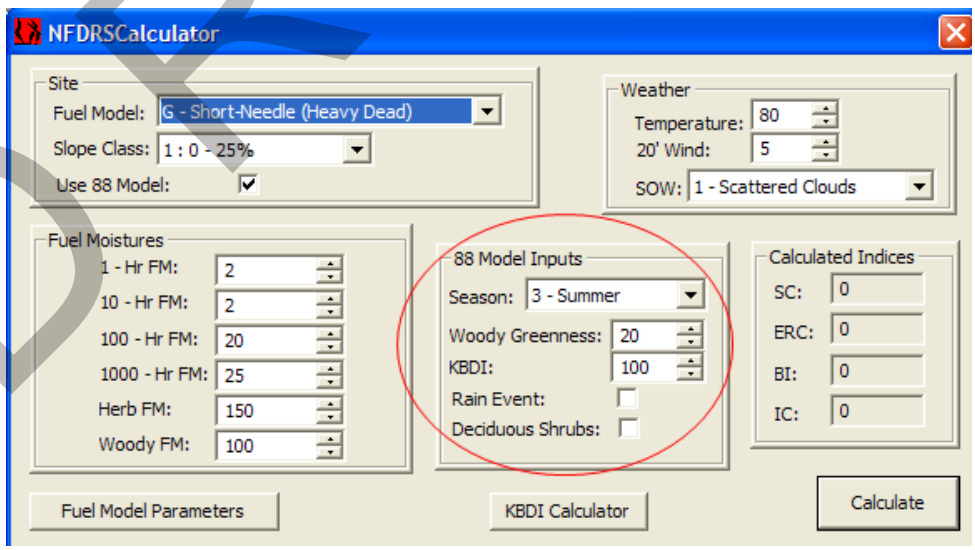
6 Complete the **88 Model Inputs** if appropriate.

7 If you wish to view or compare fuel model parameters, click on the **Fuel Model Parameters** button (lower left) to bring up the following dialog box. Here you can select a fuel model. Each time you click **Add to Table** a row is added to the table with the model parameters. The example below shows the differences in the 1978 and 1988 Fuel Model D - Southern Rough. The information table is available as long as the Calculator application is open.



Fuel Model	88 Model	1 Hour Loading	10 Hour Loading	100 Hour Loading	1000 Hour Loading	Herb Loading	Woody Loading	Drought Loading	1 Hour SA : Vol	10 Hour SA : Vol	100 Hour SA : Vol
D	☒	2	1	0	0	1	3	1.5	1,250	109	30
D	☐	2	1	0	0	0.75	3	0	1,250	109	30

8 If you know the KBDI value you want to use, you can enter it directly in the **1988 Inputs** section of the **NFDRS Calculator** dialog box.



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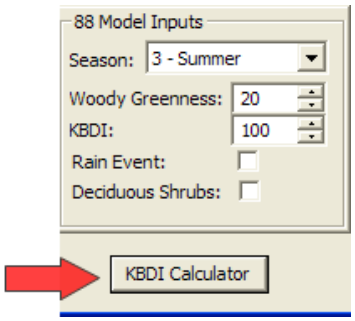
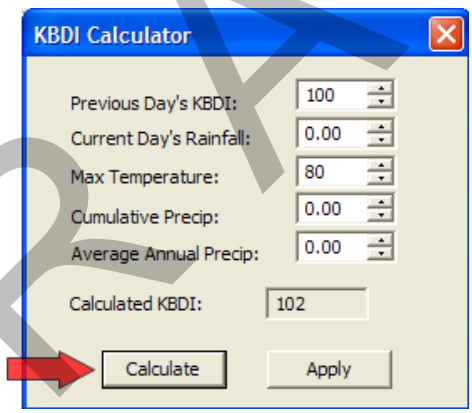


Or, you can click on the **KBDI Calculator** button and enter the required inputs. The cumulative precipitation value (**Cumulative Precip**) is used to determine if the first 0.20 inches of the current day rainfall is subtracted from the net effective rainfall. Cumulative precipitation is set to zero any day there is no rain. If there is rainfall of 0.05 inches five days in a row, the cumulative precipitation value would be 0.05, 0.10, 0.15, 0.20, and 0.25 on days 1, 2, 3, 4, and 5 respectively. In computing the KBDI, the net effective rainfall would 0 on days 1, 2, 3, and 4, and 0.25 on day 5. The KBDI will be calculated and transferred to the input box for **88 Model Inputs** when you click on **Apply.** When finished click **Calculate**.



9 When finished entering all values, click **Calculate** on the **NFDRS Calculator** dialog box.

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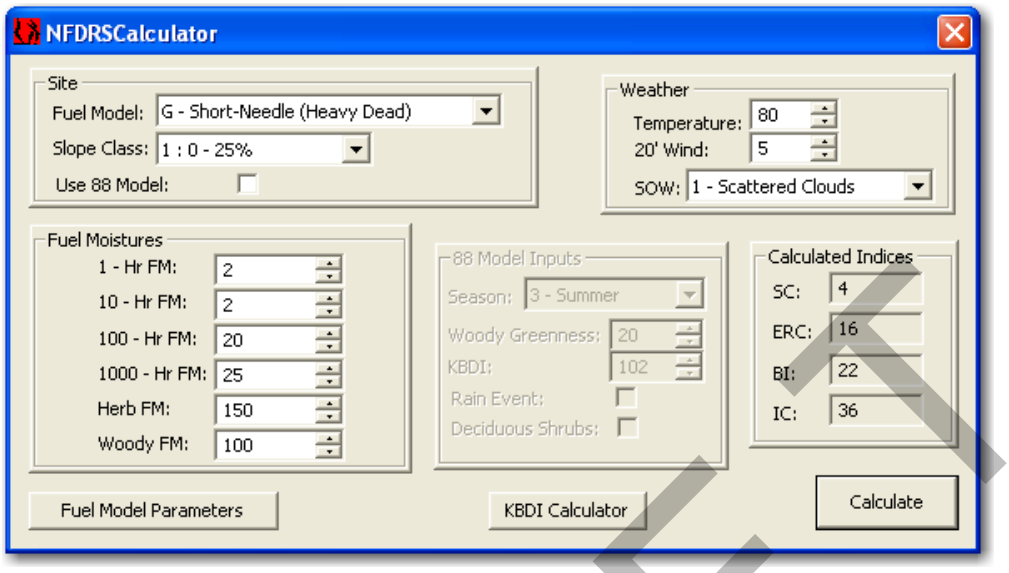
NFDRSCalculator
Site
Fuel Model: G - Short-Needle (Heavy Dead)
Slope Class: 1 : 0 - 25%
Use 88 Model:
Weather
Temperature: 80
20' Wind: 5
SOW: 1 - Scattered Clouds
Fuel Moistures
1 - Hr FM: 2
10 - Hr FM: 2
100 - Hr FM: 20
1000 - Hr FM: 25
Herb FM: 150
Woody FM: 100
88 Model Inputs
Season: 3 - Summer
Woody Greenness: 20
KBDI: 102
Rain Event:
Deciduous Shrubs:
Calculated Indices
SC: 4
ERC: 16
BI: 22
IC: 36
Fuel Model Parameters
KBDI Calculator
Calculate

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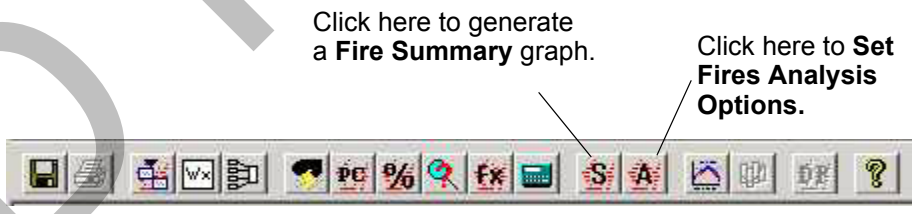
Chapter 7. Working with fire analysis tools

This chapter explains how to view and interpret combined weather and fire occurrence data using the fire analysis and decision points tools of FireFamily Plus. These tools will help you perform a variety of fire analysis functions, including:

- Performing cumulative and probability fire analysis.
- Evaluating cumulative fires analysis graphs.
- Evaluating fires probability analysis graphs.
- Setting decision points.
- Reviewing the decision points graph.
- Changing decision points to reflect fire business.
- Working with fire business candidates list.

As you read this chapter, keep in mind that FireFamily Plus allows you to:

- Interpret danger indices by relating danger indices to fire activity based on a percentage or probability basis. In addition, you can use fire analysis to select an appropriate fuel
- Choose the most appropriate fuel model and index. FireFamily Plus tools offer an objective way to evaluate the many indices and fuel models.
- Evaluate representative weather stations. By comparing fire activity in a management area to indices that are based on weather data from several area stations, you can determine which stations are most representative of fire business.
- Set better decision thresholds. Historically, critical levels for an index have been defined from percentile levels without regard to fire activity. By integrating weather and fire activity, you can better determine percentile levels to suit a variety of fire management needs.



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Performing cumulative and probability fire analysis

This section explains how to use FFP to generate graphs that identify statistical relationships between weather indices and fire occurrence. These relationships are established by fire associations with a weather station. For every day of weather, the following is determined:

- Was a fire discovered? If so, the day is marked as a “fire day.”

- If a day is marked as a "fire day," did any fire discovered on that day exceed your definition of a large fire? If yes, the day further denoted as a "large fire day."
- If a fire day is identified as a "fire day," were more fires than defined by your multiple fire day limit discovered? If so, the day is further designated as a "multiple fire day."

This determination creates four distributions: "All Days," "Fire Days," "Large Fire Days," and "Multiple Fire Days."

The Interactive Batch function in FireFamily Plus 4 (See Chapter 12) allows you to quickly review these relationships among stations, SIGS, weather/ indices and fuel models. The analysis principles are the same as described here.

***Note**: You should always review the working set parameters (stations, dates, and fire associations) before using fire analysis tools. Also make sure you have fire occurrence history for each of your weather years. For example, if you had weather data for the period 2000 to 2008 but only fire history for the years 2000 to 2007, the analysis years should be 2000 to 2007. Having no fires (as opposed to no data) is valid. For example if no fires occurred in 2005 the analysis years of 2000 to 2007 are valid.*

The examples shown in this chapter use Energy Release Component (ERC) which reflects a good fire business indicator for our sample data set. Your weather and fire occurrence datasets may not show strong correlations. You will want to analyze several fuel models and indices when preparing your analysis

The following diagrams show the example working set and fire associations used in this chapter.

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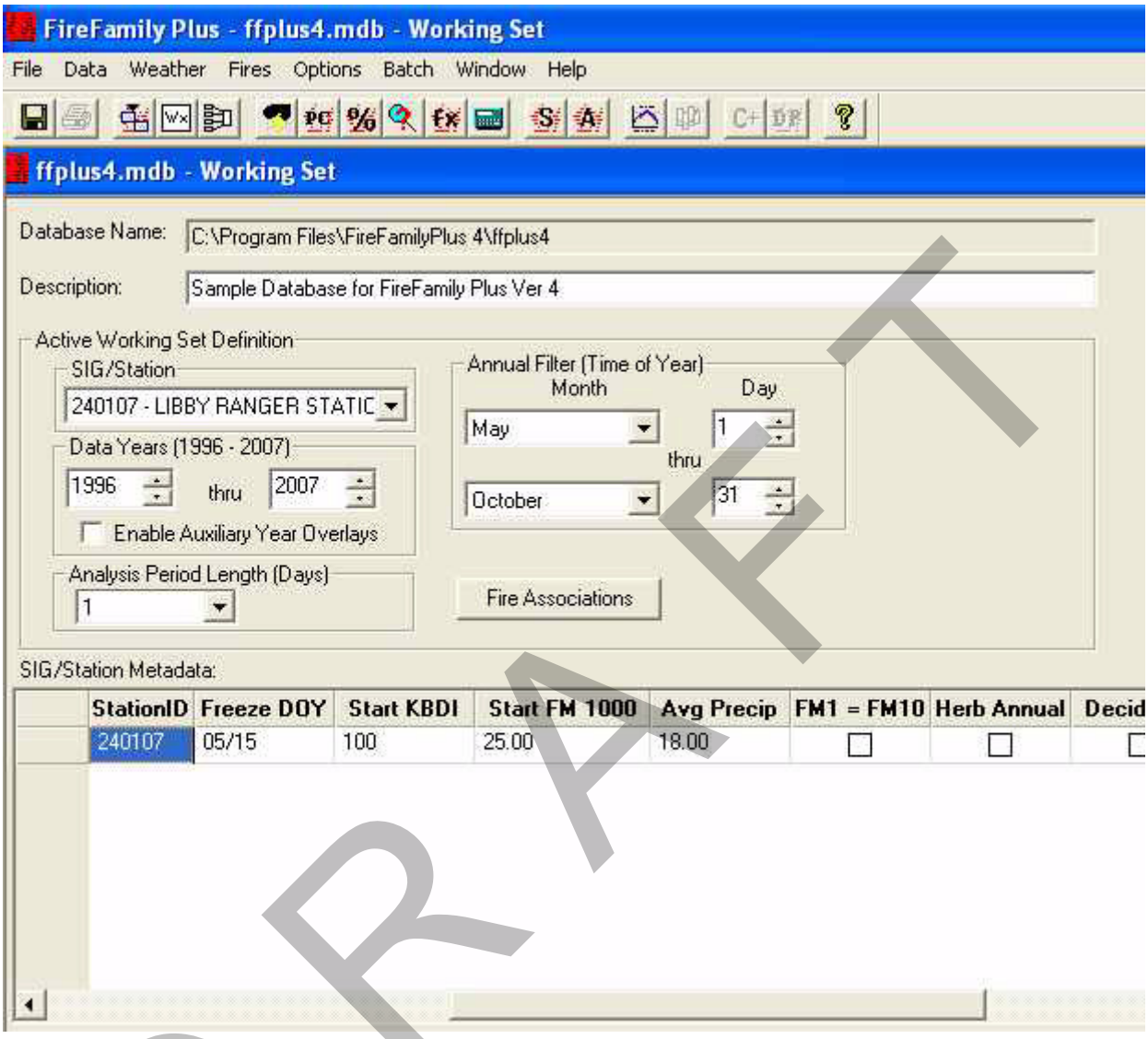
FireFamily Plus - ffplus4.mdb - Working Set
File Data Weather Fires Options Batch Window Help
ffplus4.mdb - Working Set
Database Name: C:\Program Files\FireFamilyPlus 4\ffplus4
Description: Sample Database for FireFamily Plus Ver 4
Active Working Set Definition
SIG/Station
240107 - LIBBY RANGER STATIC
Data Years (1996 - 2007)
1996 thru 2007
Enable Auxiliary Year Overlays
Analysis Period Length (Days)
1
Annual Filter (Time of Year)
Month Day
May 1
thru
October 31
Fire Associations
SIG/Station Metadata:
StationID Freeze DOY Start KBDI Start FM 1000 Avg Precip FM1 = FM10 Herb Annual Decid
240107 05/15 100 25.00 18.00

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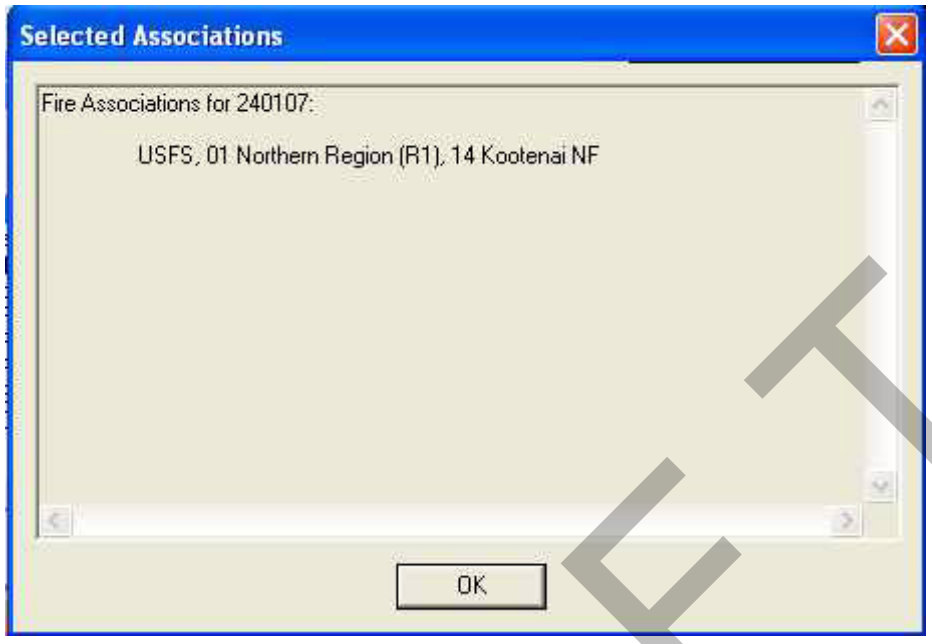
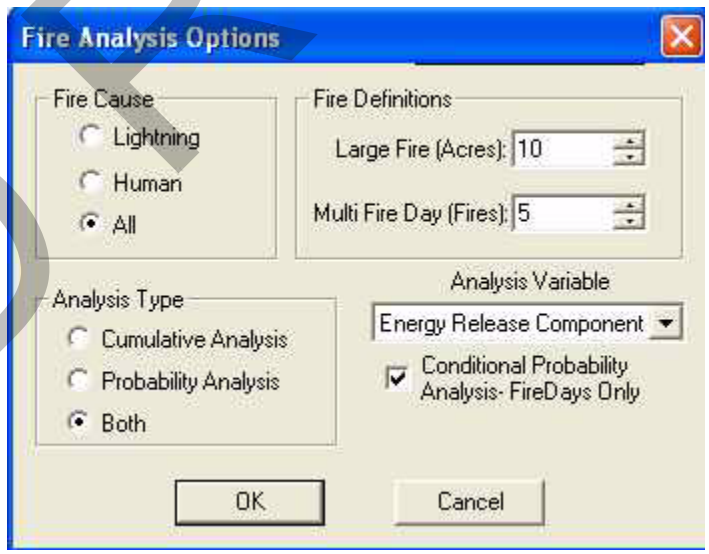


To perform cumulative and probability fire analysis using ERC

1 On the FireFamily Plus toolbar, click on **Fires -> Fires Analysis**.

The following **Fire Analysis Options** dialog box will open. In the example shown below, the **Energy Release Component** is selected as the Analysis Variable.



2 Check the appropriate **Fire Cause** radio button (the usual choice is "**All**").

3 Define the **Fire Definitions** thresholds by typing in desired values directly or by using the spinner.

DRAFT

Values for these definitions are based on local experience and results from using your fire occurrence summary statistics as described in Chapter 6.

4 Select an **Analysis Type** using the radio buttons provided. (The usual choice is "**Both**").

5 In the **Analysis Variable** drop-down list, select **Energy Release Component**.

6 The **Conditional Probability Analysis** check box controls the sample size of the large, and multiple fire day analysis. With the box unchecked, all days are included in the large and multiple fire day analysis. Checking the box creates a conditional probability analysis. That is, only weather days with fires are included in the large and multiple fire day analysis probability.

7 Click **OK** when the dialog box is complete.

The **Cumulative Fires Analysis** window displays frequency distributions of the four groups of weather days (as defined above) in two ways. The left panel shows frequencies as simple histograms (absolute frequencies). The right panel shows cumulative frequencies (percentiles). The distributions are:

- All Days regardless of fire activity - white.
- Fire Days - blue.
- Large Fire Days - purple.
- Multiple Fire Days - red.

Once you get a feel for what you are looking for, you may find that the best way to "screen" indices is to perform a Cumulative Analysis first, and then perform the Probability Analysis on your best indices.

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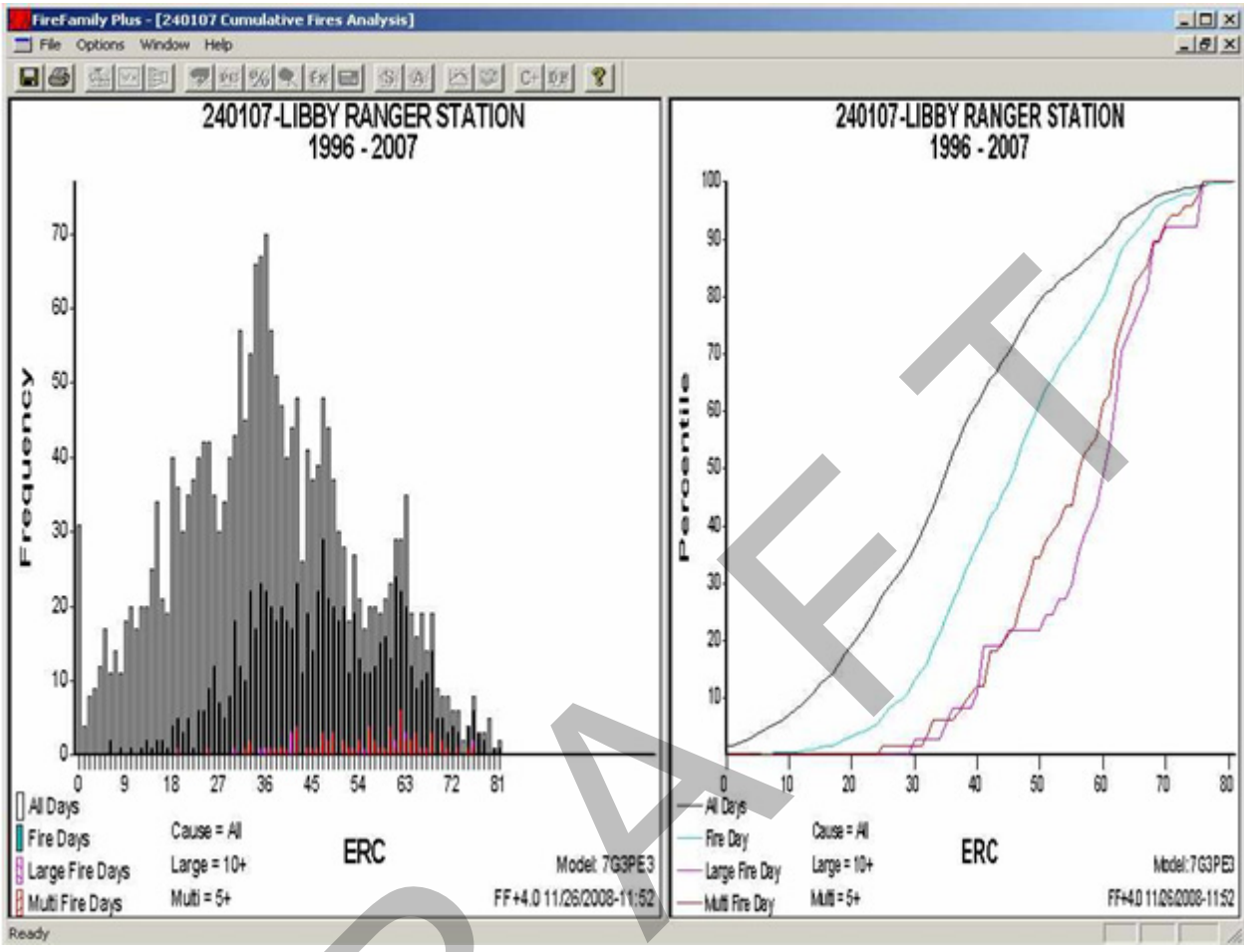

Evaluating the histogram

The maximized left panel shows absolute frequencies (day counts) in a histogram.

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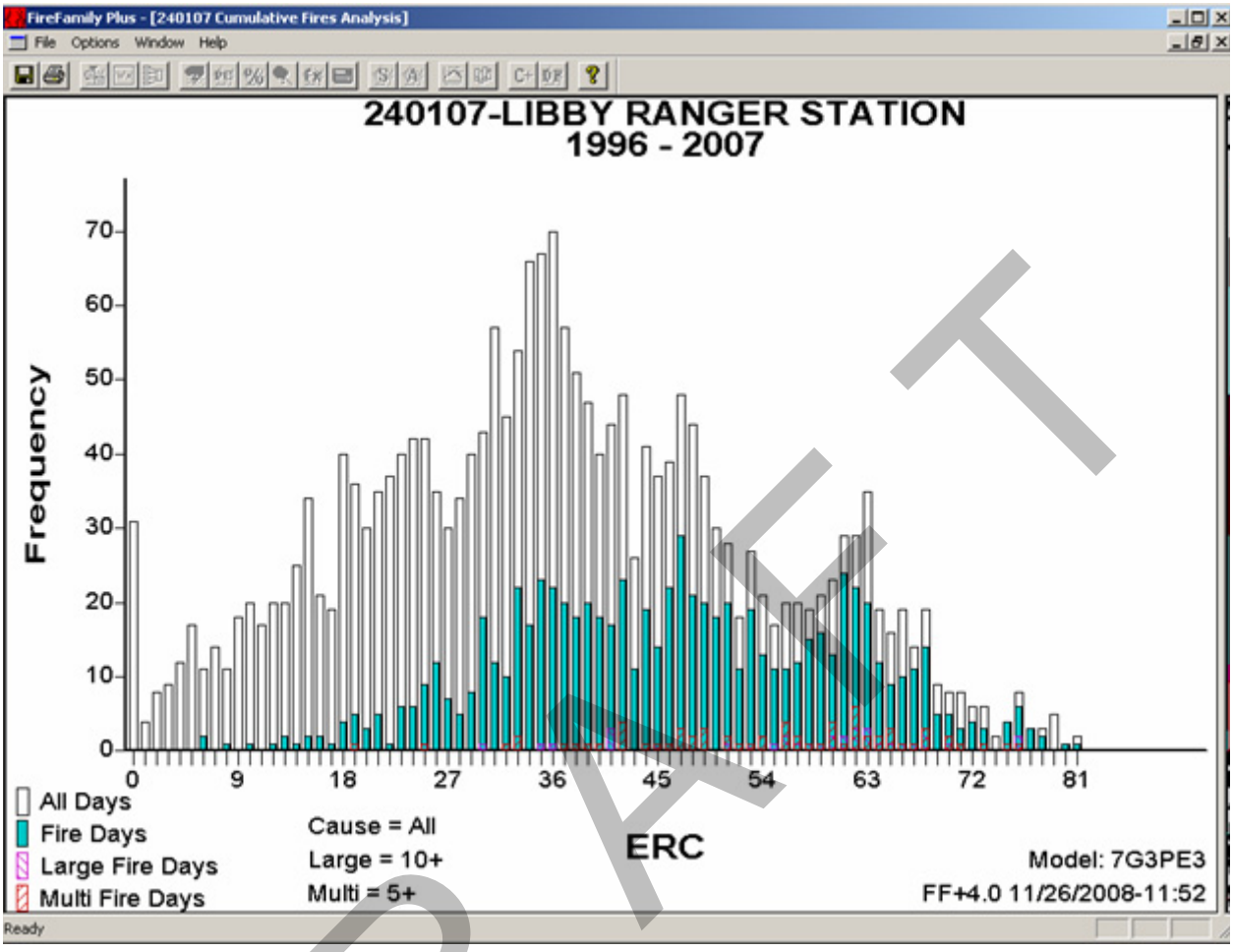


- All Days - white. ERC ranges from 0 to about 80 and 31 days had ERC = 0. Most ERC's fall between 20 and 45 or so.
- Fire Days - blue. There were no fire days with ERC less that about 6; and just a few up to about ERC = 25. Between ERC 30 and 60 fire days were pretty evenly distributed.
- Large (purple) and Multiple (red) Fire Days begin to occur at ERCs of approximately 30 with most occurring above an ERC of 55 or so. But these trends can be difficult to see on these graphs and maybe easier to interpret on the Cumulative Percentile graph (right panel).

Evaluating the cumulative distributions

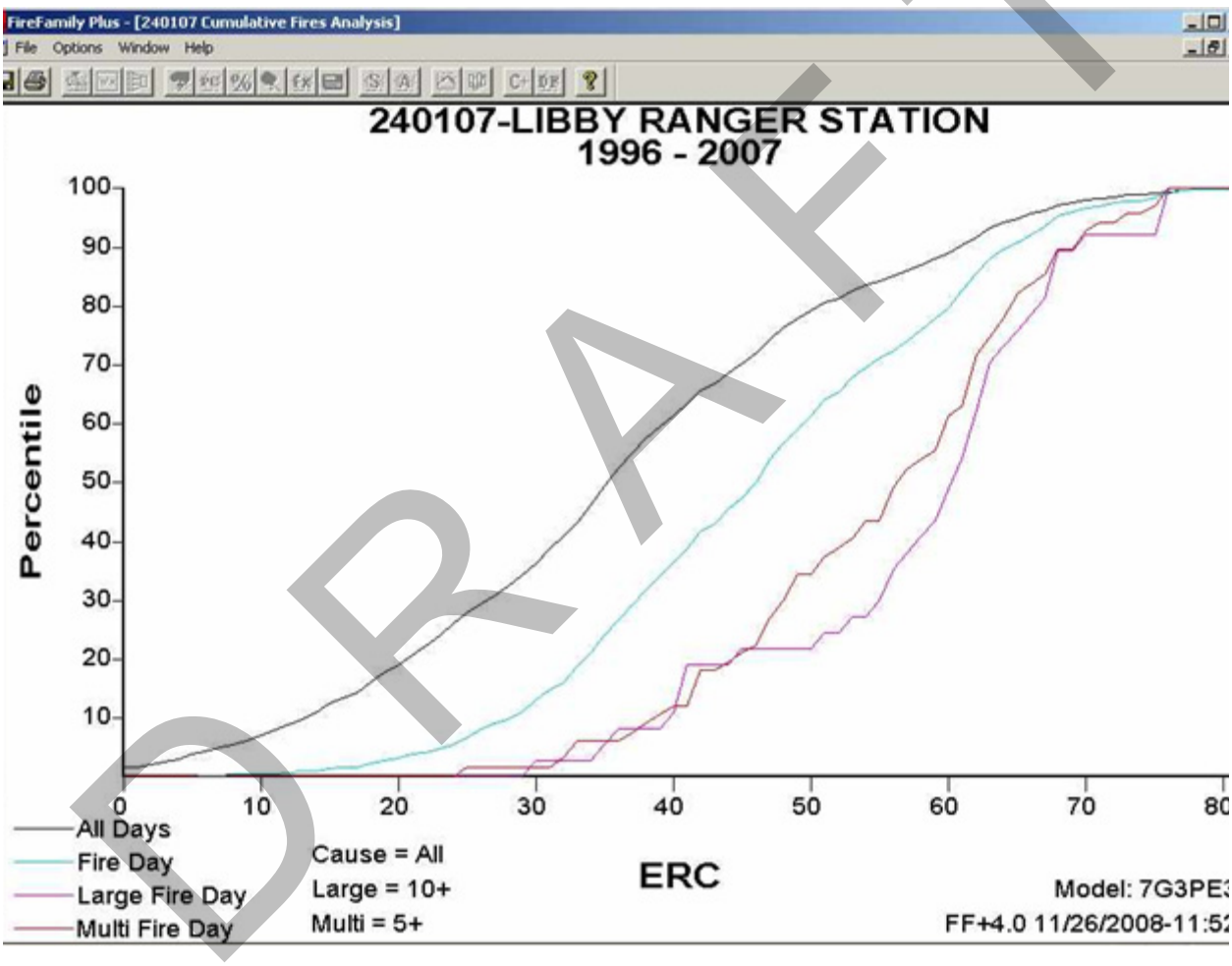
Use the following guidelines to evaluate the four frequency distributions in the graph.

- When lines are horizontal, there are no weather days in that range.
- When lines approach vertical, there are many days in that range.

DRAFT

- If lines are on top of each other, there is no difference in the distributions, and you can infer that the index contains no information to discriminate fire business.
- If the lines are nicely spread out you can infer that the index has value in discriminating fire business.
- Sharp changes of inflections in the fire (fire/large/multiple) day lines may indicate index ranges or values that could be useful starting points for developing decision thresholds.

The maximized panel on the right shows the Cumulative Fires Analysis graphs for ERC.



In the example shown:

- All Days - black. ERC values range from 0 to about 80. The histogram shows that 31 days had ERC = 0, (approximately 2 percent of the total number). Most ERC values fall between approximately 20 and 45 (the steepest part of the black line).
- Fire days - blue. There were no fire days with ERC values less that approximately 6; and just a few up to about ERC = 25. Between ERC 30

DRAFT

and 60, fire days were more or less evenly distributed. (Note that the blue line changes slope at ERC = 25 and slope is constant to ERC = 60). The separation of the curve (blue to the right of the black indicates that fire-days tend occur on higher ERC days than do non-fire days. This is good.

- Overall, large (purple) and multiple (red) fire days have similar distributions (lines are similar) but since both lines are to the right of fire-days, this indicates that large and multiple fire days tend to occur on days with higher ERC than do fire days (fires occur but not large fires).

Because the number of large and multiple fire days is (usually) small compared to weather and fire days, those lines are not smooth. Each vertical "bump" can indicate 1 or 2 fire days. In this example, we see that there are (essentially) no large or multiple fire days when ERC is below 30. The inflection point at ERC=50 on the Large Fire Day line is a good illustration of where large fire risk changes. Between 40 and 50 there were few large fire days (but a steady rate of fire days). Above an ERC of 55, the frequency of large fire steadily increases even though the frequency of weather days with ERC is small (the black curve flattens out). If you follow the intersection of ERC=55 with the All Day line, you will notice that an ERC of 55 is about the 80th percentile; only 20 percent of all days have ERC values greater than 55.

The "tailing off" of multiple and large fire days at the highest "fire danger" values is not unusual. Remember that prevention programs kick in at high fire danger. And in the west, very high ERC's mean prolonged hot and dry periods (high pressure) which translates into no lightning - the cause of 60 percent of fires in our example.

When you review the Cumulative Fires Analysis graphs, remember that fire-days started picking up above an ERC value of 25. The logistic model reinforces this interpretation.

Evaluating Fires Probability Analysis graphs

Based on your fire associations, Fires Probability Analysis takes every historical weather day, including date and index value, and assigns each day as a:

- Fire-day (yes/no)
- Large fire-day (yes/no)
- Multiple fire-day (yes/no).

FireFamily Plus performs a logistic regression for each fire-day type, to generate charts and goodness of fit statistics.

---

*Note: The **Conditional Probability Analysis** check box controls the sample size of the large, and multiple fire day analysis. If the box is unchecked, all days are included in the large and multiple fire day analysis. Checking the box creates a conditional probability analysis, that is, only weather days with fires are included in the large and multiple fire day analysis probability. In the example below there are 1454 weather days and 387 fire days. In the first Large-Fire Day analysis, all 1454 days*

DRAFT

are used, in the second, only 387 fire-days are used. The first analysis gives the probability of a given index range of a large fire day, whereas the second analysis expresses the probability, given a fire start on a day in that index range. The conditional analysis usually has a lower Chi Square score and a very different probability distribution, particularly in the low range of the index.

```
Fire-Day:
    P(Fire-Day) = 1 / (1 + exp(-1 * -3.6554 + (-1 * 0.0686) * ERC))
      Number of Weather-Days: 1454
      Number of Fire-Days: 387


Large-Fire-Day:
    P(Large-Fire-Day) = 1 / (1 + exp(-1 * -6.8110 + (-1 * 0.0891) * ERC))
      Number of Weather-Days: 1454
      Number of Large-Fire-Days: 98
Chi-Squared Goodness of Fit Tests for Large-Fire-Day
                                        LFD      LFD          No-LFD
 Prob. Range      ERC Range    Days    Pct    Obs     Exp    Obs     Exp    Chi-Square
-------------------------------------------------------------------------------------
 0.00 - 0.01       0 -    18    380     0      1       1    379     379       0.0
 0.01 - 0.01      19 -    24    141     0      0       1    141     140       1.1
 0.01 - 0.01      25 -    28    112     0      0       1    112     111       1.3
 0.01 - 0.02      29 -    31     76     0      0       1     76      75       1.2
 0.02 - 0.02      32 -    33     52     2      1       1     51      51       0.0
 0.02 - 0.03      34 -    38    110     5      6       3    104     107       3.4
 0.03 - 0.06      39 -    45    149     2      3       7    146     142       2.1
 0.06 - 0.11      46 -    53    159    10     16      13    143     146       0.6
 0.12 - 0.20      54 -    61    143    23     33      23    110     120       5.6
 0.22 - 0.45      62 -    74    132    21     28      37    104      95       2.9
-------------------------------------------------------------------------------------
                                1454     6     88      88   1366    1366      18.3
-------------------------------------------------------------------------------------
Chi Square     DF    P-Value
     18.3       8     0.0193



Large-Fire-Day: (Conditional on Fire-Day)
    P(Large-Fire-Day) = 1 / (1 + exp(-1 * -4.4775 + (-1 * 0.0629) * ERC))
      Number of Fire-Days: 387
      Number of Large-Fire-Days: 88
Chi-Squared Goodness of Fit Tests for Large-Fire-Day
                                        LFD      LFD          No-LFD
 Prob. Range      ERC Range    Days    Pct    Obs     Exp    Obs     Exp    Chi-Square
-------------------------------------------------------------------------------------
 0.01 - 0.06       1 -    27     41     2      1       2     40      39       0.2
 0.06 - 0.10      28 -    37     40    18      7       3     33      37       4.1
 0.11 - 0.14      38 -    42     35     6      2       4     33      31       1.5
 0.15 - 0.17      43 -    46     36     6      2       6     34      30       2.9
 0.18 - 0.21      47 -    50     38    13      5       7     33      31       0.9
 0.22 - 0.25      51 -    54     44    32     14      10     30      34       1.5
 0.27 - 0.29      55 -    57     32    44     14       9     18      23       4.1
 0.30 - 0.34      58 -    61     40    38     15      13     25      27       0.4
 0.36 - 0.39      62 -    64     40    30     12      15     28      25       1.0
 0.40 - 0.53      65 -    73     41    39     16      18     25      23       0.4
-------------------------------------------------------------------------------------
                                387 | 23     88      88    299     299      17.1
-------------------------------------------------------------------------------------
Chi Square     DF    P-Value
     17.1       8     0.0290
```

DRAFT

The chart is the easiest to interpret. The lines are models produced by the logistic regression on the data (e.g. the probability of a fire-day as a function of ERC). The color-associated symbols near the line are essentially the data (fraction of observed fire-days for a range of the index). If the symbols are on or near the line, the model fits the data well, if not, it doesn't.

In this example, fire-days begin increasing above an ERC of about 20. The logistic model reinforces this interpretation. Notice how the blue line's inflection changes around and ERC of 50 and the symbols jump from approximately a 10% fire-day rate to almost 30%.

You can also perform conditional probability analysis for large fire and multiple fire days.

Logistic regression is ideal for "yes/no" types of data.

The following diagram shows an ERC Fires Probability Analysis graph for Libby Ranger Station 240107 (Montana).

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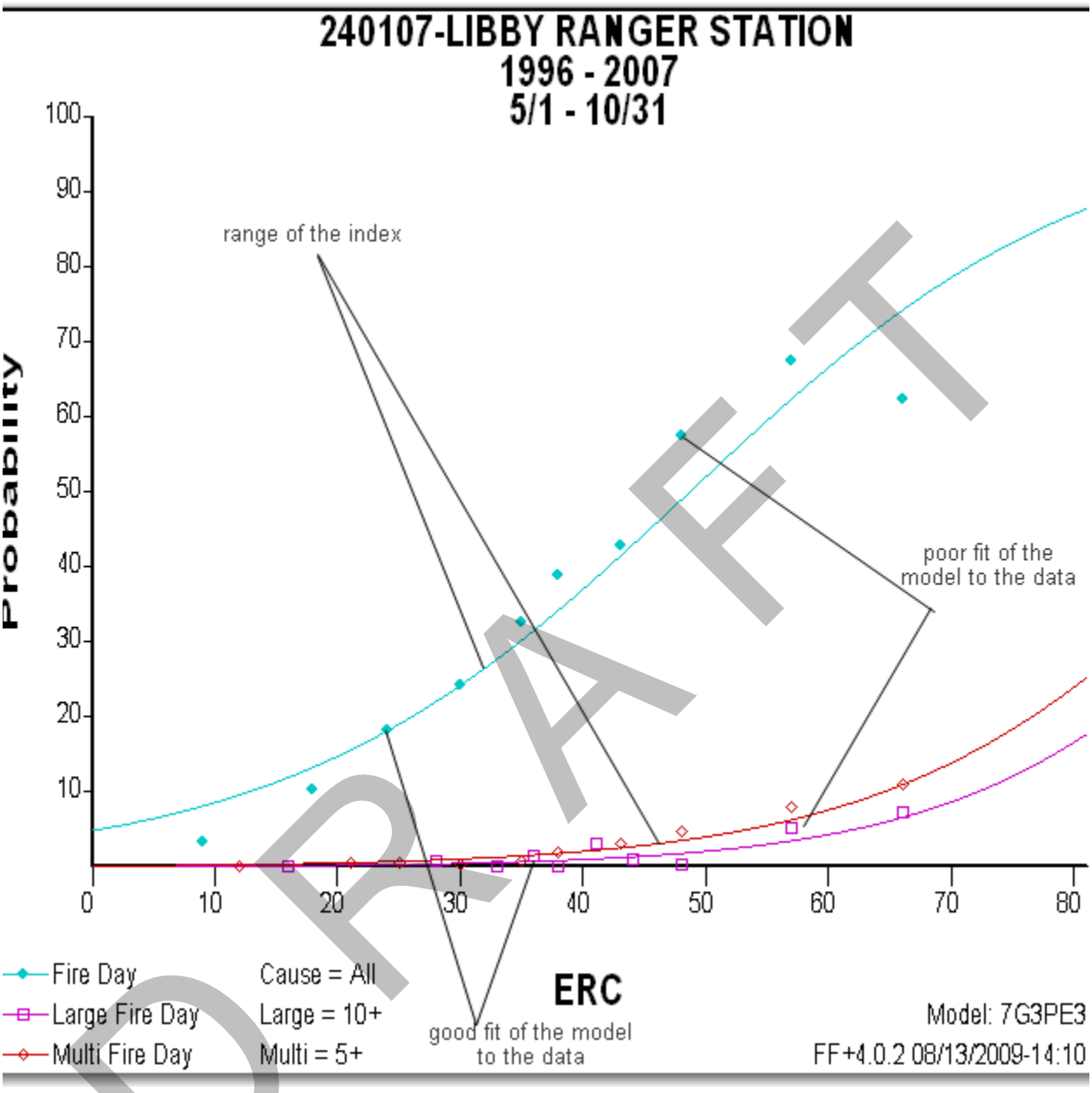

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A horizontal line at 50 percent tells you that there are no occurrences of large fire-days or multiple fire-days in your analysis.

Our final goal in evaluating the Fires Probability graph, is to discern a good index from a bad one in terms of its ability to describe fire business. To do this, we look at two qualities:

- Range of probabilities over the range of the predictor variable:
  - 10 percent at the low end to 90 percent on the high end is very good.

- 10 percent at the low end to 15 percent on the high end doesn't tell us much.

- Distribution of predictor variables:
  - A wider range (0 - 100) allows more flexibility in setting levels.
  - A narrow range (12 - 22) may make setting levels harder.
  - Avoid having 90 percent of observations in one/two classes.

When you've screened out all of the bad indices, use goodness-of-fit statistics to determine your best index.

There are two statistics to test goodness-of-fit in the text report:

"Chi Square," - a lower value is better.

"R-Squared," - a higher value is better.

Review both graphs to understand any relationship in the data. If you have determined that you have an index that contains some good information about fire business in your analysis area, it makes sense that you would want to set some sort of decision points based in part on the index (see "Setting the Decision Points," in the following section for more information).

For a complete discussion of the analysis of indexes, refer to:

Andrews, Patricia L. and Larry S. Bradshaw. "FIRES: Fire Information Retrieval and Evaluation System - a Program for Fire Danger Rating Analysis" at:

http://www.fs.fed.us/rm/pubs/int_gtr367/index.html

Setting decision points

This section explains how to set action or danger class limits based on both fire weather and fire business in your danger rating area. Before you begin, be sure that your working set is correctly configured, including years, dates, and fire associations.

*The **Decision Points** button on the FireFamily Plus toolbar is only active and available when displaying a Fires Probability Analysis graph.*

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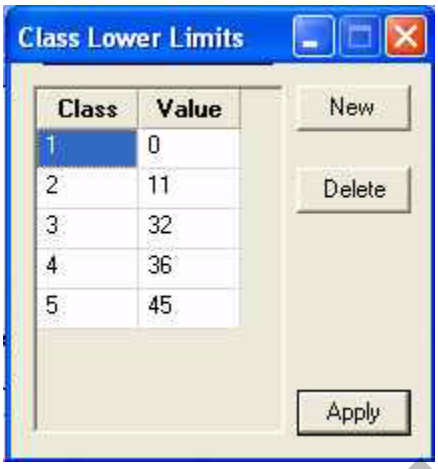

The **Class Lower Limits** dialog box displays the initial breakpoints that divide the data into five classes. These initial breakpoints are set using roughly the same logic as is used for setting the Adjective Classes in WIMS and allows you to adjust the breakpoints and add or delete classes.

Class	Lower Limit
1	Zero
2	1/4th of the index's 90th percentile value
3	1/2 of the index's 90th percentile value
4	The index's 90th percentile value
5	The index's 97th percentile value

To set decision points

1. On the **Fires** drop-down menu, click **Fires -> Fire Analysis**.
2. To generate the Fires Probability Analysis graphs, click **Probability Analysis**, select the **Analysis Variable** of your choice, and then click **OK**.
3. Click the **Decision Points** button on the toolbar.

*You can also click **Decision Points** on the **View** drop-down menu when the Conditional Probability graph window is open.*

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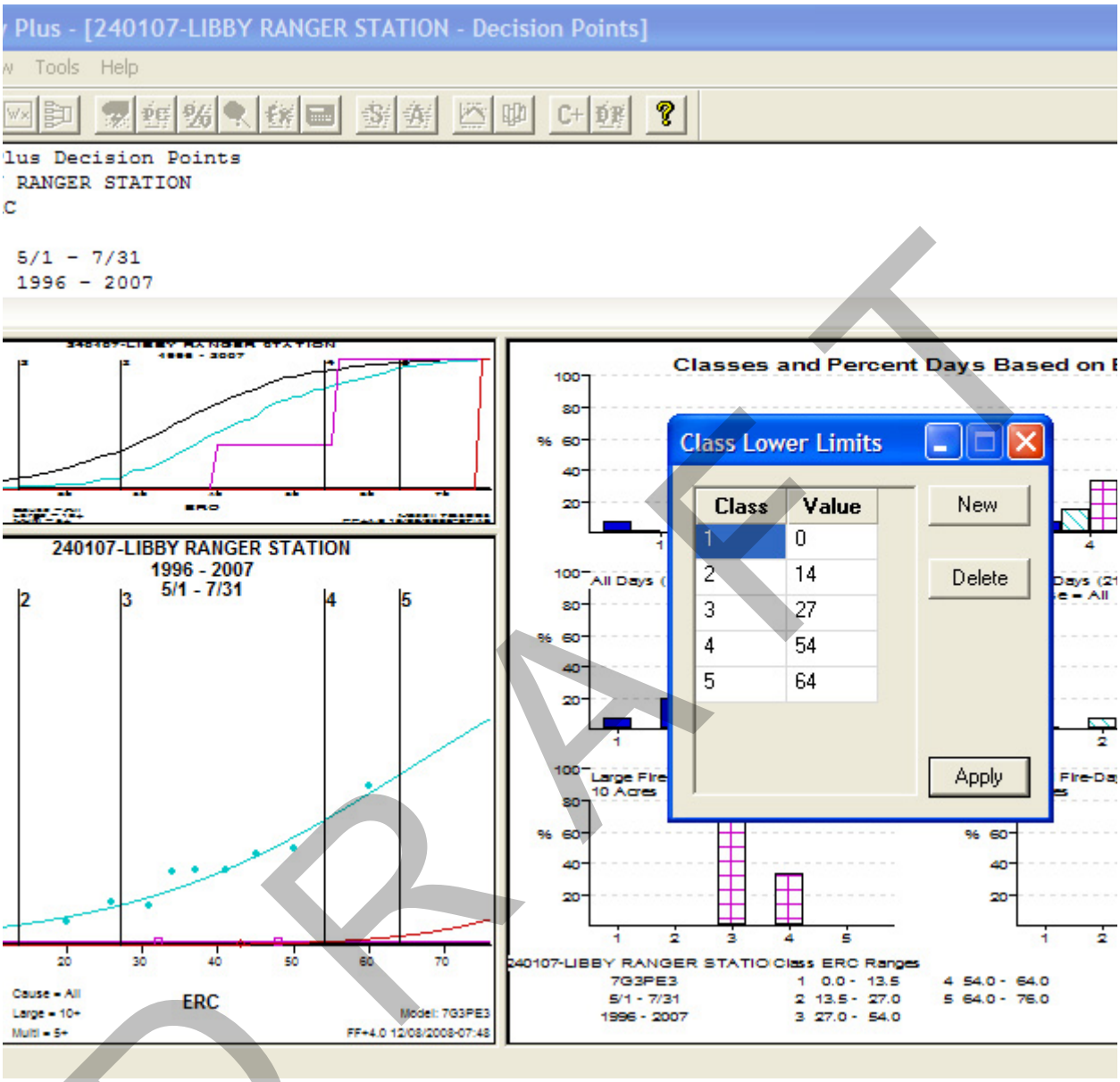

To see more clearly, maximize both the FireFamily Plus and Decision Points windows. Then move the **Class Lower Limits** box so that it does not obscure the graph.

The chart below shows the relative frequency of the four weather type days: **All Days**, **Fire-Days**, **Large Fire-Days**, and **Multi Fire-Days**. The bar chart on the top shows all day-types combined.

In the Decision Points window, you can view the Class Lower Limits box by clicking on Tools -> Class Definitions.

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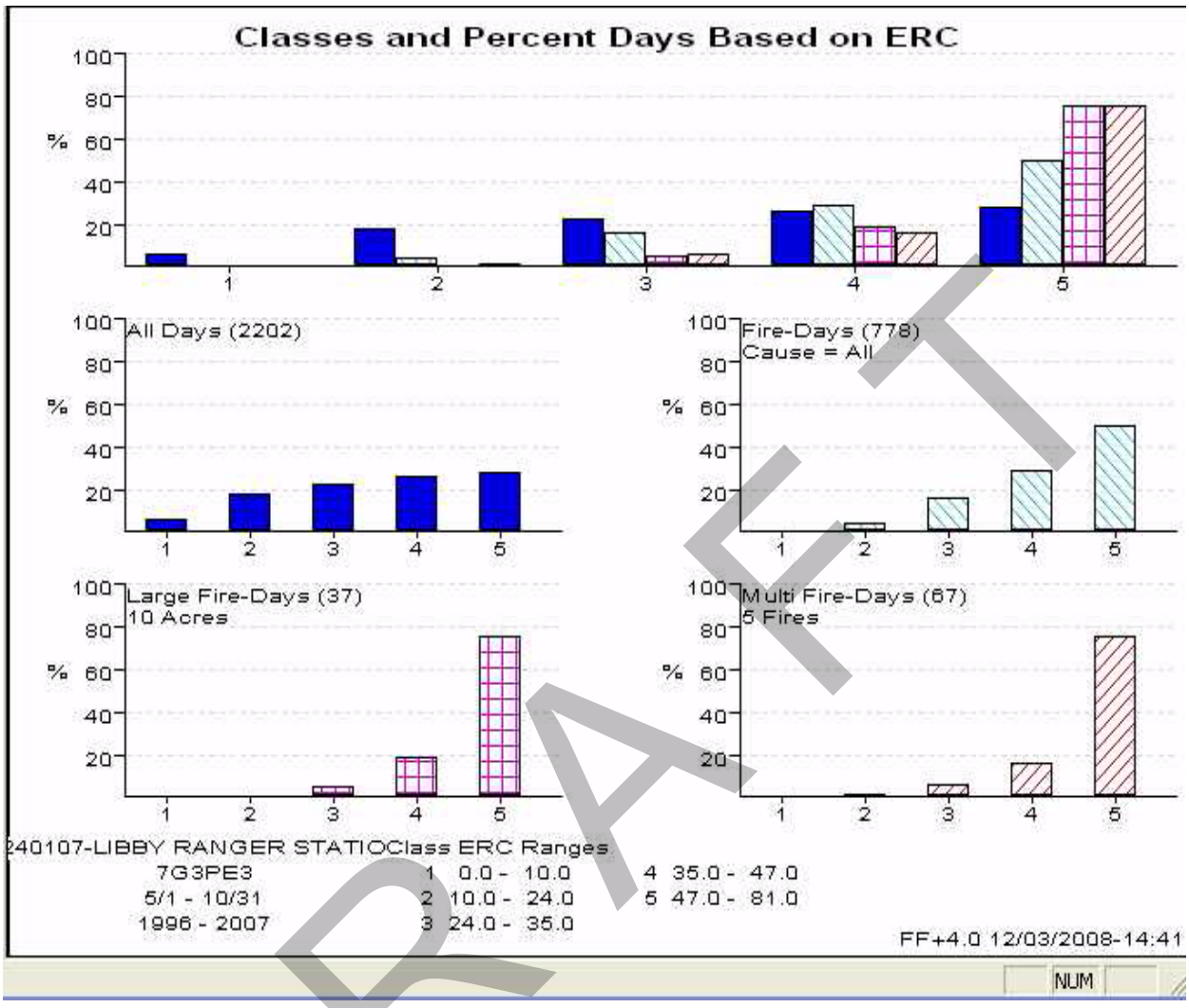

The initial screen divides the data into five classes. The initial breakdown points (lower limits) of these five classes are set using the same logic that is used for setting staffing levels in WIMS (Weather Information Management System).

Class 1: zero

Class 2: 1/4 of the value of the index's 90th percentile (10.75)

Class 3: 1/2 of the value of the index's 90th percentile (21.5)

Class 4: The value of the index's 90th percentile (43.)

Class 5: The value of the index's 97th percentile (50.69)

To expand the graph of your choice, click, hold, and slide the bars accordingly.

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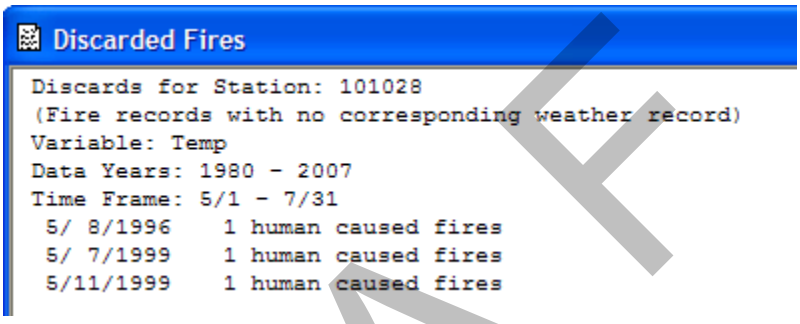
To view discarded fires

1 From the Fire Probability Analysis graph, click **Discarded Fires** on the **View** drop-down menu.

The following diagram shows a list of Discarded Fires.



Reviewing the Decision Points graphs

You are already familiar with the contents of the two graphs on the left side of the window since they are exactly the same as the ones you previously generated and studied for purposes of decision making.

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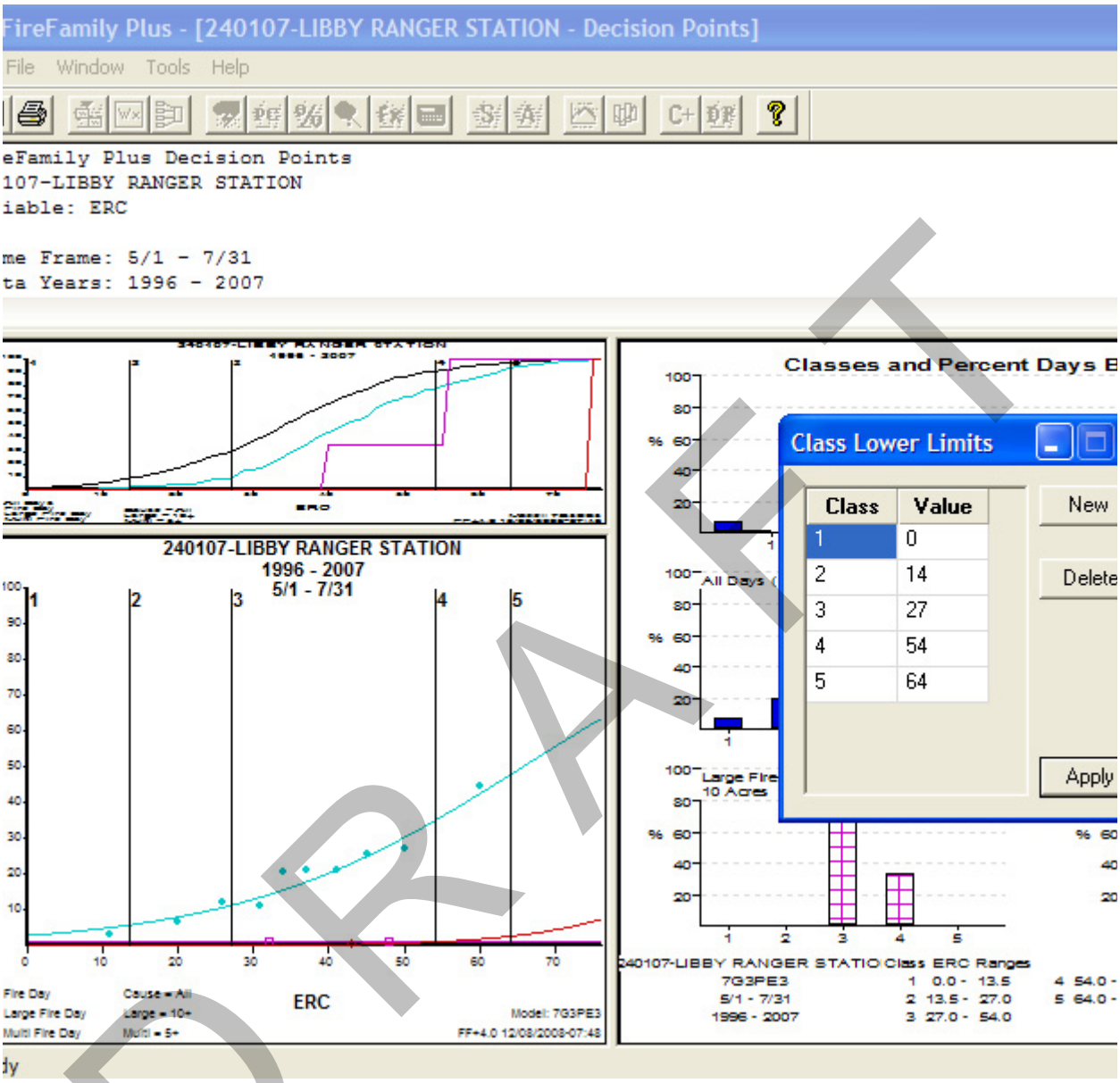

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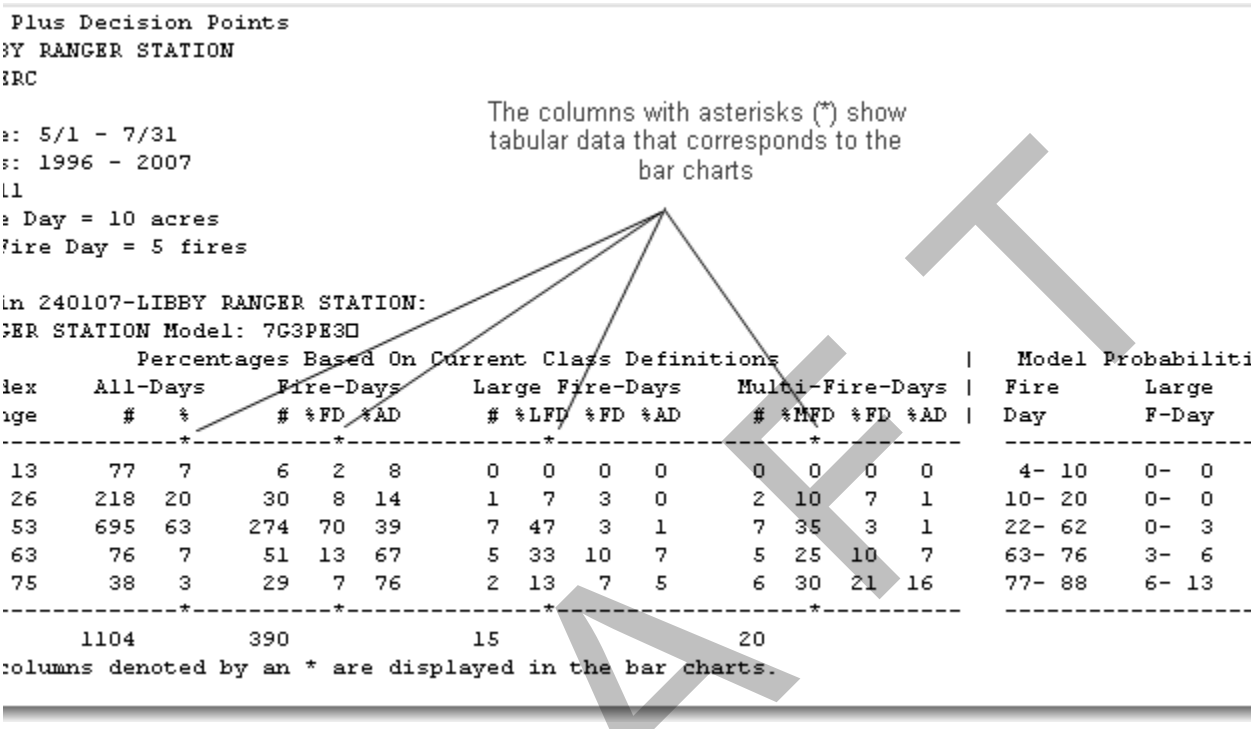
The vertical lines in these graphs demonstrate where class boundaries fall along the percentile or probability curves. The right panel in the window is quite simple. It shows the relative frequency of the four weather type days (All Day, Fire-Day, Large Fire-Day, and Multiple Fire-Day) within each class. The top right panel shows all day-types combined, the four lower graphs simply split them out so you can easily compare the relative frequency of day-types as you go between classes.

If you would prefer to view a table, the top panel offers a table format. The columns marked with asterisks--%, %FD, %LFD, and %MFD--are shown in the bar charts in the right panel of the graph window above. The table is updated each time you click on **Apply**.

The following diagram shows the Decision Points table that is located on the upper left portion of the Decision Points window. You can modify this table and the Percentile and Probability graphs by applying new decision points.



Plus Decision Points
BY RANGER STATION
IRC

e: 5/1 - 7/31
s: 1996 - 2007
11
e Day = 10 acres
Fire Day = 5 fires

in 240107-LIBBY RANGER STATION:
GER STATION Model: 7G3PE3

dex	All-Days		Fire-Days			Large Fire-Days				Multi-Fire-Days				Model Probabiliti Fire	Large
age	#	%	#	%FD	%AD	#	%LFD	%FD	%AD	#	%MFD	%FD	%AD	Day	F-Day
13	77	7	6	2	8	0	0	0	0	0	0	0	0	4- 10	0- 0
26	218	20	30	8	14	1	7	3	0	2	10	7	1	10- 20	0- 0
53	695	63	274	70	39	7	47	3	1	7	35	3	1	22- 62	0- 3
63	76	7	51	13	67	5	33	10	7	5	25	10	7	63- 76	3- 6
75	38	3	29	7	76	2	13	7	5	6	30	21	16	77- 88	6- 13
	1104		390			15				20					

columns denoted by an * are displayed in the bar charts.

These graphs contain considerable information and all of it is interconnected. Take a few minutes to review your graphs before continuing.

Changing decision points to reflect fire business

Now that you have reviewed the **Decision Points** graphs, you can change the values in the **Class Lower Limits** dialog box to adequately reflect fire business. The following list outlines how your bar charts should look and why:

- As fire danger moves from Class 1 to Class 5, you should see a steady increase in the risk of large and multiple fire days.
- As fire danger moves from Class 1 to Class 5, the ratio of days to large fire days should decrease.
- As fire danger moves from Class 3 to Class 4 and to Class 5, the percentage of large fire days and multiple fire days should not decline. Ideally, these fire days would increase.

There is no exact recipe for success in this process. You will need to look at the graphs and determine what makes sense. You can modify the graphs by changing the decision points in the **Class Lower Limits** dialog box.

For bar charts, ideally:

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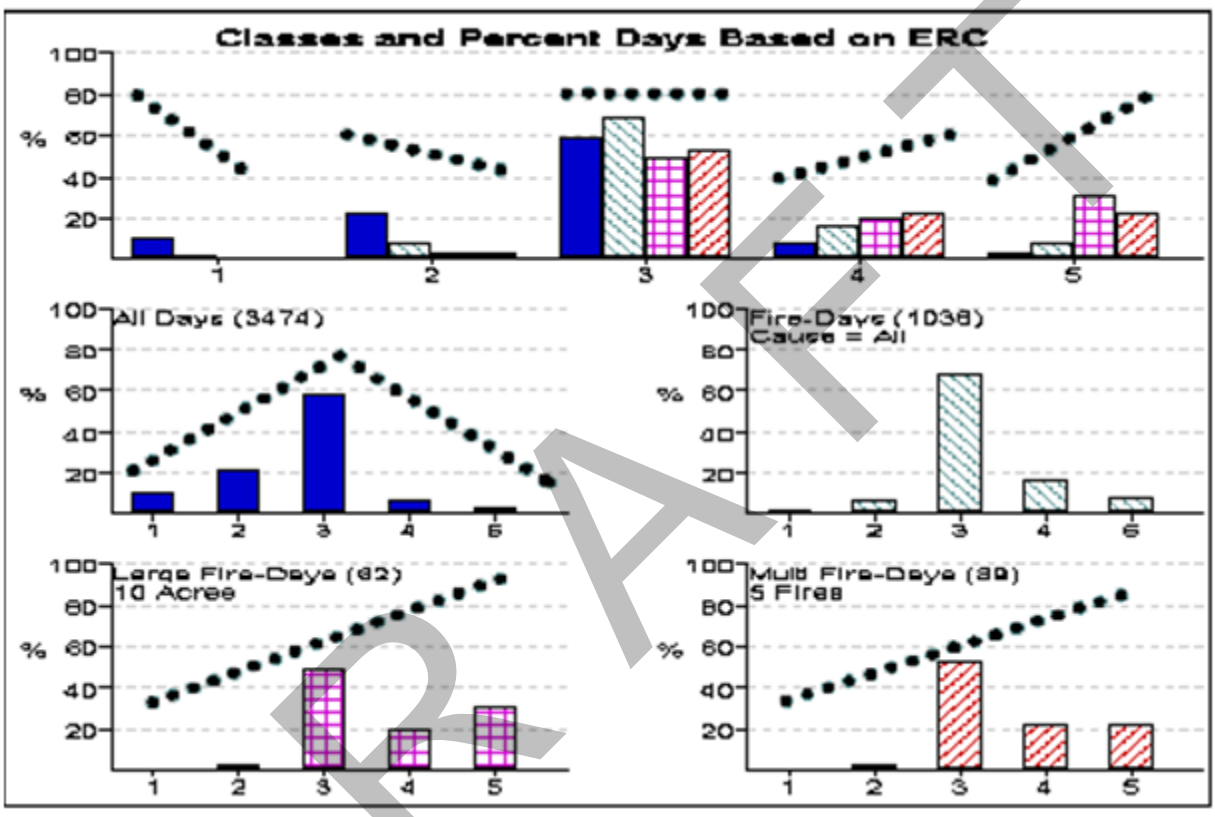
- The risk of large and multiple fire-days increases steadily as fire danger increases from Class 1 to Class 5.
- The ratio of days to large fire-days should decrease as you move from Class 1 to Class 5.
- The percentage of large fire-days and multiple fire-days should not decline as you move from Class 3 to Class 4 to Class 5. (The percentage should increase).



The dotted lines above each of the bar charts shown above illustrate trends for these charts. What needs to be changed in these examples?

- The proportion of Fire-Days in Class 3 (70%) is too high.
- Large Fire-Days and Mult Fire-Days do not show an upward trend from low to high.

How you change these class limits should be directly related to the information contained in the Probability and Percentile curves. Look at the Probability vs. ERC curves. The Class 3 lower limit is currently at the point on the Fire-Day curve where it begins to rise steeply, indicating that the probability of a fire is increasing faster as the ERC rises. Location where the curves change directions are good decision points. Also note that the Large-Fire and Multi-Fire curves are just starting an upward trend. Therefore the Class 3 decision point is in an appropriate place and does not need to be changed.

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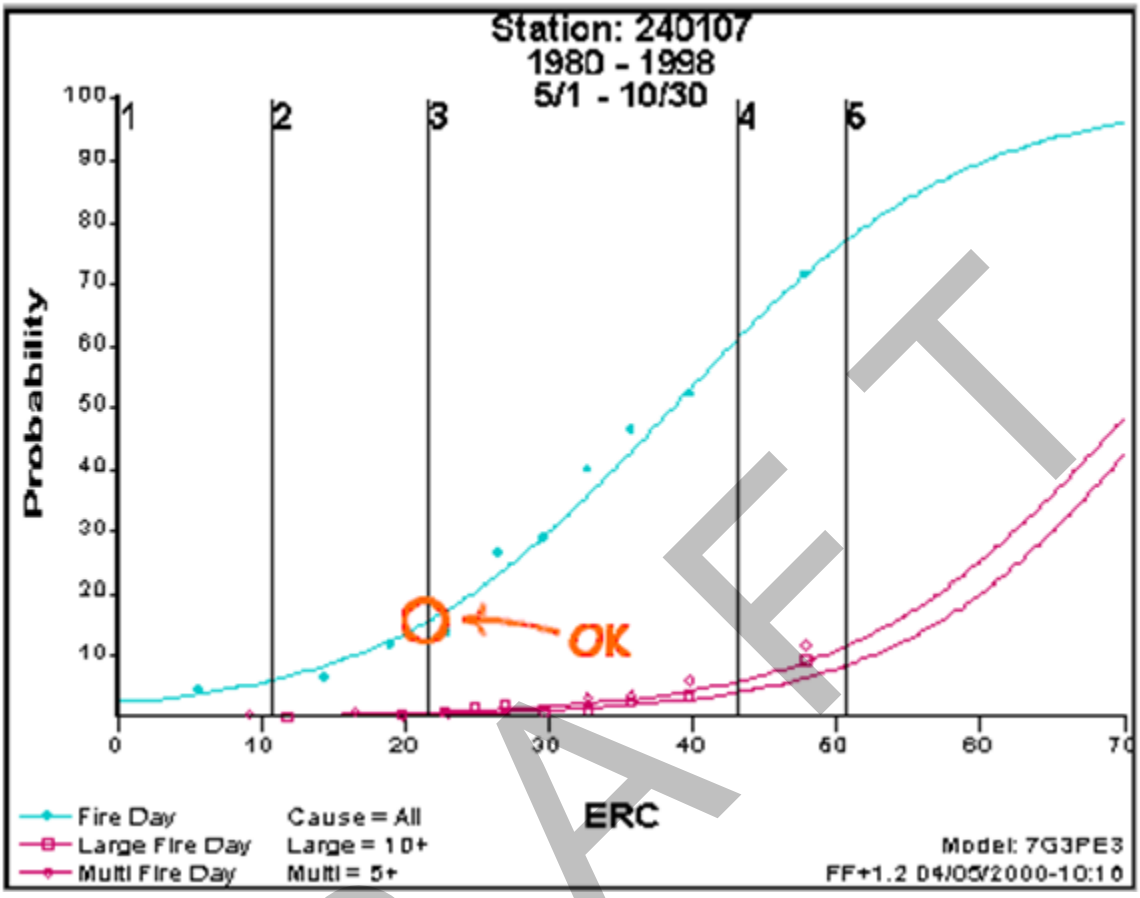

To change the class lower limits

To include more Large Fire-Days and Multi Fire-Days in Classes 4 and 5, we need to reduce the lower limits of those classes (the decision points). To change classes you should modify the **Class Lower Limits** dialog box as shown below. Change the Class 4 lower limit to 36, and the Class 5 lower limit to 45. Then click the **Apply** button.

---

*You are not limited to five classes. You may add or delete classes with the **New** and **Delete** buttons. Experiment with other Analysis Variables and different numbers of classes.*

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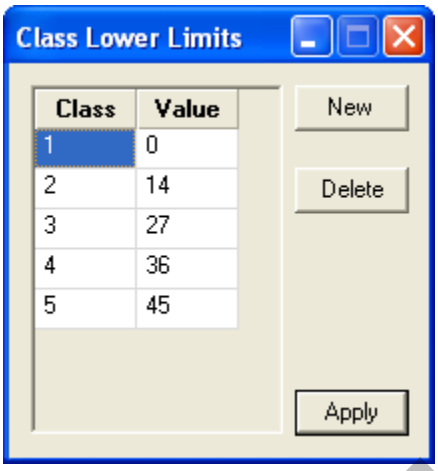
Class Lower Limits
Class
Value
1
0
2
14
3
27
4
36
5
45
New
Delete
Apply

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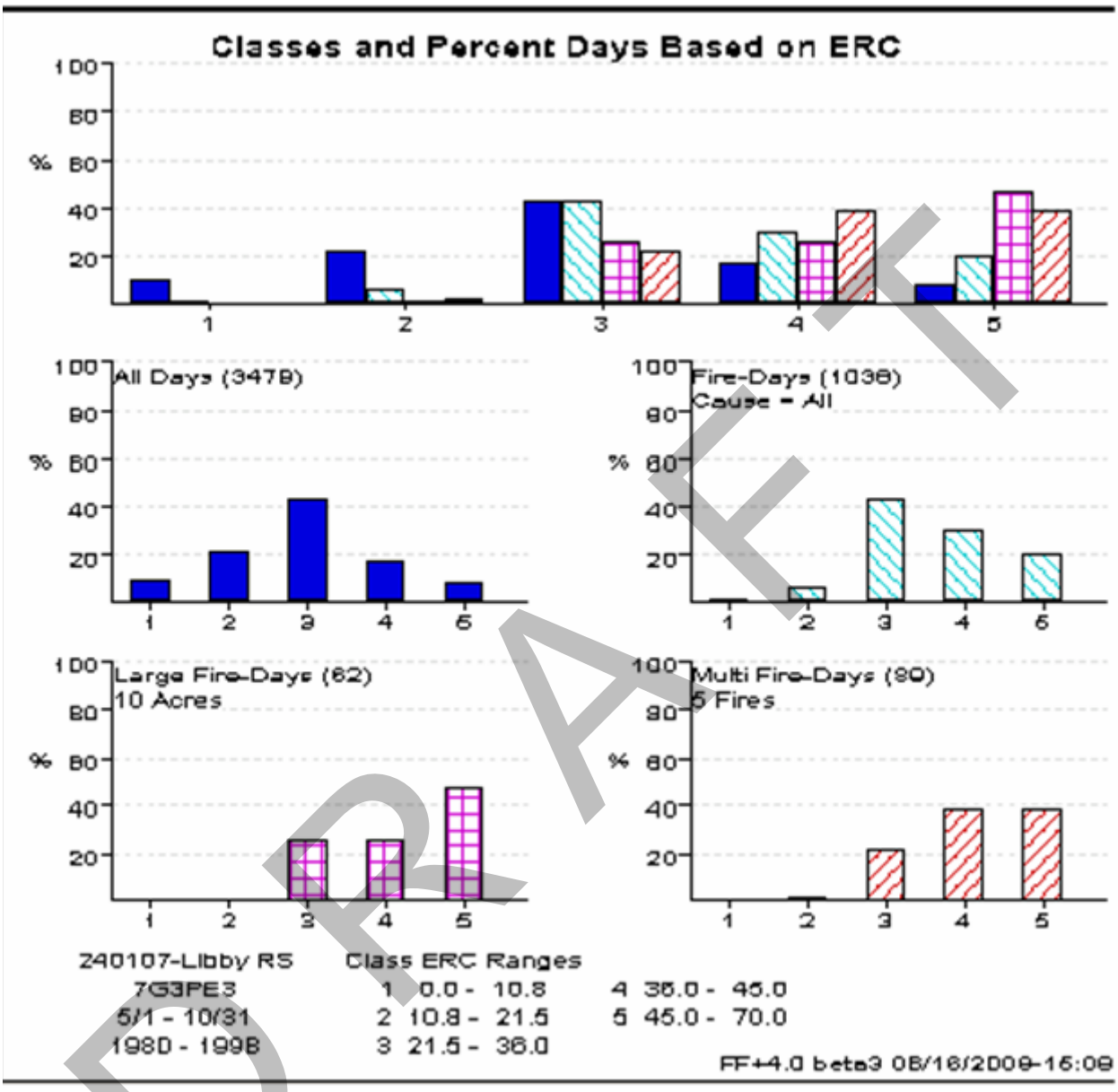

Notice that the bar graphs have a more reasonable distribution of Fire-Days, Large Fire-Days, and Multi Fire-Days. The probability and cumulative curves also tell us that the historical risk of large- and multiple fire-days is quite low at ERC values less than 20.

FireFamily Plus version 4.0 allows you to view fires rejected from the fire day probability analysis as a separate window. For more information, see the next section, "To view discarded fires."

When reviewing the Decision Points graphs, consider the following:

- Differentiate each class from the class above or below it for different fire business.
- Ensure that each class has a significant increase of risk, perhaps even twice the risk.
- Use the minimum number of classes you need to support decisions and actions.

Working with the fire business candidates list

Developing a list of potential fire business indices

FireFamily Plus (see Chapter 12 for more information) allows the user to develop a list of potential fire business indices using the candidates table.

While in the Interactive Batch Mode, if you find a good potential index of fire activity based on a fires analysis report or graph, press the button labeled **C+** to add the index to the candidates table. Several indices can be rapidly added for comparison.

1. To add an index to the fire business candidates table for later comparison, click the **C+** button.
2. All statistics will be added to the table for the current working set description and can be viewed using the **Fires -> Fire Business Candidates.**

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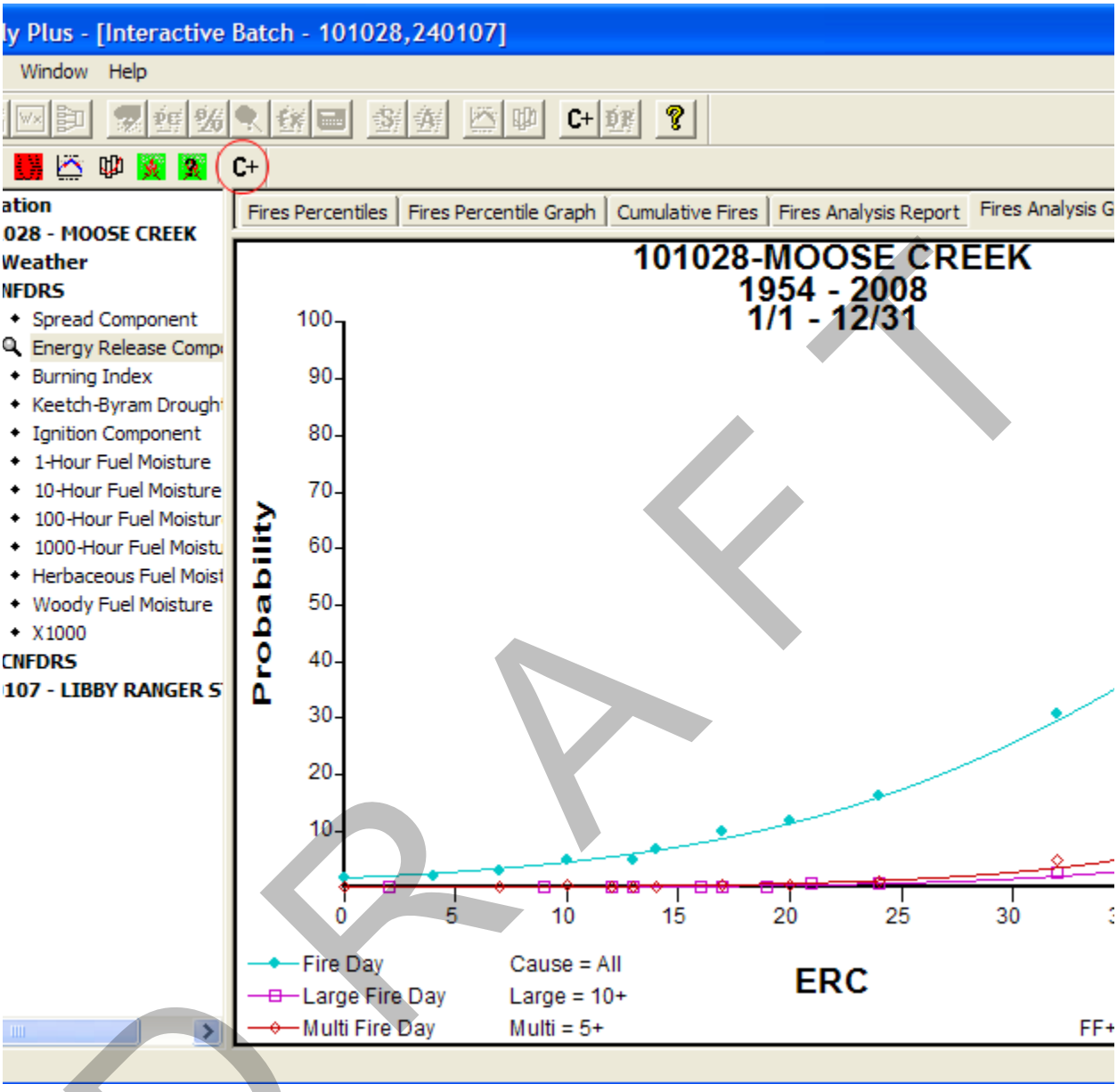

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Viewing candidates list

1 Select **Fires -> Fire Business Candidates**.

2 Review the fire business candidates list.

The following diagram is an example of the **Fire Business Candidates** table showing index statistics added using the **Add Candidates** button in the Interactive Batch mode.

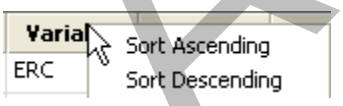
Fire Business Candidates

Fire Type: ☑ Fire Day (FD) ☑ Large Fire Day (LFD) ☑ Multiple Fire Day (MFD) | Delete... | Delete All | Export...

	SIG/Station	Years	Annual Filter	Variable	Model	MFD Chi^2	MFD P-Val	MFD P-Range
1	240107	1996 - 2007	5/1 - 10/31	ERC	7G3PE3	3.44	0.9041	0.01 - 0.28
2	240107	1996 - 2007	5/1 - 10/31	ERC	7G3PE3	3.44	0.9041	0.01 - 0.28
3	101028	1996 - 2008	1/1 - 12/31	PrecipAmt	7H3PE3	0.00	0.0000	0.00 - 0.00
4	101028	1996 - 2008	1/1 - 12/31	SOW	7H3PE3	0.00	0.0000	0.00 - 0.00
5	101028	1996 - 2008	1/1 - 12/31	WindSpeed	7H3PE3	0.00	0.0000	0.00 - 0.00
6	101028	1996 - 2008	1/1 - 12/31	WindSpeed	7H3PE3	0.00	0.0000	0.00 - 0.00

3 You can view the table for only Fire Days (FD), Large Fire Days (FD), or Multiple Fire Days (MFD) by checking the boxes in the upper left corner of the dialog box.

4 You can sort any of the columns by right-clicking the column header and selecting **Sort Ascending** or **Sort Descending**. The right most column is available for entering user comments about the variable.



5 Every entry into the Candidates List is saved in the active database until explicitly deleted using the **Delete**, or **Delete All** buttons.

6 You can also export the table to a comma-delimited text file that can be imported into a spreadsheet program such as Microsoft Excel (see example below).

Microsoft Excel - test.csv

File Edit View Insert Format Tools Data Window Help

A1 SIG/Station

	A	B	C	D	E	F	G	H	I
1	SIG/Stati	Years	Annual_Fil	Variable	Model	Greenup	Freeze	FD_Type	FD_R^2
2	240107	1996 - 200	5/1 - 10/31	ERC	7G3PE3	15-May	15-May	All	0.92
3	240107	1996 - 200	5/1 - 10/31	ERC	7G3PE3	15-May	15-May	All	0.92
4	101028	1996 - 200	1/1 - 12/31	PrecipAmt	7H3PE3	10-May	10-May		0
5	101028	1996 - 200	1/1 - 12/31	SOW	7H3PE3	10-May	10-May		0
6	101028	1996 - 200	1/1 - 12/31	WindSpee	7H3PE3	10-May	10-May		0
7	101028	1996 - 200	1/1 - 12/31	WindSpee	7H3PE3	10-May	10-May		0

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*If you click on **Export**, the file will be saved automatically to the FireFamilyPlus4 folder.*

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Chapter 8. Generating a pocket card

This chapter explains how to generate and work with a pocket card. Topics include:

- Identifying years of interest, fires, and index values.
- Generating a pocket card.

A pocket card is a safety tool that identifies key information about a specific fire danger area. Fire Family Plus allows you to generate a pocket card at any time to increase firefighter awareness of current local conditions.

Identifying the years of interest, fires, and index values

Use the climatology reports and fires analysis information generated in Chapters 6, “Working with reports and graphs” and 7, “Working with fire analysis tools,” to determine and define which two years of interest, indices, and thresholds you need to create a meaningful pocket card.

Start FireFamily Plus, open the default database and create a Working Set.

- Select the Libby weather station (240107).
- Select all available data years.
- Limit the annual filter to the fire season (May 1 through September 30).

Select an NFDRS index value and fuel model for the pocket card based on your prior examination of seasonal trends of various indices and fires analysis.

- In this example, ERC appears to be useful and BI is often used for staffing.
- Fuel model G is the primary fuel model used for the Libby station. Make sure that the Station Metadata uses the “G” model.

Burning Index (BI) is often used for staffing decisions.

To determine the years of interest for comparison

Next we will select years of interest for comparison by looking at the fire history.

1 On the Main Menu click **Fires -> Summary -> Working Set** or click on the **Fire Summary Working Set** icon on the toolbar.

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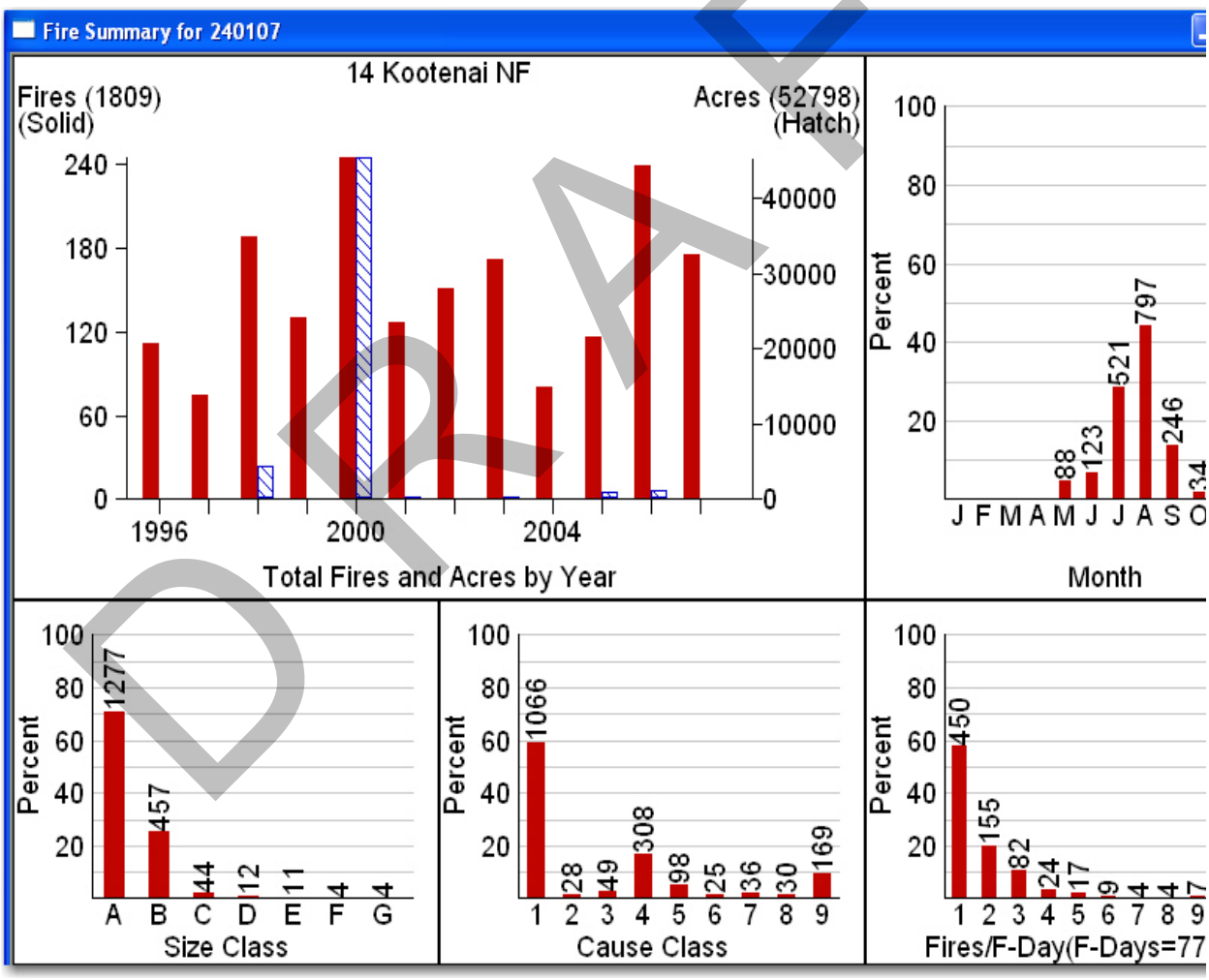
2 Click on the **USFS** tab and make sure that the **Northern Region** and **Kootenai Forest** are highlighted.

3 Click **OK**.

The following window should open showing the Fire Summary for the Libby weather station (240107).



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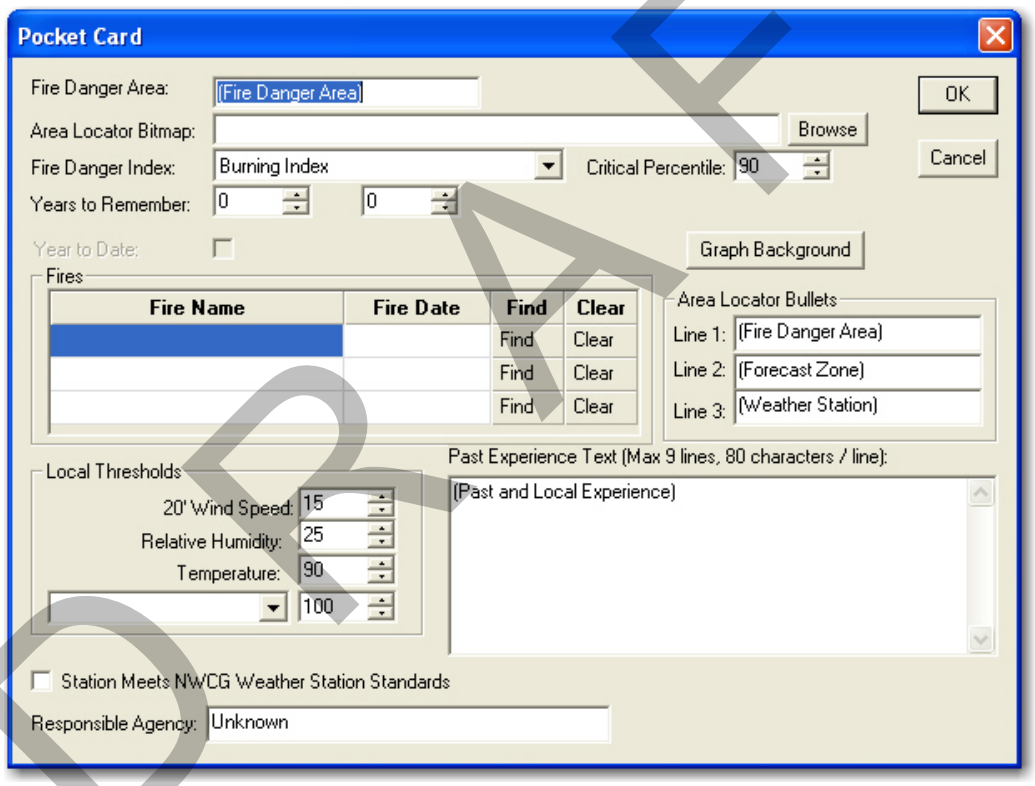
Based on the Fire Summary graph, 2000 and 2006 have significant burned acres and would be good choices to use as "Years to Remember" for the pocket card.

Generating the pocket card

After completing the background analysis you can generate a meaningful pocket card to highlight local conditions.

To generate a pocket card

1 On the FireFamily Plus toolbar, click **Weather -> Pocket Card** or click on the **Pocket Card** icon. The **Pocket Card** dialog box will open as follows:



2 Type or select **Fire Danger Area** (in this case, type in "Northwest Montana").

3 If desired, select an **Area Locator Bitmap** using the **Browse** button to locate the file**.** The bitmap may consist of a bitmap graphic that shows the area location, a logo, or even a photograph. This step is optional. In the following example, a bitmap of northwestern Montana is selected.

4 Select a **Fire Danger Index** from the drop-down menu (use "Energy Release Component").

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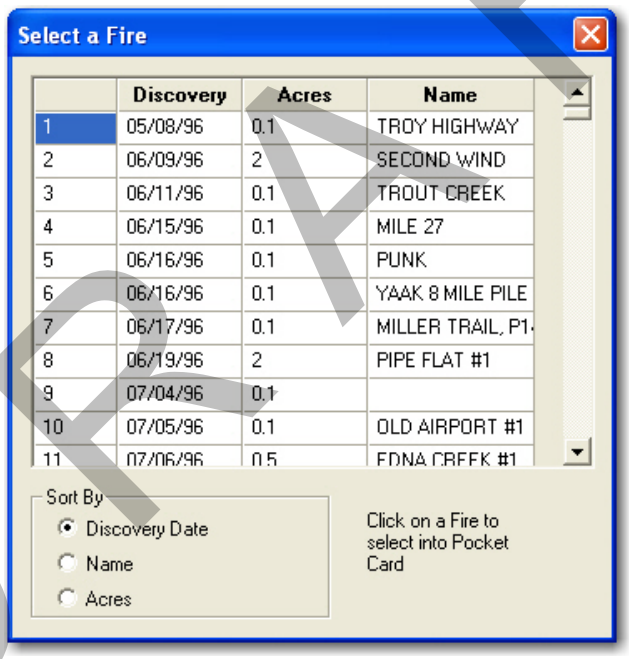
5 Select the **Years to Remember** (for this example we have selected "2000" and "2006").

*If your working set does not include the current year, but there is current year data in the database, you can select the **Year to Date** check box to enable a third overlay.*

6 **Year to Date**: If your working set does not include the current year, but there is current year data in the database, the **Year to Date** box will be enabled as a third overlay. (The current year will not be included in the statistics (mean, max., or min. lines).

The example does not include current year data, therefore the check box is grayed out.

7 To select a fire for comparison, click **Find** in the appropriate Fires list, and then double-click the fire of your choice in the **Select a Fire** dialog box. Up to three fires can be plotted on the Pocket Card graph, but they must be from the "Years to Remember." (In this example, 2000 and 2006).



You can select up to three fires for comparison, but they must have occurred during the "Years to Remember."

8 Type in the **Area Locator Bullets** (in this example, type in **Line 1**: "Northwest Montana;" **Line 2**: "Fire Wx Forecast Zone 104;" and **Line 3**: "Libby Weather Station").

9 Select **Local Thresholds** (in this example, a) Wind Speed **15**; b) Relative Humidity: **25**; c) Temperature: **90**; and d) Live Fuel Index: **100**).

DRAFT

10 Type **Past Experience** text. Include information specific to this area as well as any general and key points to remember (for this example, type in "Large fire activity can occur when the ERC exceeds 45").

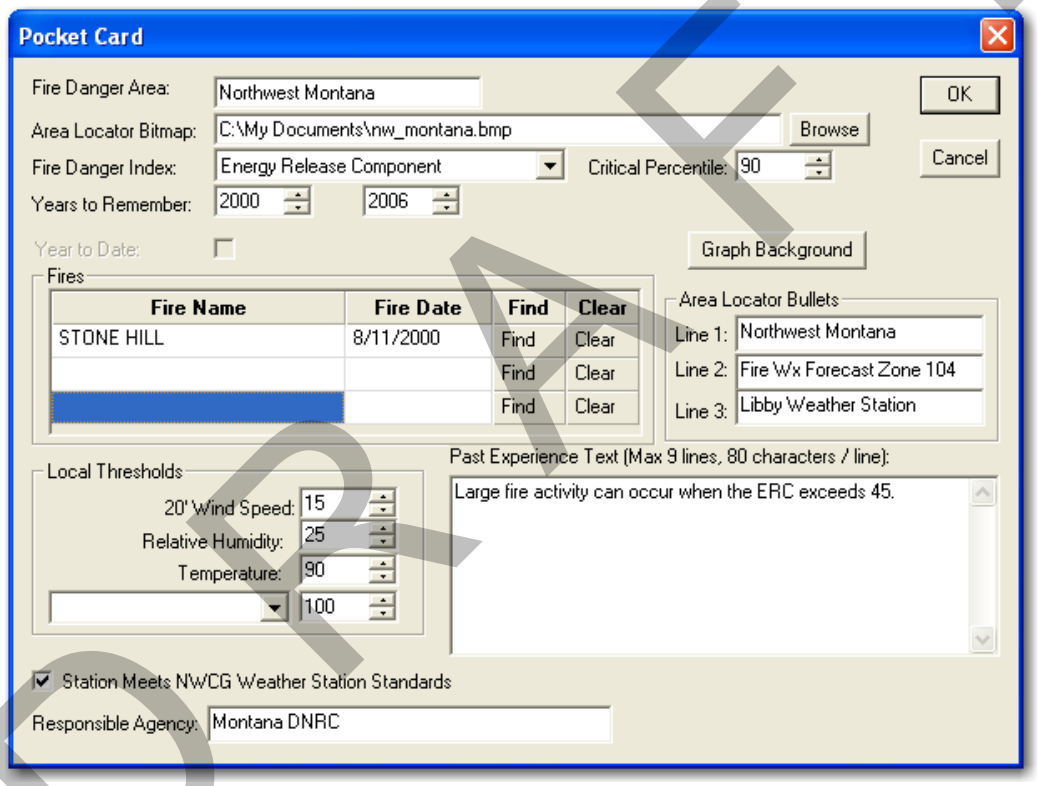
11 Check the box in the lower left corner if the station meets NWCG Weather Station Standards.

See http://www.fs.fed.us/raws/standards.shtml for information on Weather Station Standards.

12 Fill in the box for responsible agency. The example shows "Montana DNRC." Select the available fields and data format as described above.

13 When finished, click **OK**.

The following diagram shows a sample Pocket Card screen.



The following diagram shows the generated pocket card.

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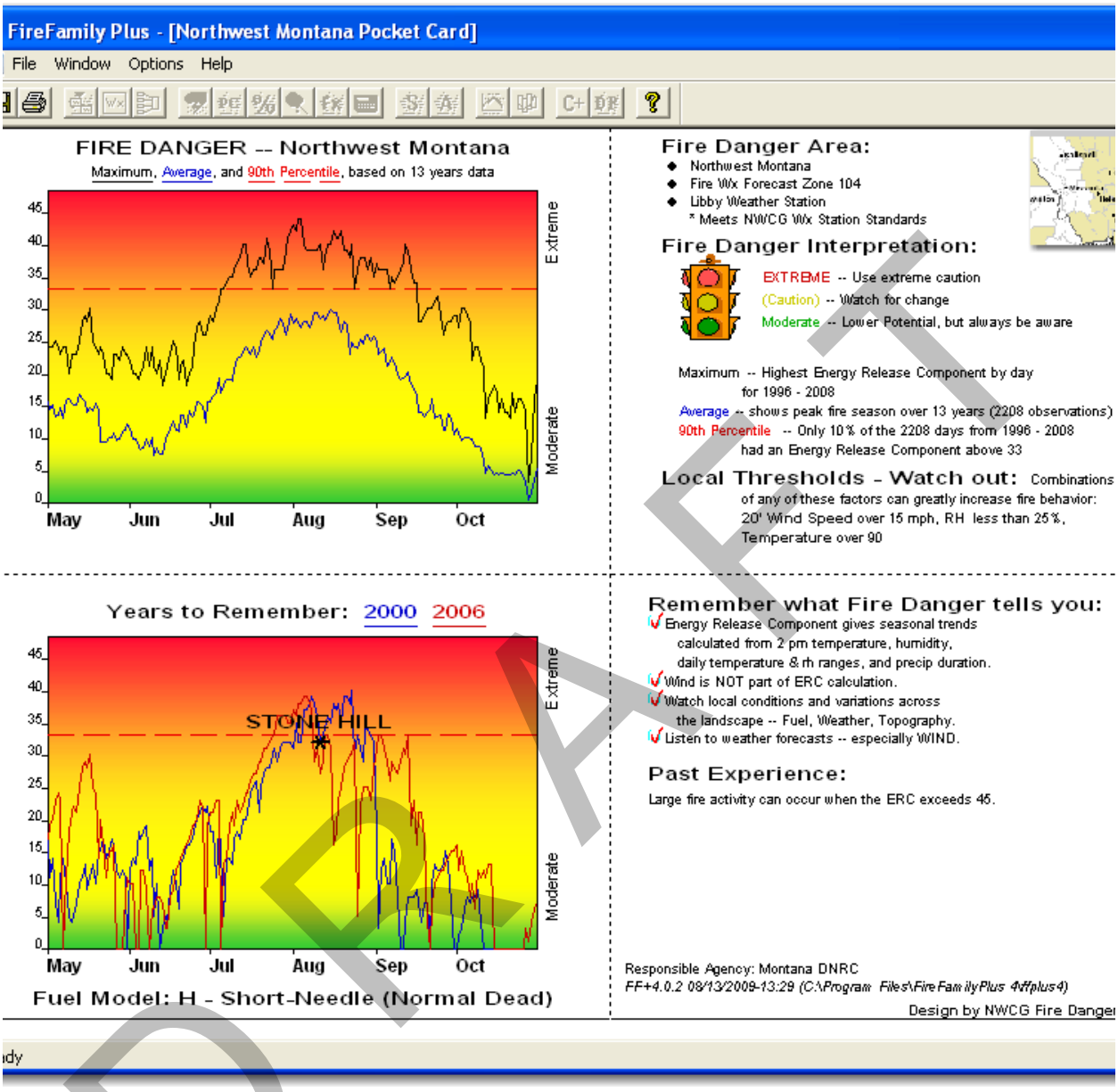


The following website includes example pocket cards from across the U.S. available for review as well as information on items to include in pocket cards: http://fam.nwcg.gov/fam-web/pocketcards/default.htm.

To print a pocket card

1. On the **File** menu, click **Print**.
2. In the **Name** list, click the color printer of your choice.
3. To change the page orientation, click **Properties**, click **Landscape**, and then click **OK**.

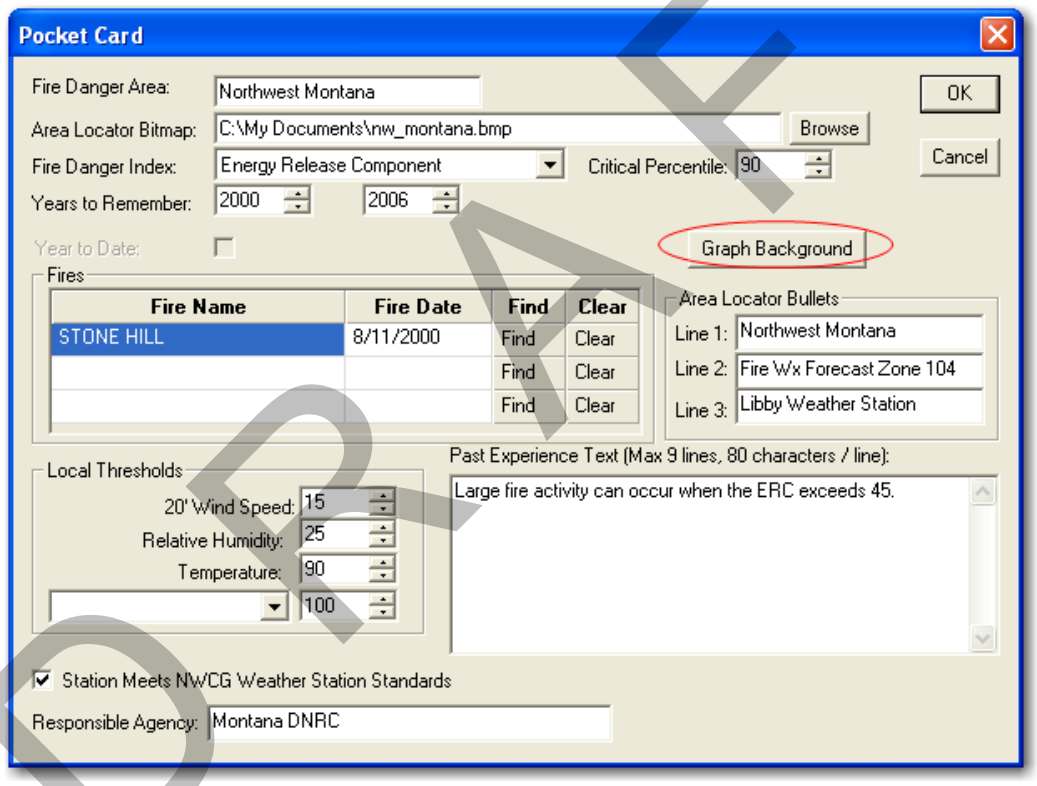
DRAFT

To change the background pattern of your pocket card

This option allows you to change the visual appearance of your graph. Look carefully at the readability of the lines in your graph and what these background colors denote. For example, don't use red to denote the lower portion of your graph if the index value is low or moderate. On humidity and fuel moisture graphs where low represents a higher fire danger, the colors will be inverted.

FireFamily Plus will invert the colors for humidity and fuel moisture graphs where low represents a higher fire danger.

1 In the **Pocket Card** dialog box, click **Graph Background**.



2 Change the **Vertical Percent** fields as desired (for the example use a) red/yellow: **80**; b) yellow: **0**; c) yellow/green: **20**), and then click **OK**.

The following **Graph Background** dialog box shows the background settings that were used to create the sample pocket card.

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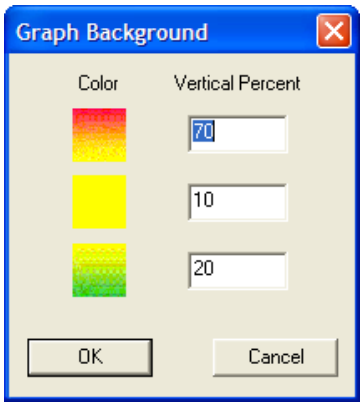

3 Click on **OK** to export weather data.

To save a pocket card

1 On the **File** drop-down menu, click **Save As**.

2 In the **File name** text box, type the file name of your choice, select the file format of your choice, and then click **OK**.

You can save the pocket card in .bmp, .png, .jpg, .gif, and .tif formats. Select the file format that best suits your needs.

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Chapter 9. Working with fire danger projections

This chapter explains how to generate medium range fire danger projections based on current year-to-date weather. It also outlines several techniques for developing fire weather scenarios. Topics include:

- Understanding generated fire weather records from climatological percentiles.
- Reviewing the active working set.
- Generating fire danger projections.
- Generating reports and graphs.

You can create projected observations using one of the following:

- Blank fire weather observations.
- Persistence of the last year-to-date fire weather observation in the working set.
- Fire weather observations generated from climatological percentiles from your active working set, which includes stations, years, and annual filters.

To successfully create projected observations, you must have year-to-date observations in your active working set for the stations of interest. The current year must be part of your active working set. You can edit your projected observations, although these are not saved as part of your database.

Understanding generated fire weather records from climatological percentiles

Generated fire weather records use historical, ***individual daily*** percentiles of temperature, humidity, and wind speed. This differs from the percentile for the entire working set. For example, if your period length is one day, there is one observation for each year in the working set. Therefore, a working set that contains 20 years of data contains 20 observations for each day from which to select the percentile. As compared to the overall critical percentile, this value is the same as plotting the **seasonal values** of critical percentiles on a statistical graph.

To generate projected observations from the 60th percentile of temperature for July 1 to July 15, for example, FireFamily Plus examines the working set for the 60th percentile for the observed dry bulb, and maximum, and minimum temperatures for each of the 15 days. If you select the 10th percentile of humidity, FireFamily Plus examines the working set for the driest 10th

DRAFT

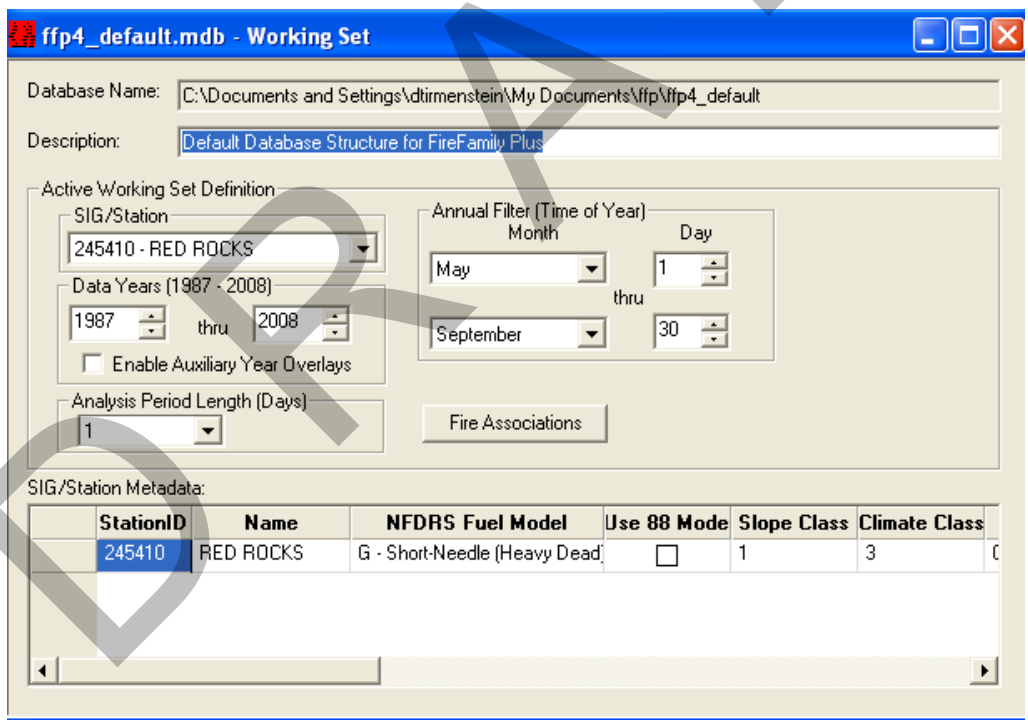
percentile of observed, maximum, and minimum relative humidities for each day. Similarly, by selecting 50th percentile winds, FireFamily Plus will calculate the median value of wind for each of those 15 days.

You can project hot dry conditions by selecting high percentile values for temperature and low percentile values for humidity.

Projected observations from percentile weather have precipitation amount, duration, and state of the weather initialized to "no precipitation" and "mostly sunny skies," where state of the weather equals "1." It is up to you to create precipitation events, if desired, for your medium range projections.

Reviewing the active working set

The following figure shows the active working set used for the examples in this chapter. Notice that observation data for the current year 2008 is available and selected in the working set. Since there are no observations for the year 2008 during the projections period, the projected observations you generate from historical percentiles will be based on daily observation data from 1990 through 2007.



You can project fire danger indices for other analysis period lengths and for Special Interest Groups (SIGS).

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Generating fire danger projections

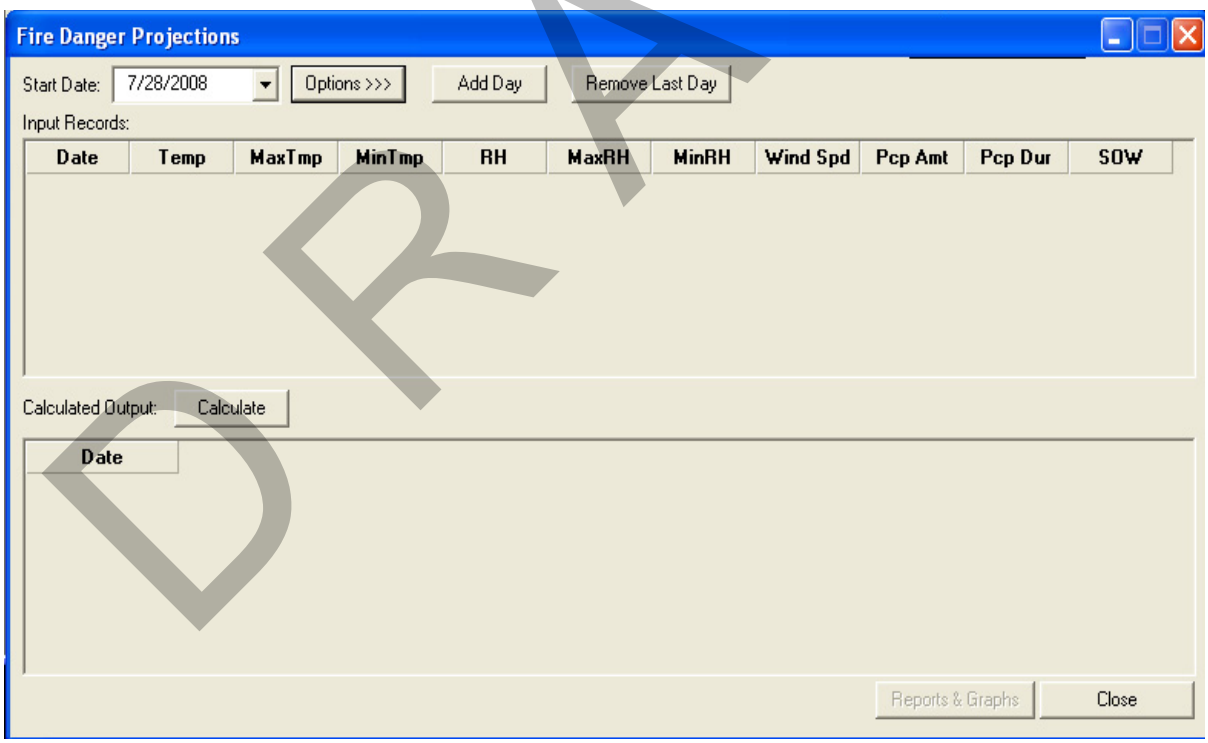
This section explains how to generate NFDRS indices from your projected observations. You can also generate projections from climatology and obtain the percentile values for temperature, humidity, and wind.

To start the fire danger projection module

1 On the **FireFamily Plus** toolbar, click on the **Fire Danger Projection** icon.

*Just as when you generate a statistical table or graph, FireFamily Plus automatically synchronizes your active working set when you click on **Fire Danger Projections**.*

The following diagram shows the **Fire Danger Projections** dialog box. Notice the starting date in this example is July 28, 2008 which indicates that the active working set has data for the Red Rocks station through the 28th of July, 2008.

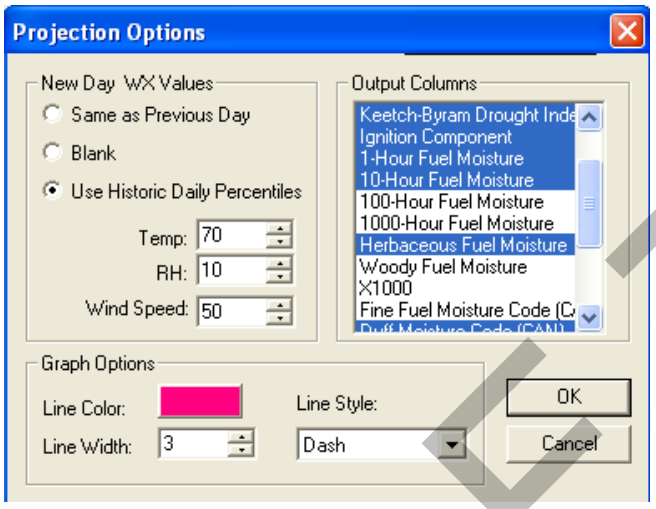


To select the fire danger projection options

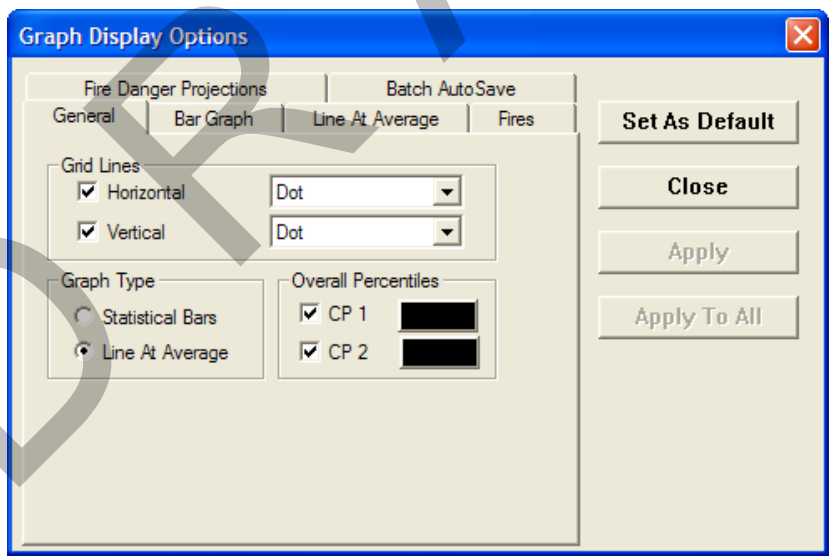
1 Click **Options >>>**.

DRAFT

Based on the indices you selected for your projection, select variables as desired for the **Output Columns**. The following diagram shows the **Projection Options** dialog box.



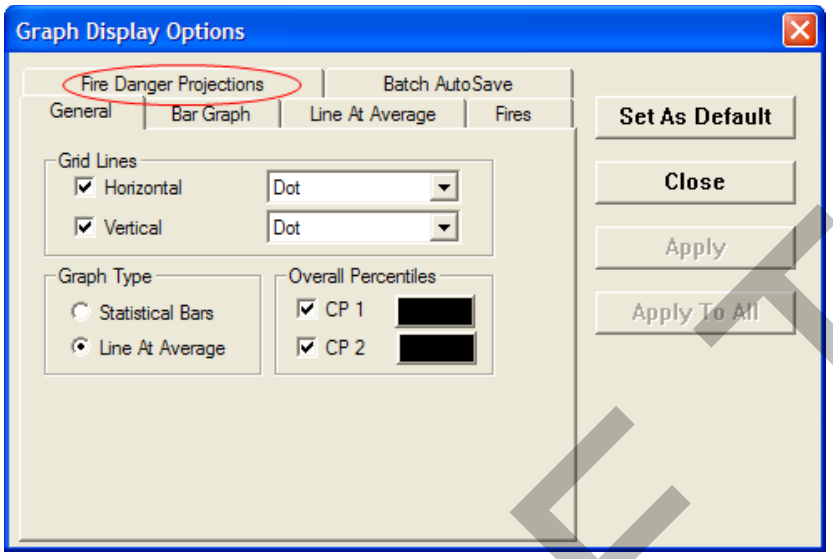
2 Use **Options -> Graph Options** to modify the graph as needed. (See Chapter 6 for additional information). The **New Day WX Values** option in the **Projection Options** dialog box allows you to select the method you would like to use to create observations. Selections are: **Same as Previous Day**, **Blank**, or **Use Historic Daily Percentiles**.



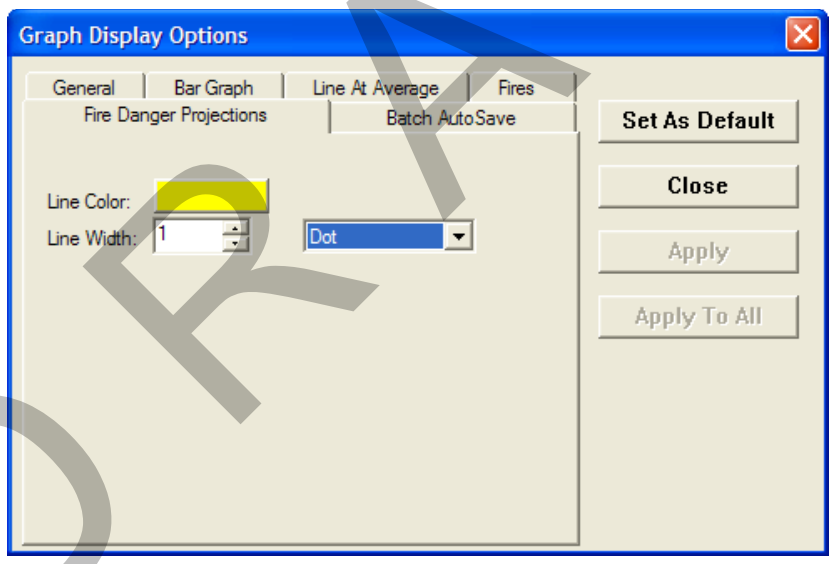
Graph Display Options *dialog box allows you to distinguish the format of the projection line from the year-to-date and other overlays on the statistical season graph. You can also modify the projection line once you create the statistical season graph by clicking the* ***Fire Danger Projections*** *tab on the* ***Graph Options*** *dialog box.*

DRAFT

3 Click on the **Fire Danger Projections** tab as shown.



The following dialog box will open.



4 Select the **Line Color**, **Width** and style options you would like to apply.

Although you can select only one **New Day WX Values** option at a time, you can create several days of persistence, and then switch to a climatology sequence before clicking the **Calculate** button on the **Fire Danger Projections** dialog box.

In this example, you will generate the following projections:

- Temperature based on the 70th percentile, which is slightly above the median.
- Humidity at the 10th percentile, which is slightly below the median.

DRAFT

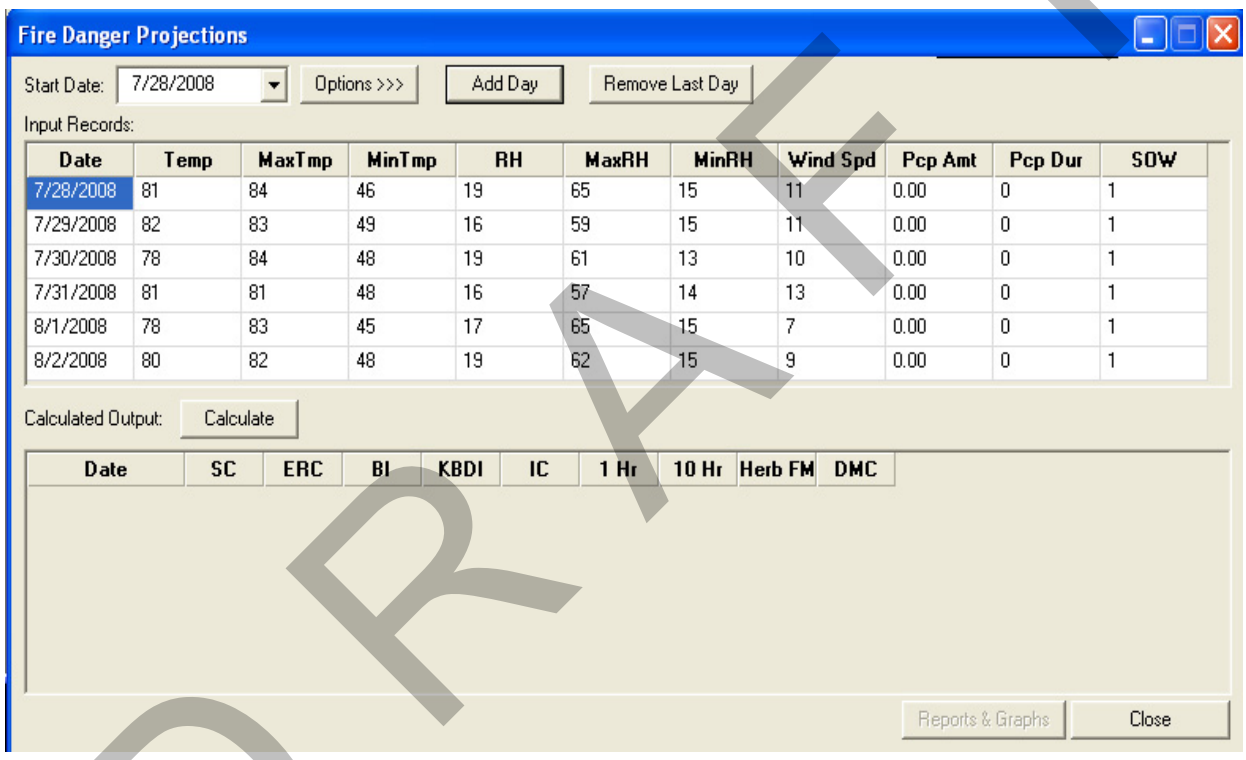
- Wind speed based on the 50th percentile.

*For this example, if you selected the **Same as Previous Day** option, every new record would be the same as July 27th, 2008.*

To add days of projected weather data

1 Click **Add Day** for each day of projected weather data.

The following diagram shows the Fire Danger Projections beginning July 28th, 2008. Notice that the daily observations vary slightly, there is no precipitation, and the State-of-the-Weather (SOW) values are all set to "1."



Date	Temp	MaxTmp	MinTmp	RH	MaxRH	MinRH	Wind Spd	Pcp Amt	Pcp Dur	SOW
7/28/2008	81	84	46	19	65	15	11	0.00	0	1
7/29/2008	82	83	49	16	59	15	11	0.00	0	1
7/30/2008	78	84	48	19	61	13	10	0.00	0	1
7/31/2008	81	81	48	16	57	14	13	0.00	0	1
8/1/2008	78	83	45	17	65	15	7	0.00	0	1
8/2/2008	80	82	48	19	62	15	9	0.00	0	1

Date	SC	ERC	BI	KBDI	IC	1 Hr	10 Hr	Herb FM	DMC

You can add days up to the end of the Annual Filter as defined in your working set.

State of the Weather (SPW) codes showing percent cloud cover include:

0	*clear (0.0 - 0.1)*	*5*	*drizzling*
1	*scattered clouds (0.2 - 0.5)*	*6*	*raining*
2	*broken clouds (0.6 - 0.9)*	*7*	*snow/sleet*
3	*overcast (100% obscured)*	*8*	*showering*
4	*foggy*	*9*	*thunderstorms in progress*

To remove a record from your list of fire danger projections

1 Highlight the record of your choice.

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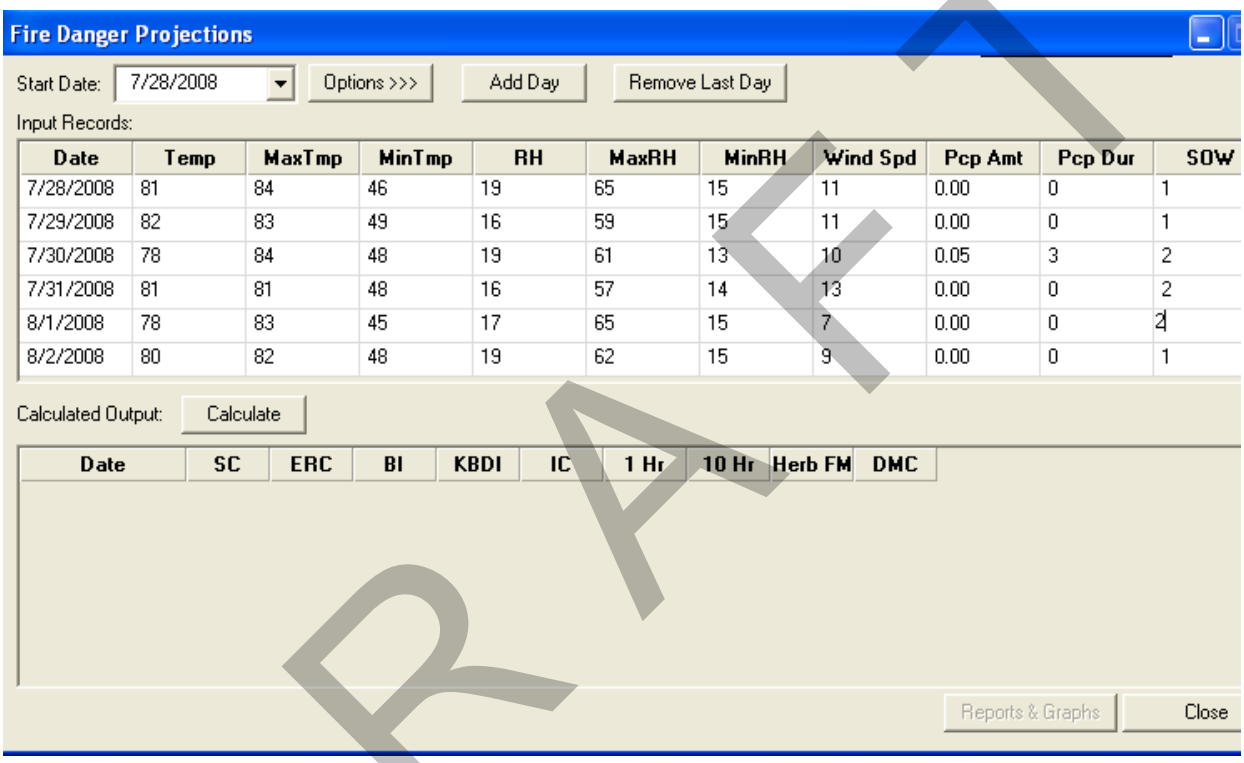
2 Click **Remove Last Day**.

To modify the weather for a specific date

1 Highlight the record of your choice, and then modify the appropriate fields as desired.

The following diagram shows cloudiness (SOW=2) for July 30th through August 1st, and three hours of rain (0.05 inches) for July 30th.



Date	Temp	MaxTmp	MinTmp	RH	MaxRH	MinRH	Wind Spd	Pcp Amt	Pcp Dur	SOW
7/28/2008	81	84	46	19	65	15	11	0.00	0	1
7/29/2008	82	83	49	16	59	15	11	0.00	0	1
7/30/2008	78	84	48	19	61	13	10	0.05	3	2
7/31/2008	81	81	48	16	57	14	13	0.00	0	2
8/1/2008	78	83	45	17	65	15	7	0.00	0	2
8/2/2008	80	82	48	19	62	15	9	0.00	0	1

Date	SC	ERC	BI	KBDI	IC	1 Hr	10 Hr	Herb FM	DMC

2 When satisfied with your projection strings, click **Calculate**.

The following diagram shows the calculated outputs for your fire danger projections.

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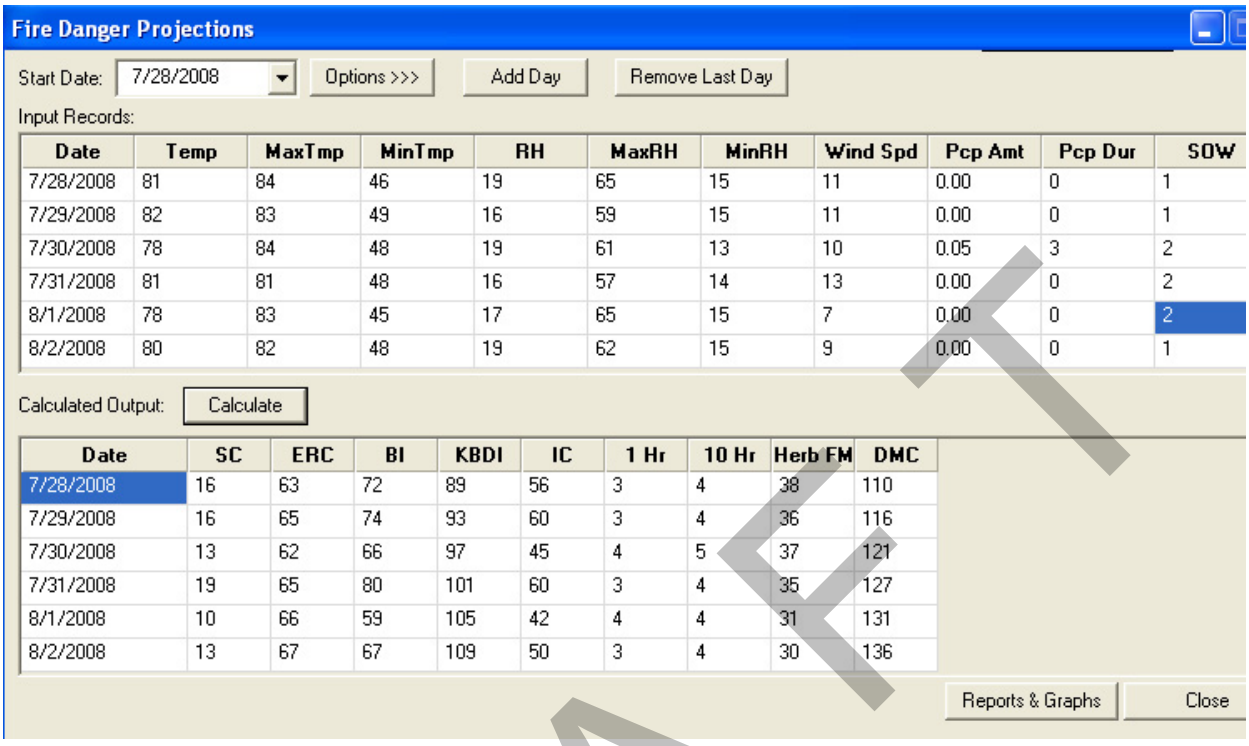

Date	Temp	MaxTmp	MinTmp	RH	MaxRH	MinRH	Wind Spd	Pcp Amt	Pcp Dur	SOW
7/28/2008	81	84	46	19	65	15	11	0.00	0	1
7/29/2008	82	83	49	16	59	15	11	0.00	0	1
7/30/2008	78	84	48	19	61	13	10	0.05	3	2
7/31/2008	81	81	48	16	57	14	13	0.00	0	2
8/1/2008	78	83	45	17	65	15	7	0.00	0	2
8/2/2008	80	82	48	19	62	15	9	0.00	0	1

Date	SC	ERC	BI	KBDI	IC	1 Hr	10 Hr	Herb FM	DMC
7/28/2008	16	63	72	89	56	3	4	38	110
7/29/2008	16	65	74	93	60	3	4	36	116
7/30/2008	13	62	66	97	45	4	5	37	121
7/31/2008	19	65	80	101	60	3	4	35	127
8/1/2008	10	66	59	105	42	4	4	31	131
8/2/2008	13	67	67	109	50	3	4	30	136

From here, you can change, delete, or add the projected observations and recalculate as desired. You can also change the projections options.

Generating reports and graphs

This section explains how to generate reports and graphs from your projections.

To generate reports and graphs from your projections

1 In the **Fire Danger Projections** dialog box, click **Reports & Graphs** at the lower right. The **Select Outputs to Generate** dialog box opens as shown.

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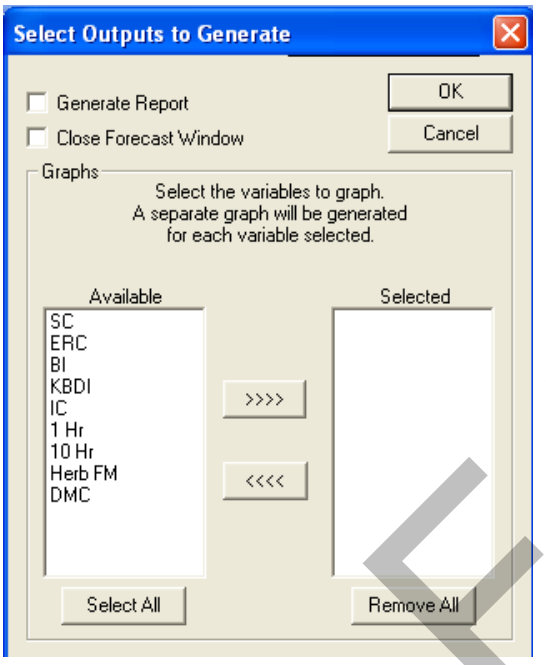

2 In the **Available** column, highlight the variable(s) of your choice, and then click **>>>>** to move that variable to the **Selected** column. To generate a graph for every available variable, click **Select All**.

3 To generate a text file of the projected weather and indices, check **Generate Report**.

4 To generate the reports and graphs, click **OK**.

After generating the reports and graphs, you can return to the **Fire Danger Projections** dialog box and edit your projection strings.

---

*If you select the **Close Forecast Window** check box, FireFamily Plus will end your current projection session and return to your active working set after you generate the reports and graphs. To continue to edit your projection strings without starting all over again, be sure to clear this check box.*

The following diagram shows the initial window appearance after your **Fire Danger Projection** run is complete.

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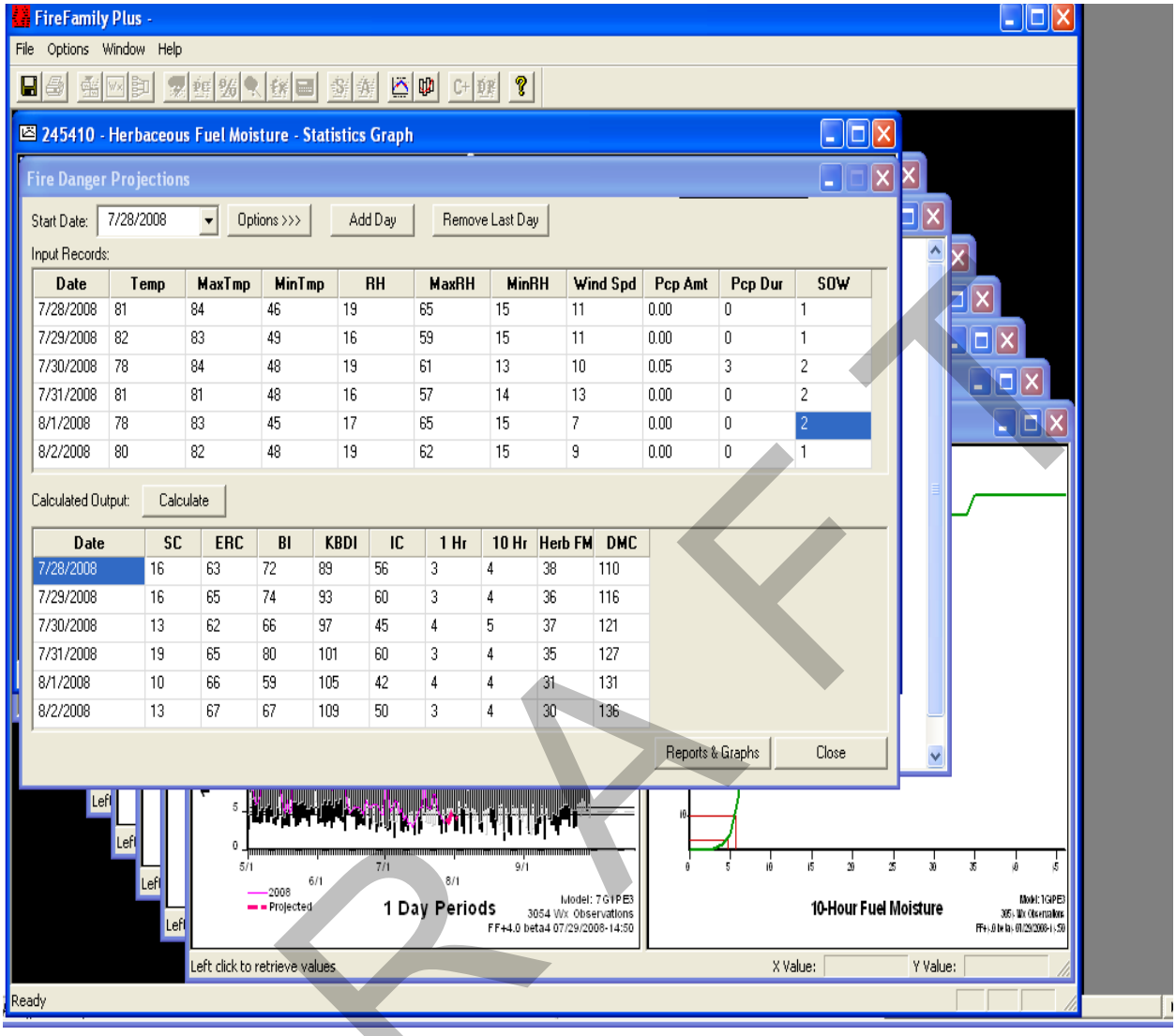

FireFamily Plus reprocesses the working set to obtain any potential overlay years and then displays a window for each graph object you selected. These windows appear behind the **Fire Danger Projections** window.

The following diagram shows the **Energy Release Component Statistics Graph** window. Here, the heavy dashed line represents projected ERC based on your generated projection strings.

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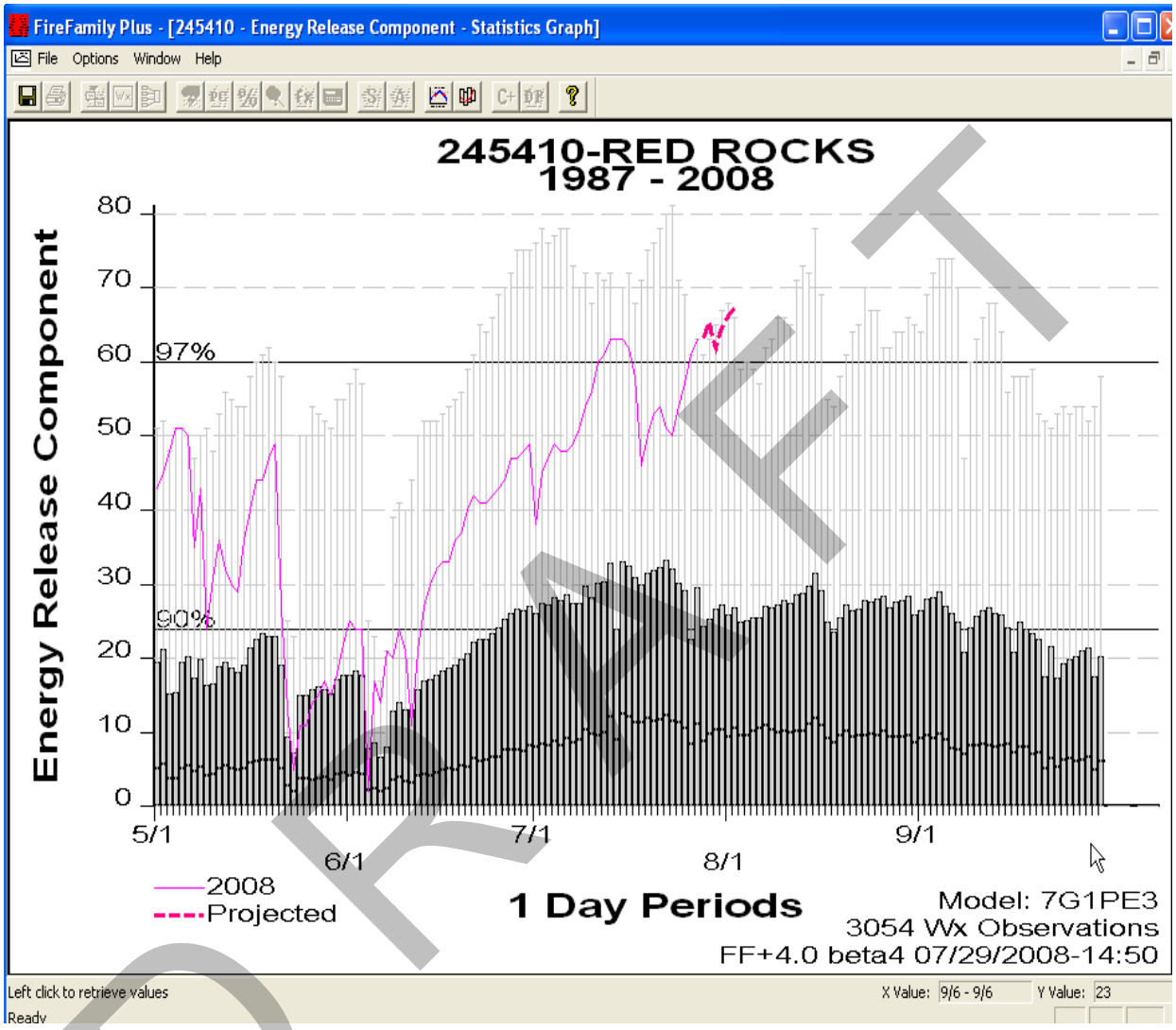

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To create an overlay on your statistical projections graph

1 On the **Options** menu, click **Overlays**. The **Set Overlay Options** dialog box will open as shown.

2 Click **New**, then select the **Year**, **Color**, and **Width,** and **Line Style** for the overlay.

3 To review the appearance of the overlay, click **Apply**.

4 When finished adding new overlays, click **OK**.

---

*Be sure to check the "**Enable Auxiliary Years Overlays**" box on the working set screen to use this option.*

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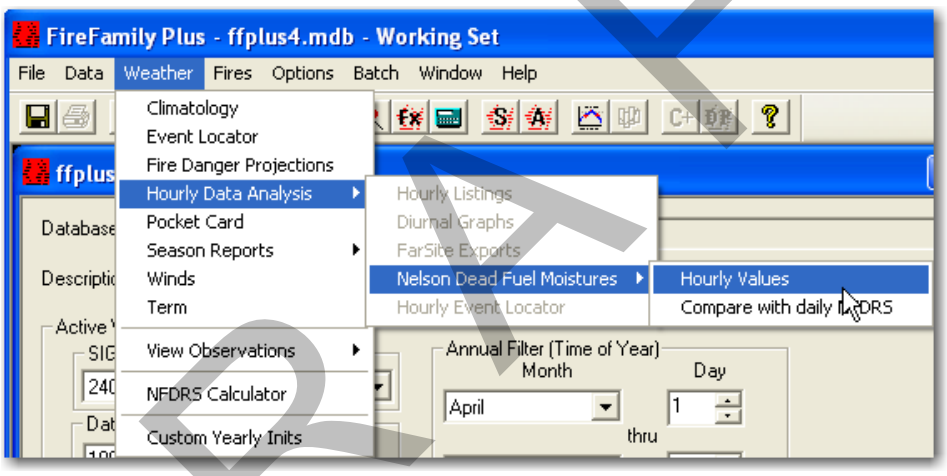
Chapter 10. Performing hourly data analysis

This chapter explains how to work with hourly weather data. Topics include:

- Viewing hourly observations.
- Generating hourly listings.
- Generating diurnal graphs.
- Exporting hourly weather data to FARSITE.
- Using the Hourly Event Locator.
- Working with the Nelson Dead Fuel Moisture model.

As elsewhere in FireFamily Plus, your hourly data analysis results are controlled by how you configure your active working set. The best way to determine the type of hourly data you have, is to select your station/SIG in the working set and select ***Weather -> View Observations -> All.***



To support hourly analysis you should import files from National Interagency Fire Management Integrated Database (NIFMID) that are in the standard FW9 format (See Appendix D for additional information). The FW9 file format has several observation types, including:

- **O type.** A 1300 hour NFDRS record with State of the Weather (SOW) and wet flag.
- **R type**. An hourly weather observation record without State of the Weather.

If a station in your active working set contains “R” type observations, you will be able to choose from the **Hourly Data Analysis** options on the **Weather** menu. If no stations contain “R” type observations, these options appear dimmed and are not enabled.

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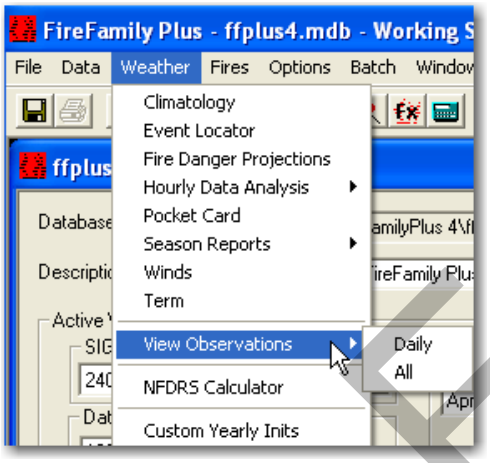
Viewing hourly observations

The **View Observations** option on the **Weather** menu allows you to view either daily observations (1300 NFDRS type "O" observations) or all observations in your active working set.



To view all observations in your working set

1 On the **Weather** drop-down menu, point to **View Observations.**

2 Click **All**.

The following diagram shows all observations in the default FireFamily Plus database (ffplus4). Notice the buttons available on the toolbar.

Recall that the working set is a filter of the active database (see Chapter 5 for additional information).

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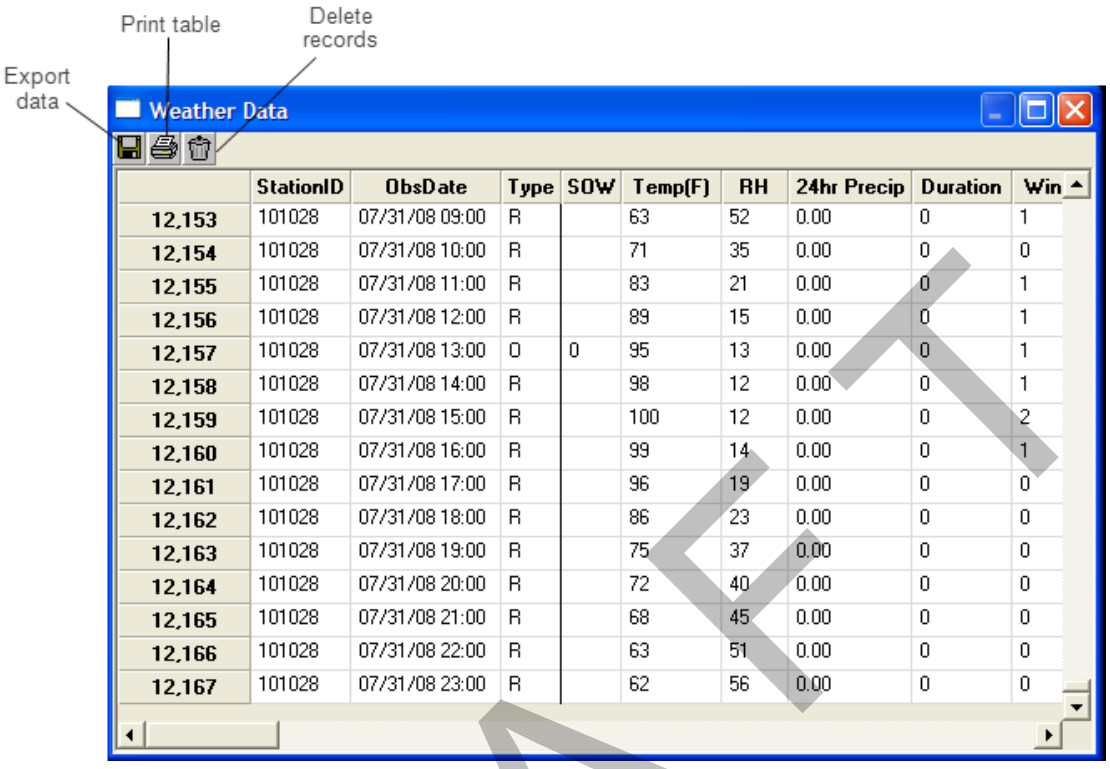

	StationID	ObsDate	Type	SOW	Temp(F)	RH	24hr Precip	Duration	Win
12,153	101028	07/31/08 09:00	R		63	52	0.00	0	1
12,154	101028	07/31/08 10:00	R		71	35	0.00	0	0
12,155	101028	07/31/08 11:00	R		83	21	0.00	0	1
12,156	101028	07/31/08 12:00	R		89	15	0.00	0	1
12,157	101028	07/31/08 13:00	O	0	95	13	0.00	0	1
12,158	101028	07/31/08 14:00	R		98	12	0.00	0	1
12,159	101028	07/31/08 15:00	R		100	12	0.00	0	2
12,160	101028	07/31/08 16:00	R		99	14	0.00	0	1
12,161	101028	07/31/08 17:00	R		96	19	0.00	0	0
12,162	101028	07/31/08 18:00	R		86	23	0.00	0	0
12,163	101028	07/31/08 19:00	R		75	37	0.00	0	0
12,164	101028	07/31/08 20:00	R		72	40	0.00	0	0
12,165	101028	07/31/08 21:00	R		68	45	0.00	0	0
12,166	101028	07/31/08 22:00	R		63	51	0.00	0	0
12,167	101028	07/31/08 23:00	R		62	56	0.00	0	0

To save (export) observation records to your computer

1 Click the **Export Data** icon and select the file format of your choice.

2 Save the file in a folder of your choice.

The following diagram shows the **Export Weather Data to a Text File** dialog box. From here, you can export weather data and save it in a variety of formats.

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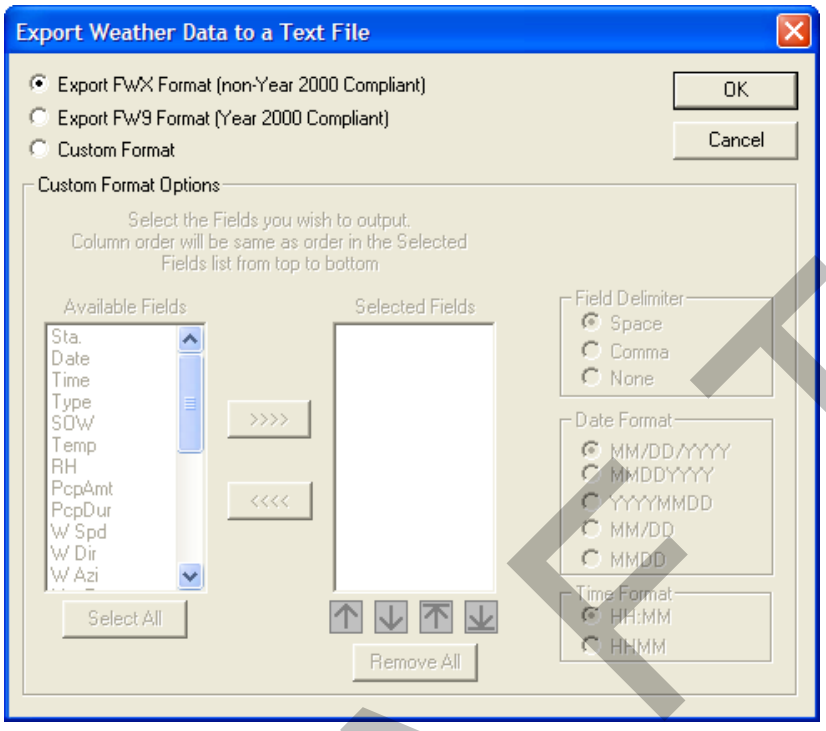
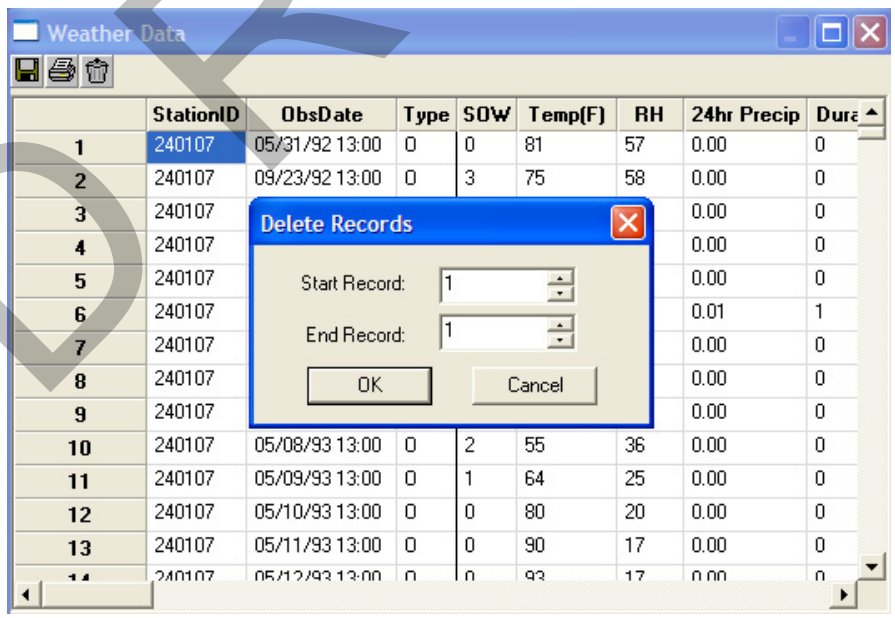


To delete a range of observations from your active working set

1 Select the record of your choice, and then click the **Delete Records** icon. The **Delete Records** dialog box will open.



2 In the **Start Record** box, type or select the first record of your choice.

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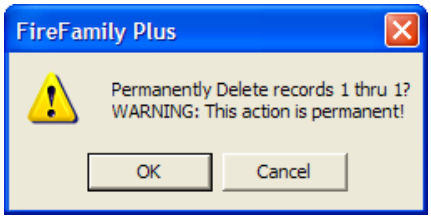
3 In the **End Record** box, type or select the last record of your choice.

4 When finished, click **OK**.

5 To confirm the delete, click **OK**. The following diagram shows the warning message for deleting weather observations from your active working set.



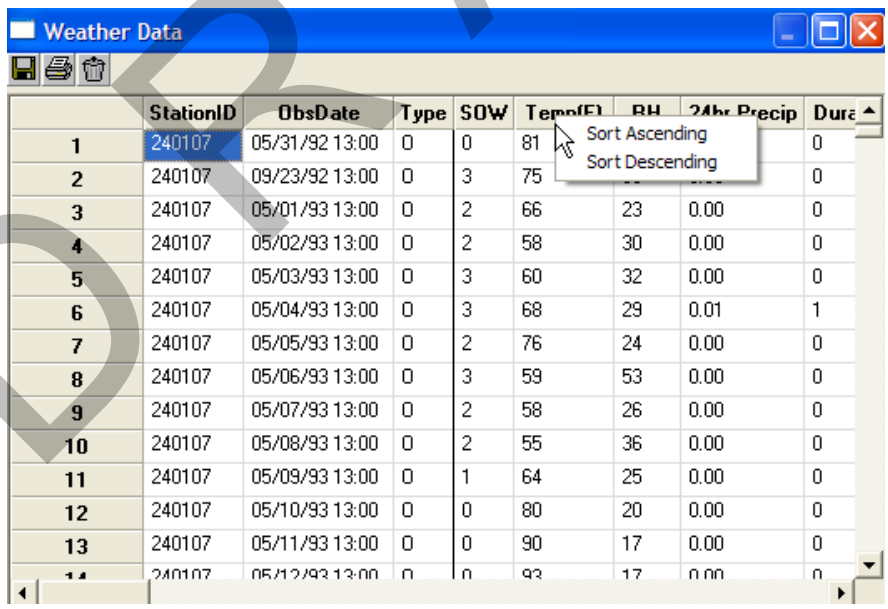
Hint: To delete all records you can put a huge number for the "End Record" value.

To sort the weather observations

1 Right-click on the column of your choice, and then select either **Sort Ascending** or **Sort Descending**.

The following diagram shows the **Weather Data** listing as it appears when you right-click on the **Temp(F)** column.

.



	StationID	ObsDate	Type	SOW	Temp(F)	RH	24hr Precip	Dura
1	240107	05/31/92 13:00	0	0	81			0
2	240107	09/23/92 13:00	0	3	75			0
3	240107	05/01/93 13:00	0	2	66	23	0.00	0
4	240107	05/02/93 13:00	0	2	58	30	0.00	0
5	240107	05/03/93 13:00	0	3	60	32	0.00	0
6	240107	05/04/93 13:00	0	3	68	29	0.01	1
7	240107	05/05/93 13:00	0	2	76	24	0.00	0
8	240107	05/06/93 13:00	0	3	59	53	0.00	0
9	240107	05/07/93 13:00	0	2	58	26	0.00	0
10	240107	05/08/93 13:00	0	2	55	36	0.00	0
11	240107	05/09/93 13:00	0	1	64	25	0.00	0
12	240107	05/10/93 13:00	0	0	80	20	0.00	0
13	240107	05/11/93 13:00	0	0	90	17	0.00	0
14	240107	05/12/93 13:00	0	0	93	17	0.00	0

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To increase a column width

1 Position the pointer in the column heading of your choice, and then drag to the right or to the left to increase or decrease the column width.

You can also increase or decrease the height of any row using this same method.

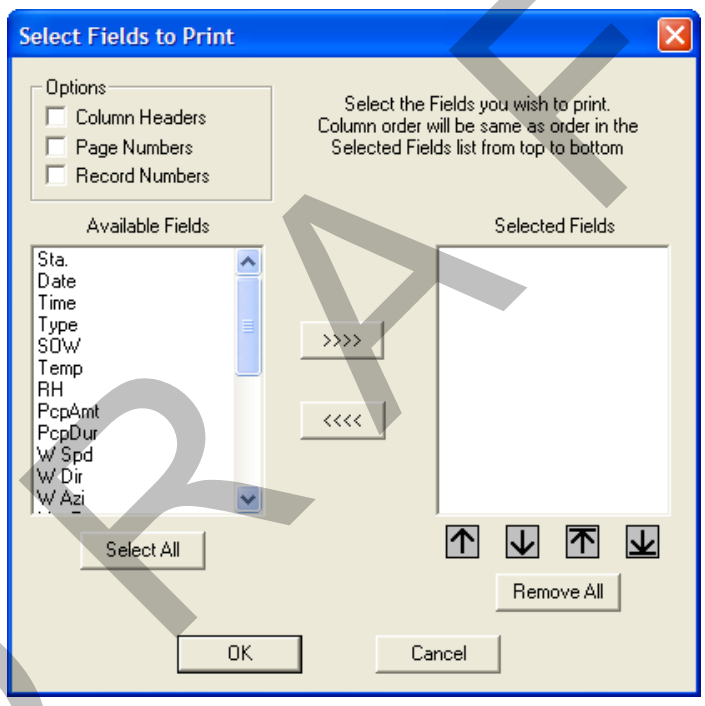
To print the weather observations in your working set

1 Click the **Print Table** icon.

2 Select **Options** and **Available Fields** of your choice.

3 Click **OK** when you have competed your selections.

The following diagram shows the **Select Fields to Print** dialog box.



*Since you are dealing with hourly data, printing these files may require vast quantities of paper! Be sure that **printing all** is what you really want to do!*

Generating hourly listings

To generate an hourly listing

1 On the **Weather** drop-down menu, point to **Hourly Data Analysis**, then click **Hourly Listings**.

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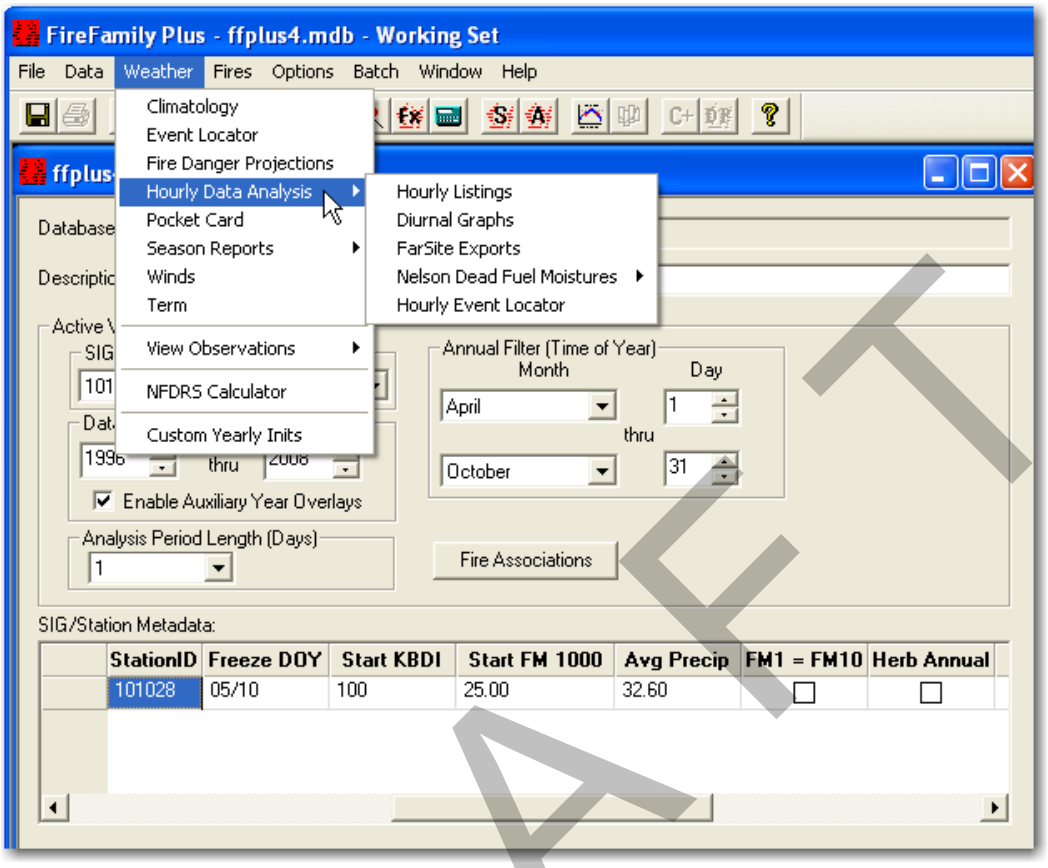

The following diagram shows the **Select Output Variables for Hourly Listing** dialog box.

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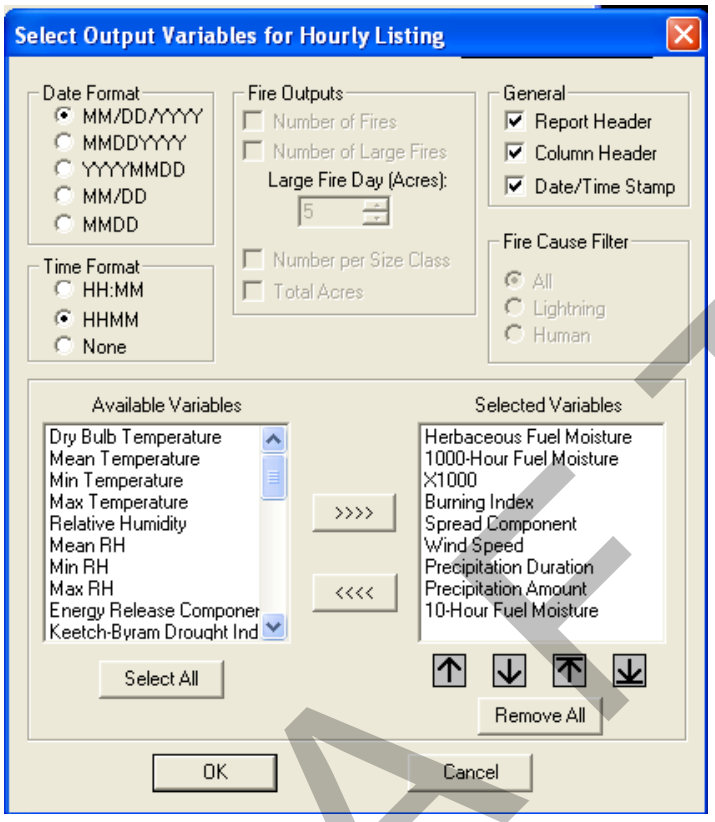

2 Select the **General**, **Data Format**, and **Time Format** options of your choice.

3 In the **Available Variables** column, highlight the variable(s) of your choice, and then click >>>> to move that variable to the **Selected Variables** column. To generate an hourly listing for every available variable, click **Select All**.

4 To generate the hourly listing, click **OK**.

To change the order of your selected variables, highlight the selected variable(s) of your choice and then click the up and down arrows to move the selection up or down.

The following diagram shows the resulting hourly listing for Dry Bulb Temperature, Relative Humidity, and Wind Speed.

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240107 - Hourly Listing

FireFamily Plus Hourly Listing Report
Hourly Listing of Selected Values
Station: 240107 - LIBBY RANGER STATION 2001 - 2002

DATE	Time	Temp	RH	Wind
05/01/2001	00:00	45	56	2
05/01/2001	01:00	45	53	2
05/01/2001	02:00	42	63	2
05/01/2001	03:00	39	73	0
05/01/2001	04:00	37	77	0
05/01/2001	05:00	37	76	1
05/01/2001	06:00	38	79	1
05/01/2001	07:00	40	73	0
05/01/2001	08:00	43	57	1
05/01/2001	09:00	45	55	2
05/01/2001	10:00	48	48	3
05/01/2001	11:00	51	38	3
05/01/2001	12:00	52	35	2
05/01/2001	13:00	56	38	3
05/01/2001	14:00	56	32	3
05/01/2001	15:00	56	34	3
05/01/2001	16:00	51	42	3

Generating diurnal graphs

The **Diurnal Graphs** option allows you to determine the hourly average value for all days in your active working set. It also allows you to generate a companion report of the average value for each hour for each day of the year (*not for **each** day of **each** year)*.

Each variable you select will produce one graph and report.

There are no overlays or graphic configuration options for diurnal graphs.

The diagram below shows the active working set used for most of the examples that follow in this chapter.

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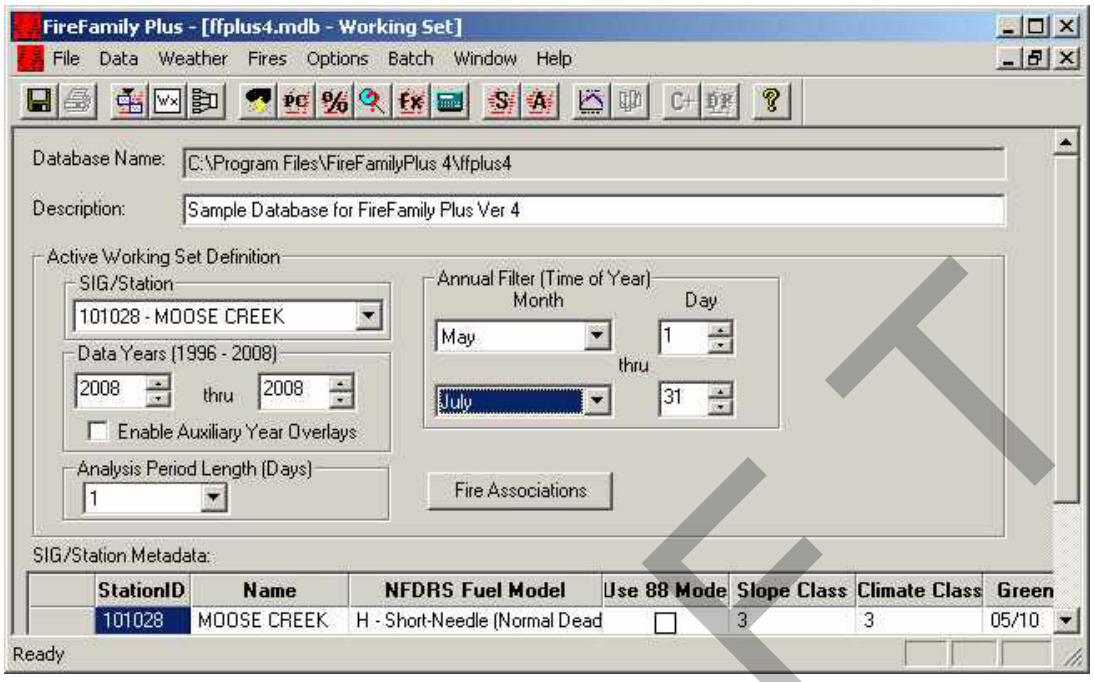
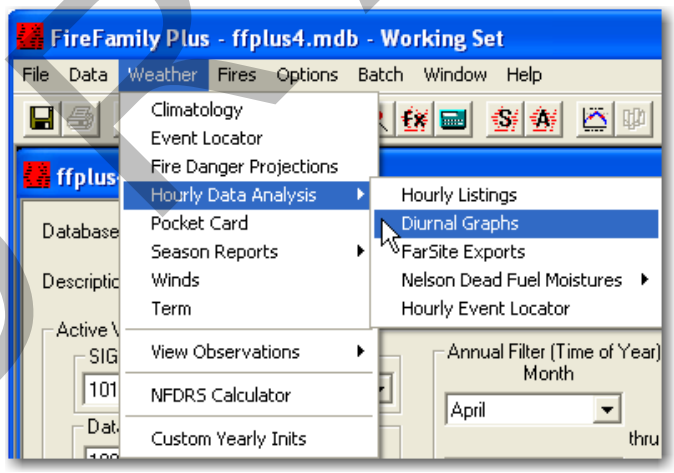


To generate a diurnal graph

1 On the **Weather** drop-down menu, click on **Hourly Data Analysis**, and then click **Diurnal Graphs.**



The following **Generate Diurnal Graphs** dialog box will open.

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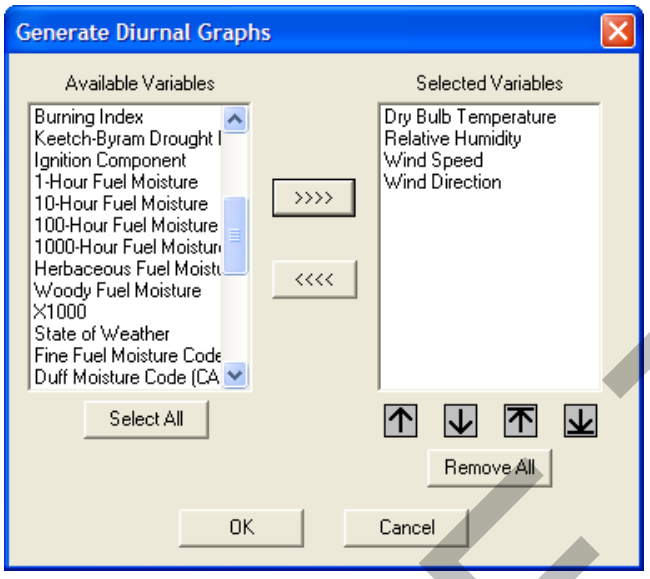
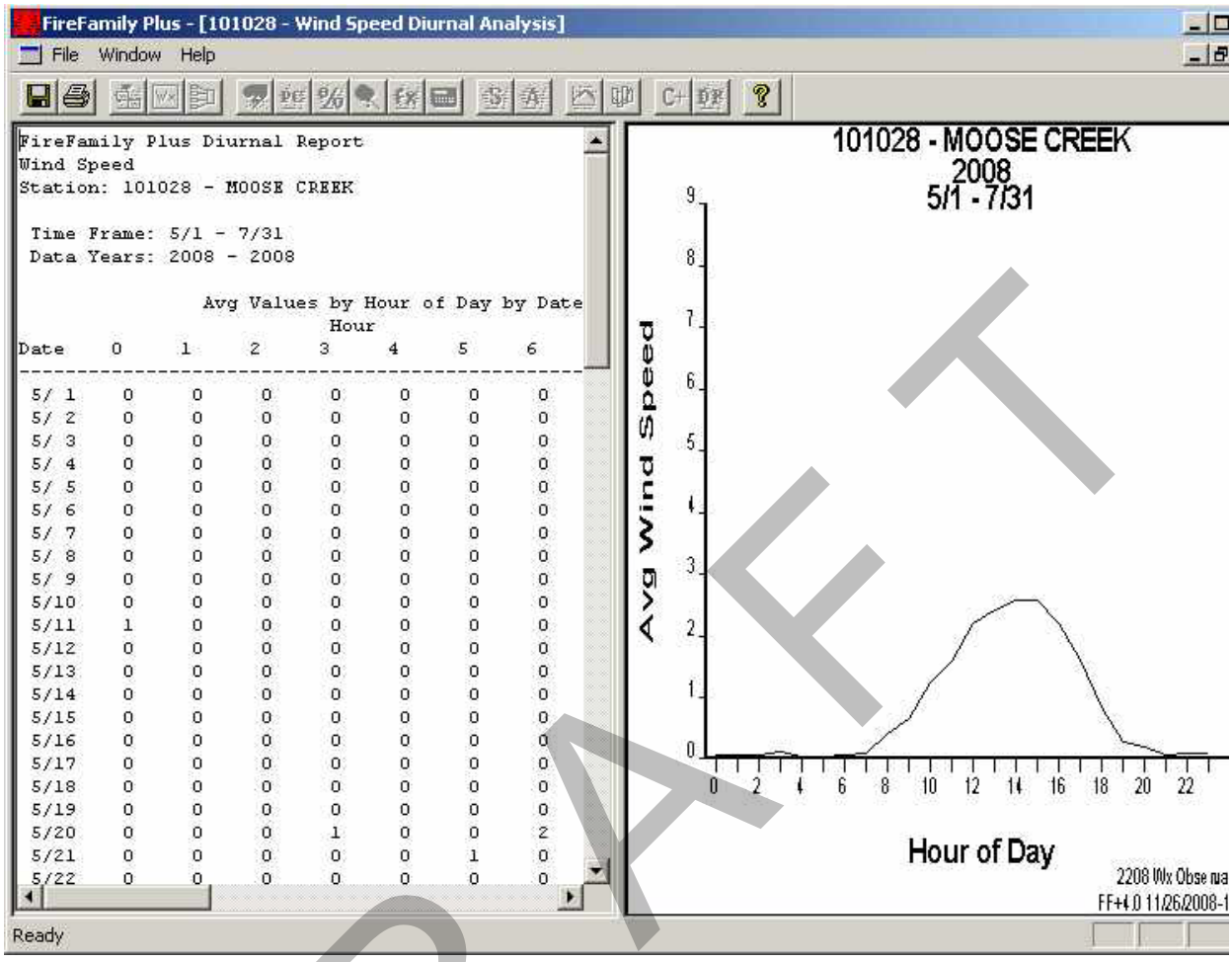


2 In the **Available Variables** column, highlight the variable(s) of your choice, and then click **>>>>** to move that variable to the **Selected Variables** column. To generate diurnal graphs for every available variable, click on **Select All**.

3 To generate the diurnal graphs, click **OK**.

The following diagram shows the resulting **Wind Speed Diurnal Analysis** output.

DRAFT



The report on the left displays the average value for each day in the working set.

The graph on the right displays the "0000" through "2300" hourly averages for all days in the working set, which is essentially the average of each column in the report.

The graph may not always display the precise average of each column in the report. The report does not display the number of observations for each day/ hour, which may vary from cell to cell.

The following diagram shows the resulting **Mode Wind Direction** graph. Instead of a numerical average, the mode direction identifies the direction that occurs most often.

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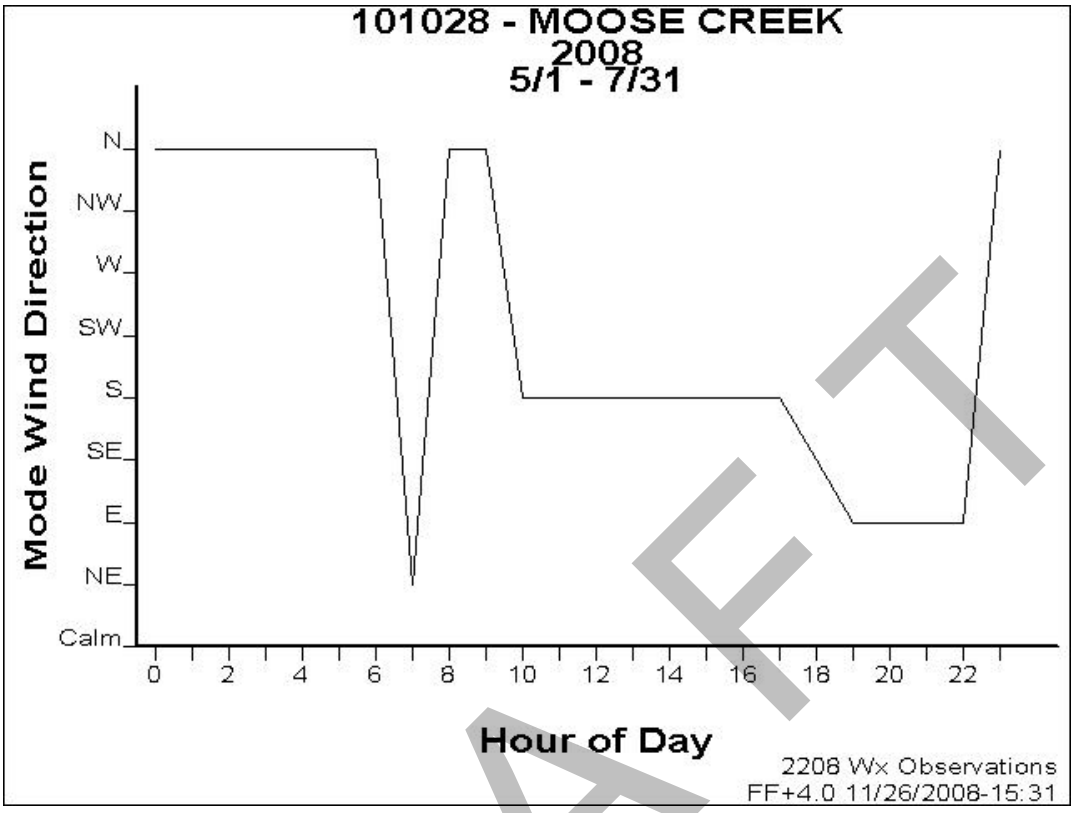

"Wind direction" is classified according to the eight standard wind directions in a fire weather observation, where 0 = Calm, 1 = NE, 2 = E, and so on.

Remember, this summary is based on your active working set.

To save your diurnal reports and graphs

1 On the **File** menu, point to **Save,** and then click **Report** or **Graph**.

2 Type a name of your choice and then click **Save**. Reports are saved using the .txt file extension. Graphs can be saved in a variety of file formats (.bmp, .png, .jpg, .gif, or .tif files).

*If report options are comma-delimited, the report can be saved as a *.csv file and imported into an Excel spreadsheet.*

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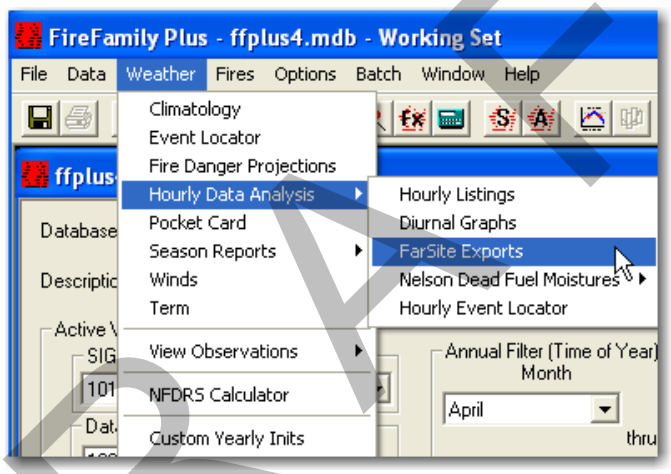
Exporting hourly weather data to FARSITE

The FARSITE Exports option allows you to automatically create FARSITE export files from your active working set, (one file for each day). These files are compatible with FARSITE version 3 and greater. You can use FireFamily Plus version 4.0 to directly export fire weather observations to initialize fire growth projections using FARSITE.

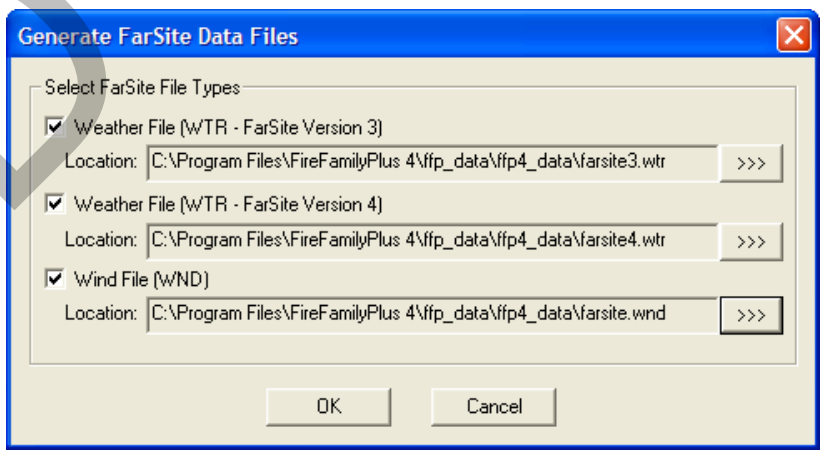
Select a period of weather from a specific year from your climatology analysis for FARSITE simulations.

To create a FARSITE export file

1 On the **Weather** drop-down menu, click on **Hourly Data Analysis**, and then click **FARSITE Exports**.



2 The FARSITE Datafiles dialog box will open. Click on the **Select FarSite File Types** check boxes of your choice.



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3 Click >>>> to browse to the folder location of your choice and then type the **File Name** of each export file.

4 After clicking **OK**, your selected reports will be displayed. The exported files will be properly formatted for immediate use in FARSITE and FlamMap.

You can save the export files shown above in any folder you choose.

The following diagram shows the layout of the export weather file (.WTR) for FARSITE version 3. This weather file has one summary record per day. The fields are month, day, precipitation amount, time of minimum temperature, time of maximum temperature, minimum temperature, maximum temperature, maximum relative humidity, minimum relative humidity, and station elevation (expressed in feet).

C:\Documents and Settings\lbradshaw\My Documents\ffp4_ug\Screen_shots\farsite4.wtr

```
5 1 0 2300 1400 31 54 97 34 2460
5 2 0 200 1400 28 69 96 12 2460
5 3 0 400 1300 30 72 93 19 2460
5 4 0 400 1400 32 78 95 17 2460
5 5 0 300 1300 33 79 93 20 2460
5 6 0 400 1500 36 73 93 29 2460
5 7 0 300 1400 42 62 90 44 2460
5 8 1 400 1500 41 64 98 26 2460 0 0
5 9 0 600 1300 33 61 91 26 2460
5 10 0 500 1500 31 70 94 19 2460
5 11 8 500 1500 39 62 94 30 2460 500 700
5 12 2 2300 1400 36 56 97 36 2460 0 0
5 13 4 400 1300 30 67 97 26 2460 1800 2300
5 14 21 100 1300 43 60 99 70 2460 0 900
5 15 0 200 1600 46 82 98 26 2460
5 16 0 500 1600 39 92 97 17 2460
5 17 0 400 1500 40 96 86 11 2460
```

The following diagram shows an example wind export file (.WND). It contains an hourly listing for each day in the working set range and identifies month, day, hour/minute, wind speed, direction (azimuth), and cloud cover.

C:\Documents and Settings\lbradshaw\My Documents\ffp4_ug\Screen_shots\farsite.wnd

```
5 1 0 0 28 0
5 1 100 0 2 0
5 1 200 0 76 0
5 1 300 0 67 0
5 1 400 0 234 0
5 1 500 0 323 0
5 1 600 0 288 0
5 1 700 0 297 0
5 1 800 0 349 0
5 1 900 3 185 0
5 1 1000 4 118 0
5 1 1100 3 323 0
5 1 1200 3 68 0
5 1 1300 3 201 0
5 1 1400 2 47 0
5 1 1500 3 203 0
5 1 1600 3 194 0
```

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Cloud cover is "0" unless rain occurred during the hour. If rain occurred, cloud cover is set to "100." In this example, no rain occurred.

Using the hourly event locator

The Hourly Event Locator functions much like the Event Locator described in Chapter 6. However, instead of using daily data, the Hourly Event Locator uses hourly data. If you have hourly data, you can use the Hourly Event Locator to query the database for weather events lasting a specific minimum number of hours. You can use it to locate, count, and list periods of specified weather events that occur within a single hour or over several consecutive hours.

For example, it allows you to:

- Find periods of potential extreme burning conditions.
- Find events such as a brief period of heavy rain or high winds.
- Inspect the database for suspect data.

The Hourly Event Locator allows you to use the following categories to identify particular values:

- **Sum:** The summed, or total, of the variable.
- **Avg:** The average of the variable for the period.
- **Min:** The minimum value in the string.
- **Max:** The maximum value in the string.
- **Hourly:** The hours value in the string.

To search for erroneous data - an example

The Hourly Event Locator functions in much the same way as the Event Locator described in Chapter 6.

This example explains how to search for precipitation amounts greater than or equal to 1 inch of rain in a single hour.

1. On the **Weather** drop-down menu, click **Hourly Data Analysis** and select **Hourly Event Locator**.
2. In the **Period Length (Hours)** box, type **1** and then press **Tab** twice.
3. In the **Variable** box, select **Precipitation Amount,** and then press **Tab.**
4. In the **Category** box, select **Sum**.
5. In the **Operator** box, select **>=,** and then press **Tab.**
6. In the **Value** box, type in **1.0** and then press **Tab**.
7. In the **Value Type** box select **Value**, and then click **OK**.

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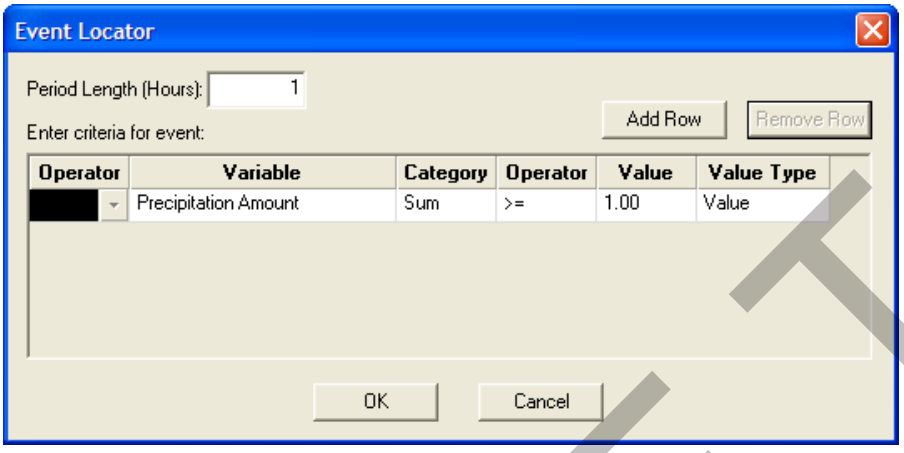
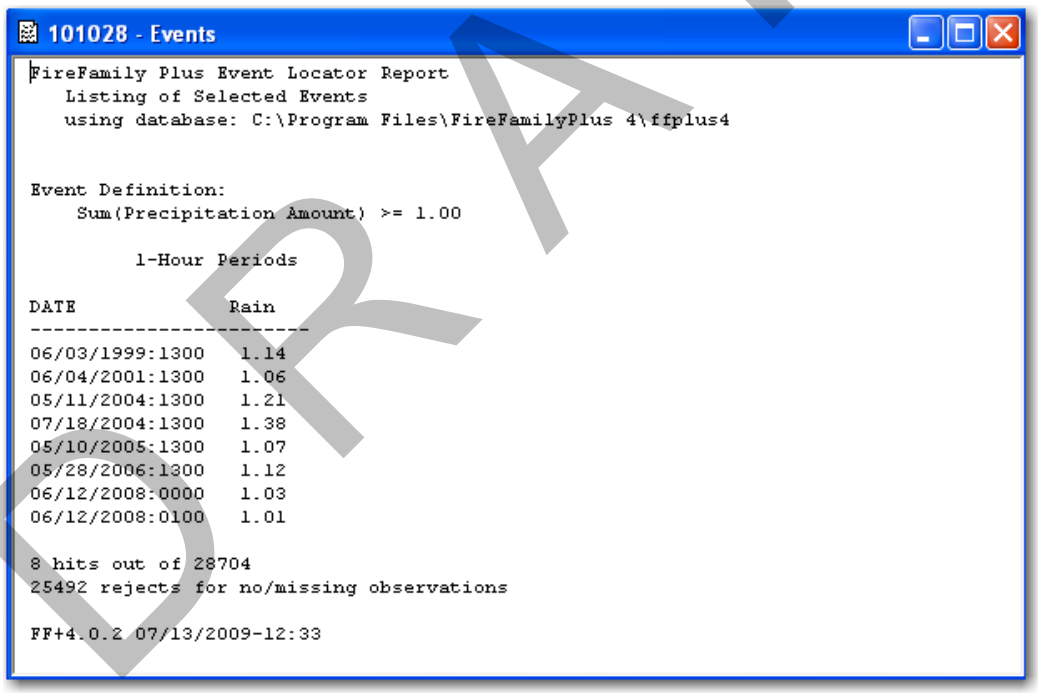
The following diagram shows the **Hourly Event Locator** dialog box used to search for hourly precipitation amounts equal to or greater than 1 inch.



The following **Events** report shows individual 1-Hour Periods receiving 1 inch or more of precipitation.



```
101028 - Events

FireFamily Plus Event Locator Report
   Listing of Selected Events
   using database: C:\Program Files\FireFamilyPlus 4\ffplus4


Event Definition:
    Sum(Precipitation Amount) >= 1.00

         1-Hour Periods

DATE                Rain
------------------------
06/03/1999:1300     1.14
06/04/2001:1300     1.06
05/11/2004:1300     1.21
07/18/2004:1300     1.38
05/10/2005:1300     1.07
05/28/2006:1300     1.12
06/12/2008:0000     1.03
06/12/2008:0100     1.01

8 hits out of 28704
25492 rejects for no/missing observations

FF+4.0.2 07/13/2009-12:33
```

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To search for a run of extreme burning conditions - an example

The following example shows how to look for periods of hours of extreme burning conditions.

1 On the **Weather** drop-down menu, click **Hourly Data Analysis** and select **Hourly Event Locator**.

2 In the **Period Length (Hours)** box, type **4** and then press **Tab** twice.

3 In the **Variable** box, select **Dry Bulb Temperature,** and then press **Tab.**

4 In the **Category** box, select **Hourly**.

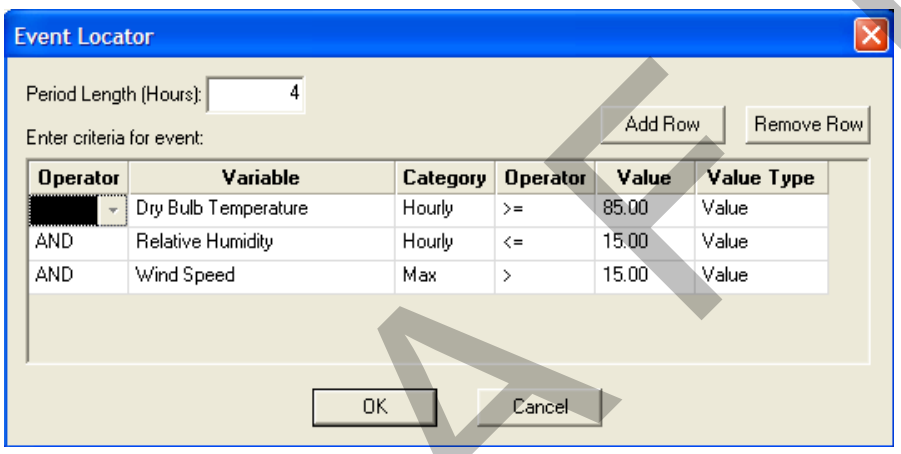
5 In the **Operator** box, select **>=,** and then press **Tab.**

6 In the **Value** box, type in **85.00** and then press **Tab**.

7 In the **Value Type** box select **Value**, and then click **OK**.

8 Complete the box as shown below.

9 When the dialog is completed, click **OK**.



The following example from the Red Rocks station in Montana (245410) shows extreme burning conditions meeting the conditions of your search.

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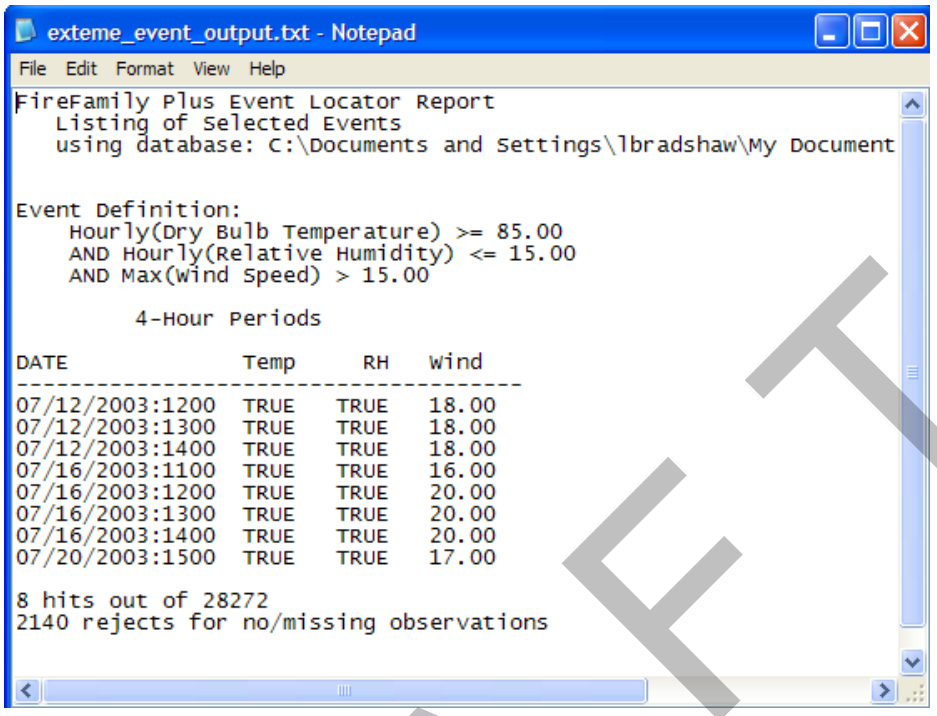
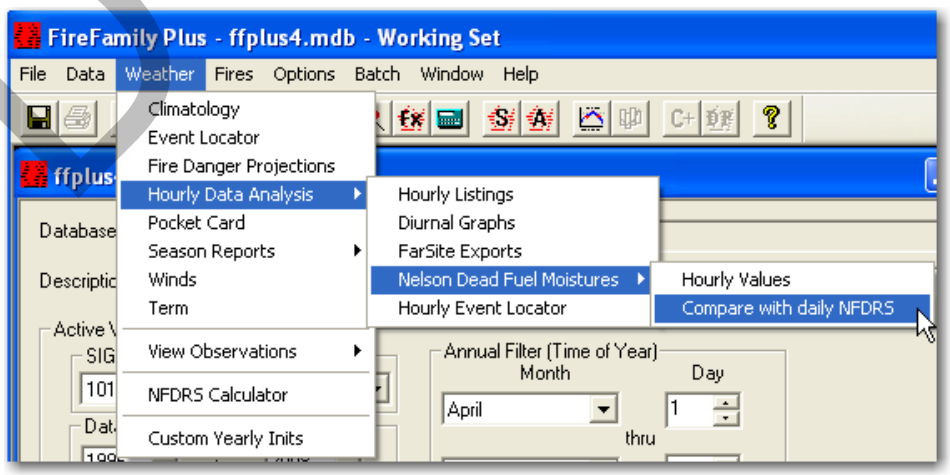


```
exteme_event_output.txt - Notepad
File  Edit  Format  View  Help
FireFamily Plus Event Locator Report
   Listing of Selected Events
   using database: C:\Documents and Settings\lbradshaw\My Document


Event Definition:
    Hourly(Dry Bulb Temperature) >= 85.00
    AND Hourly(Relative Humidity) <= 15.00
    AND Max(Wind Speed) > 15.00

         4-Hour Periods

DATE              Temp      RH    Wind
--------------------------------------
07/12/2003:1200   TRUE    TRUE    18.00
07/12/2003:1300   TRUE    TRUE    18.00
07/12/2003:1400   TRUE    TRUE    18.00
07/16/2003:1100   TRUE    TRUE    16.00
07/16/2003:1200   TRUE    TRUE    20.00
07/16/2003:1300   TRUE    TRUE    20.00
07/16/2003:1400   TRUE    TRUE    20.00
07/20/2003:1500   TRUE    TRUE    17.00

8 hits out of 28272
2140 rejects for no/missing observations
```

The Nelson Dead Fuel Moisture Model

The Nelson Dead Fuel Moisture Model is driven by hourly precipitation, solar radiation, temperature, and relative humidity, and eliminates the need for user-defined state of the weather (SOW) inputs. The model runs on hourly data and can be defined for any size-class of fuel. It is a physical model of moisture gain and loss in dead fuel, and it has been shown to be a better predictor of fine dead fuel moisture than the original NFDRS logic. There are two options for the Nelson Deal Fuel Moisture analysis in FireFamily Plus version 4.0: "**Hourly Values**," and "**Compare with daily NFDRS**."



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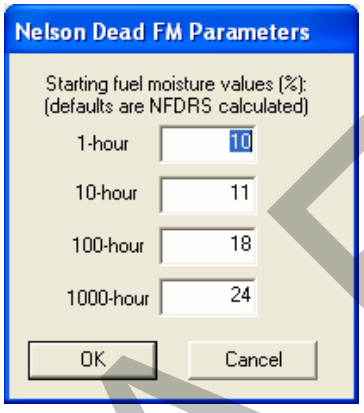
Hourly Values

The hourly values listing will produce a report of the hourly fuel moistures for each of the four NFDRS dead fuel size classes. It includes the hourly data used to calculate the moistures as well as a summary of the settings for that run. When you choose the hourly values report from the menu, you will first be prompted for startup values for each size class. If you have good measurements of fuel moisture for the startup period, enter them in the dialog box. Otherwise accept the defaults which are based on station climate class, and select **OK**.



Once you have pressed **OK**, in the **Nelson Dead FM Parameters** dialog box, the model will calculate the fuel moisture values and display both the meteorological data and the derived moisture values in tabular format as shown.

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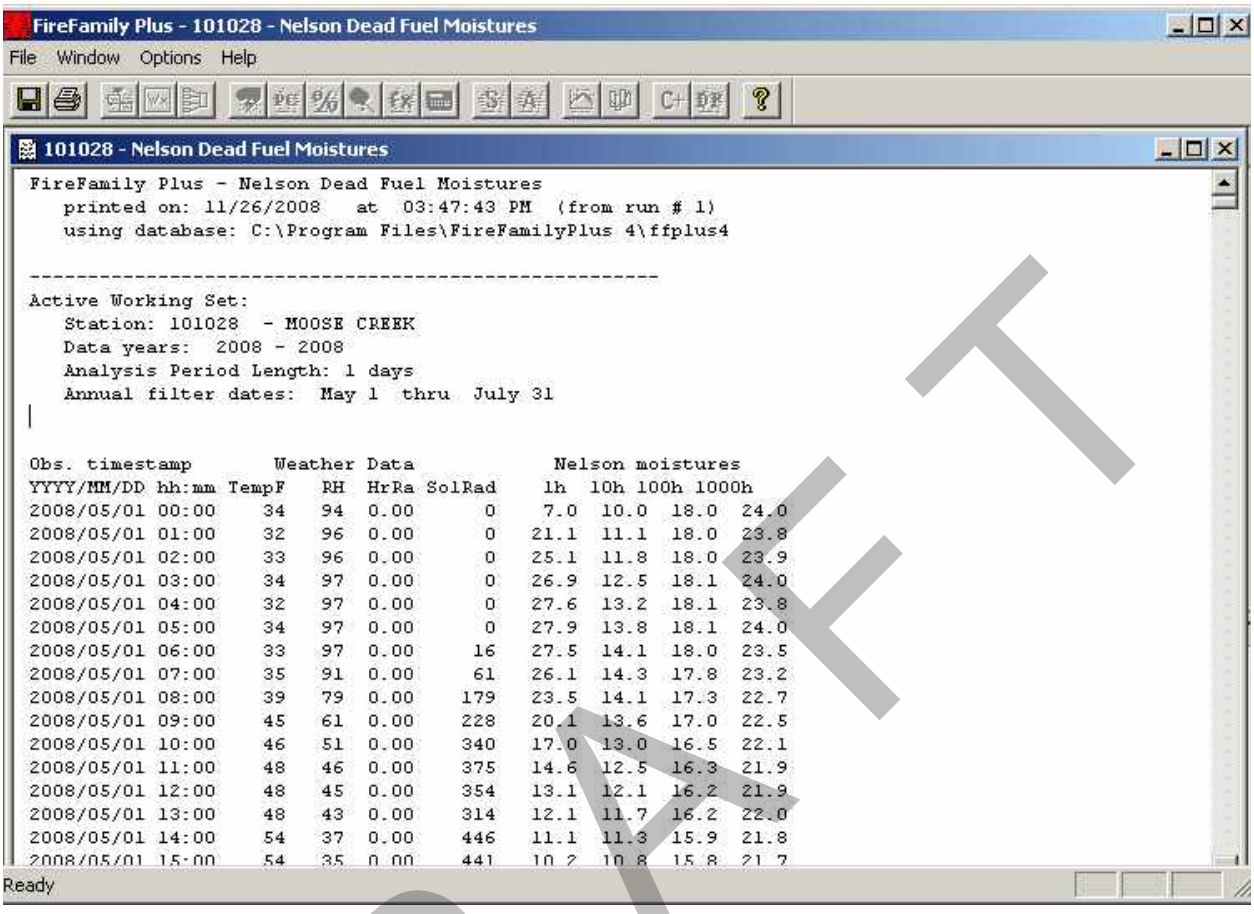

Compare with daily NFDRS

The second option for calculating Nelson Dead Fuel Moistures in FireFamily Plus is the "**Compare with daily NFDRS**" option. This option displays both the Nelson Dead Fuel Moistures and the traditional NFDRS-based fuel moisture calculations to allow for comparison of these differences for calculated ERC, SC, IC, and BI. It is important for users to become familiar with this feature because it builds an understanding of the potential influence of the new fuel moisture model on the calculated indices. The report is similar to "**Hourly Values**" but adds summaries of the traditional NFDRS moisture values. The columns at the left side of the report show indices with the traditional method. The Nelson moisture driven calculations appear on the right. These data can be exported into a spreadsheet for further analysis by clicking the **Save** icon at the upper left on the toolbar.

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FireFamily Plus - [101028 - Nelson Dead Fuel Moistures]

File Window Options Help

```
FireFamily Plus - Nelson Dead Fuel Moistures
   printed on: 11/26/2008   at  03:49:03 PM  (from run # 1)
   using database: C:\Program Files\FireFamilyPlus 4\ffplus4

-----------------------------------------------------
Active Working Set:
   Station: 101028  - MOOSE CREEK
   Data years:  2008 - 2008
   Analysis Period Length: 1 days
   Annual filter dates:  May 1  thru  July 31
-----------------------------------------------------
```

Obs. timestamp		Weather Data				NFDRS Moistures				Nelson moistures				....NFDRS indices			
YYYY/MM/DD	hh:mm	TempF	RH	24Hr	CumRa	1h	10h	100h	1000h	1h	10h	100h	1000h	SC	-	SC	ERC	-
2008/05/01	13:00	48	43	0.00	0.00	7	10	18	24	12	11	16	21	1	-	0	6	-
2008/05/02	13:00	66	13	0.00	0.00	2	5	16	24	8	11	14	21	1	-	1	12	-
2008/05/03	13:00	72	19	0.00	0.00	3	5	14	23	7	10	13	20	1	-	1	13	-
2008/05/04	13:00	75	21	0.00	0.00	3	5	14	22	7	10	12	20	1	-	1	13	-
2008/05/05	13:00	79	21	0.00	0.00	3	5	13	22	7	10	12	20	1	-	1	15	-
2008/05/06	13:00	68	31	0.00	0.00	5	7	12	21	9	11	11	20	1	-	1	13	-
2008/05/07	13:00	55	50	0.00	0.00	9	10	12	21	11	12	11	20	1	-	1	11	-
2008/05/08	13:00	62	28	0.01	0.01	5	7	13	20	9	14	10	19	1	-	1	14	-
2008/05/09	13:00	61	26	0.00	0.01	5	6	12	20	8	11	9	19	1	-	1	15	-
2008/05/10	13:00	69	20	0.00	0.01	4	5	12	20	8	10	9	18	2	-	2	20	-
2008/05/11	13:00	60	37	0.08	0.09	6	8	13	19	12	17	9	18	2	-	2	17	-
2008/05/12	13:00	55	42	0.02	0.11	8	9	13	19	11	15	9	18	2	-	2	15	-
2008/05/13	13:00	67	28	0.00	0.11	5	6	13	19	9	11	9	18	2	-	2	18	-
2008/05/14	13:00	60	72	0.25	0.36	13	14	19	21	19	34	24	23	1	-	0	4	-
2008/05/15	13:00	78	31	0.01	0.37	5	7	17	21	9	17	20	23	2	-	2	14	-
2008/05/16	13:00	87	21	0.00	0.37	3	6	16	20	7	12	15	20	2	-	2	17	-
2008/05/17	13:00	90	15	0.00	0.37	2	4	14	20	6	9	12	19	2	-	2	20	-

Ready

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Chapter 11. Batch functions

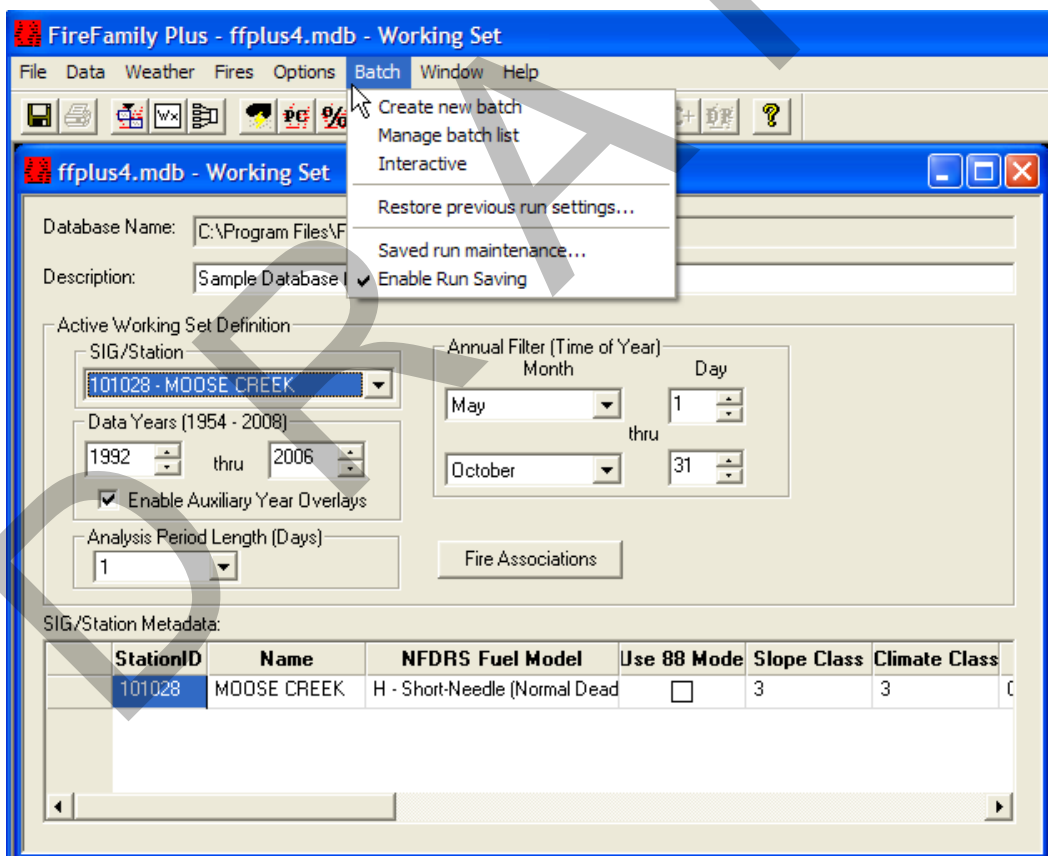
Version 4.0 of FireFamily Plus introduces new “batch” functionality. This chapter explains how to work with batch functions in FireFamily Plus. Topics include:

- Creating a new batch.
- Managing a batch list.
- Saved run maintenance.

In order to understand and use FireFamily Plus batch functions, you should become familiar with two terms: *runs* and *batches*.

- “**Runs**” are stored almost anytime you generate a report in FireFamily Plus as long as the **Batch -> Enable Run Saving** option is selected.
- “**Batches”** are collections of two or more “**Runs**.”

Note: Importing data is not considered a “run.”



To facilitate building batches, FFP runs may be saved in the active working set database. Runs are numbered sequentially. All of the parameters in the run (stations, SIG, data years, seasonal filters, overlay years, etc.) are saved.

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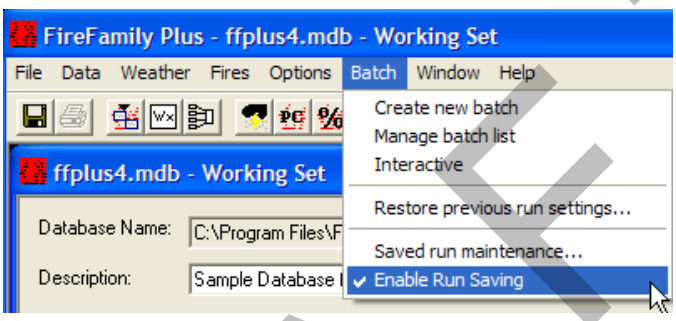
Once in the saved database, these runs can be used to:

- Build batch jobs consisting of one or more saved runs, or
- Restore run settings and run FireFamily Plus in the "classic" mode. When running a batch, output can be sent to the screen ("flying windows") or auto-saved to a disk.

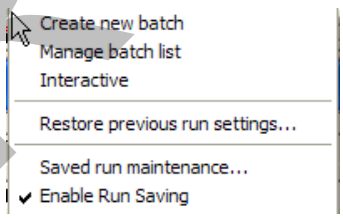
To save a run

Run saving is toggled on and off by clicking on **Batch -> Enable Run Saving** in the **Batch** menu.



Creating a new batch

To create a new batch



1 Click on **Batch ->Create new batch** and the following dialog box opens:

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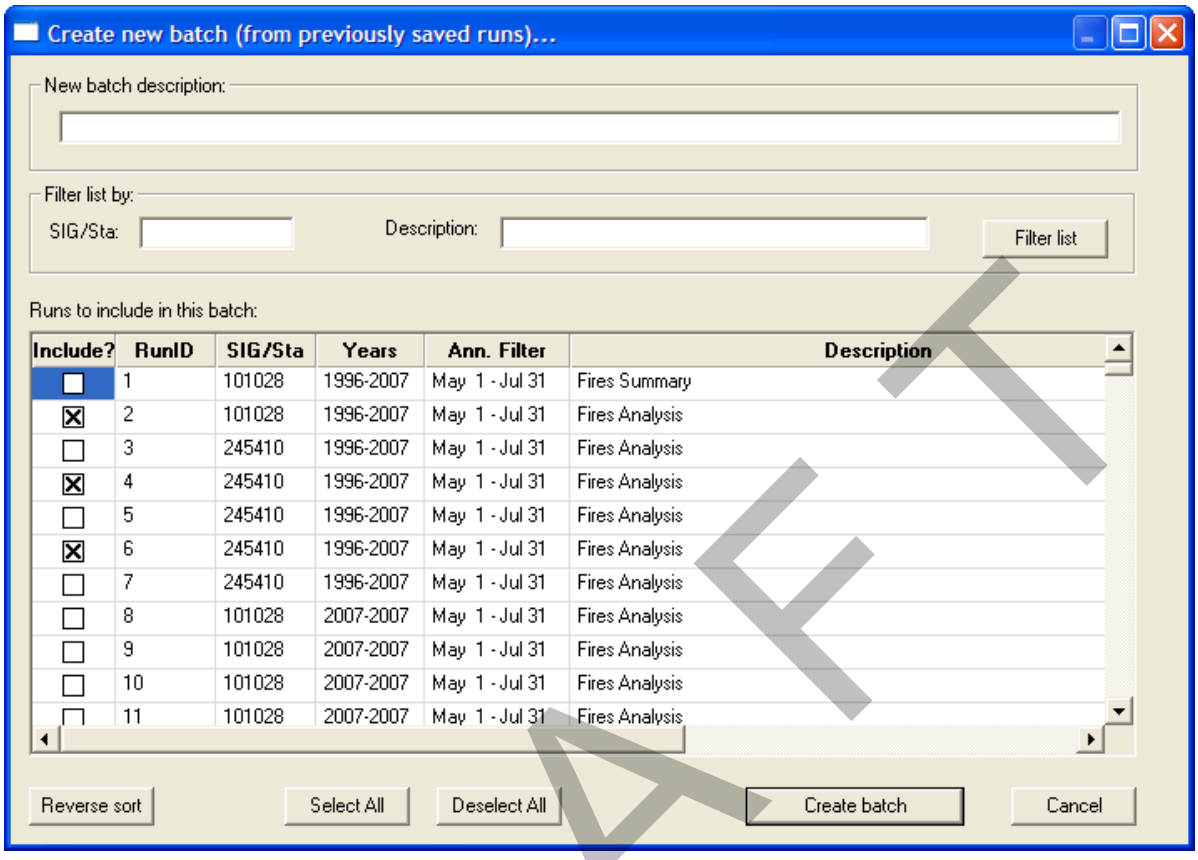


This dialog box can be used to identify a new batch run that you would like to create from previously saved runs.

2 Check the runs that you would like to include by selecting the boxes to the left of the boxes in the **Include?** column.

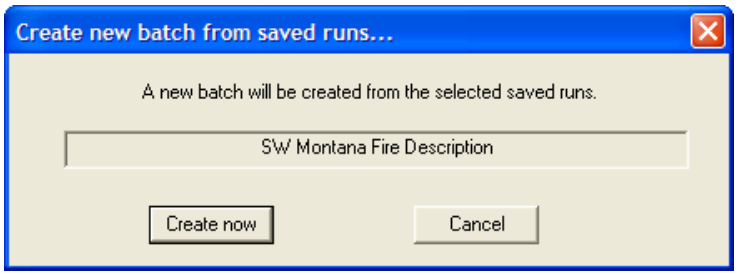
3 Add a description of your batch run in the box provided under **Description**.

4 Use the **Select All** button at the bottom of the dialog box to include all previously saved runs shown.

5 Click on **Deselect All** to uncheck all runs.

6 When you have completed your selection, click on **Create batch**. You may cancel (click on **Cancel**) at any time.

When you have completed your selection, the following box will appear.



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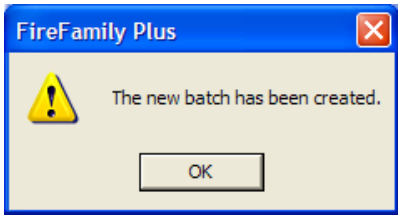
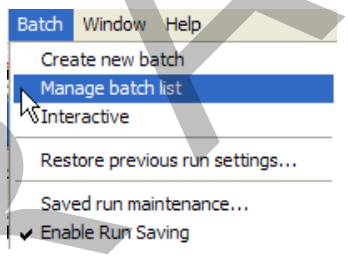
7 Click on **Create now** or **Cancel**.

A new batch will be created from your saved runs. The following dialog box verifies that the batch has been created.



If you have many saved runs, you can filter and sort by SIG or Station name or by description (such as "Climatology" or "Daily Listing") for ease of locating a run.

Maintaining and running batches



To manage a batch list

1 Select **Batch -> Manage batch list** from the drop-down menu as shown to open the following **Batch Management** dialog box.

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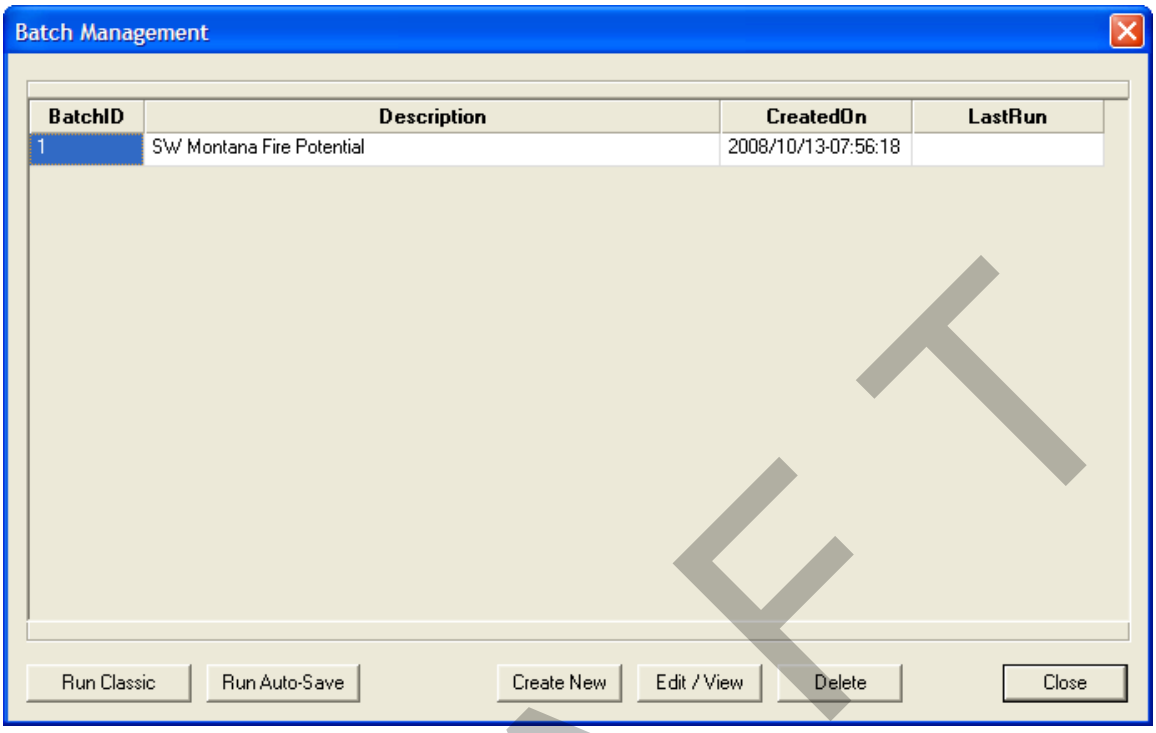
.



2 Next you will need to select the batch you want to run or maintain from the **Batch Management** dialog box.

You can choose from the following options:

- **Run Classic**: Runs all reports in the batch and creates many, many windows in the FireFamily Plus application.
- **Run Auto-Save**: Runs all reports, but saves all reports and graphs to a location that you specify (see "Run Auto-Save" on page 11.6).
- **Create new:** Allows you to create a new batch as described.
- **Edit/View**: Allows you to view and edit (add or delete Runs).
- **Delete:** Allows you to delete a batch.

Run classic

If you select **Run Classic**, you will see the following progress bar as your run proceeds.

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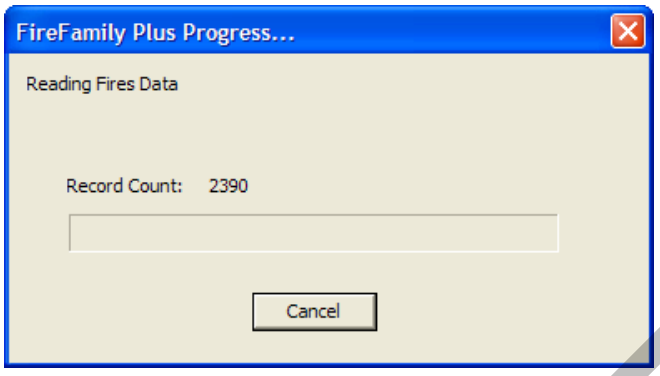
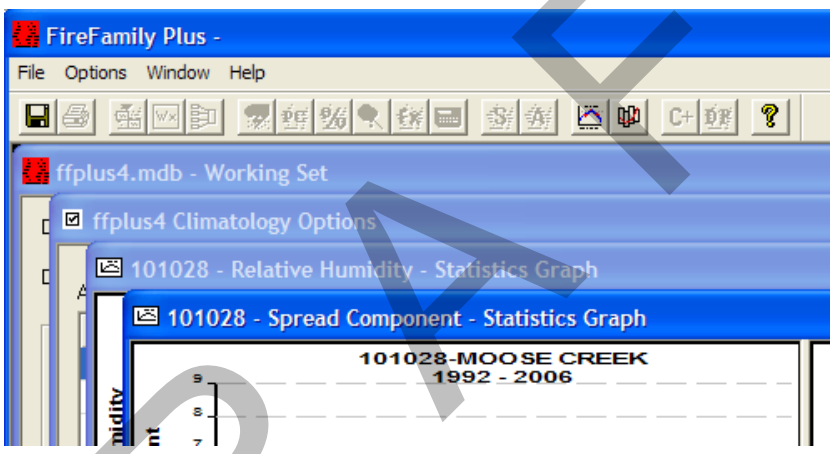


After the run is complete, numerous windows open in the FireFamily Plus application as shown below:



Run auto-save

If you select **Run Auto-Save**, reports are saved as set in **Options -> Batch/ Run Options -> Batch Auto Save**.

To select batch options

1 Click **Options -> Batch/Run Options**.

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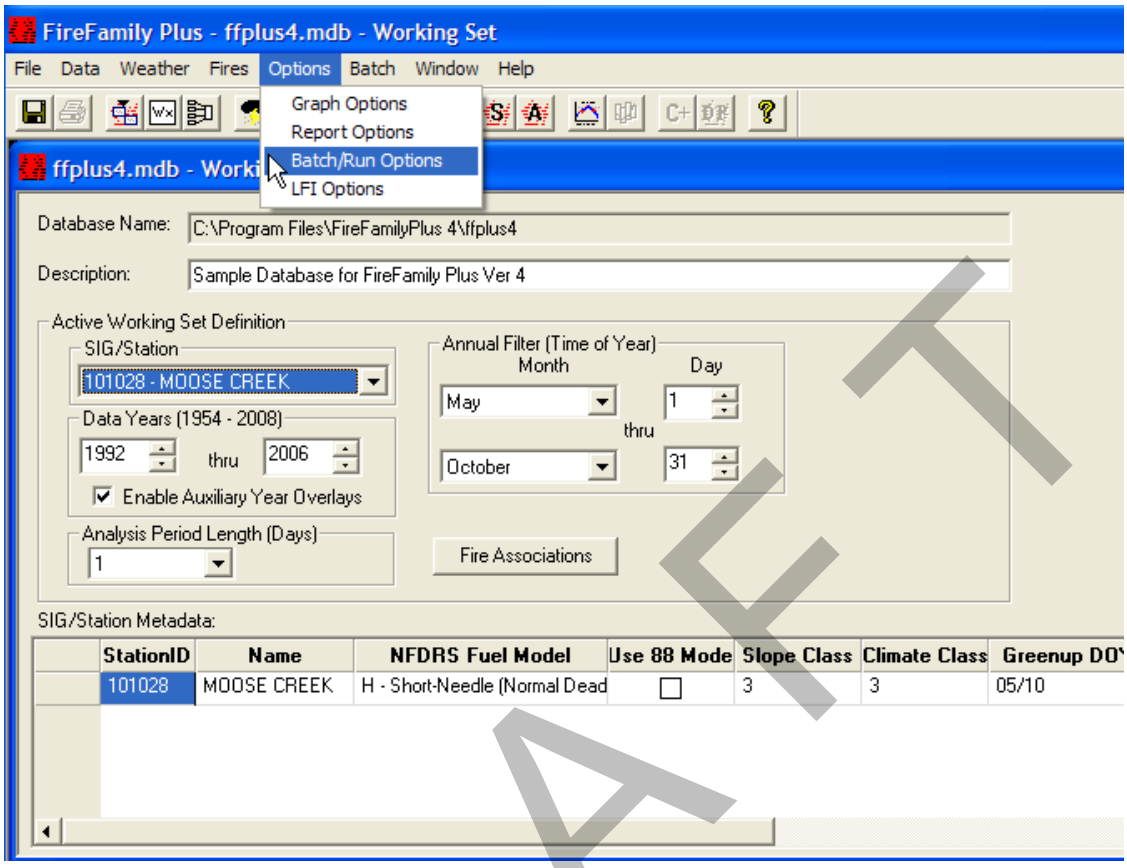
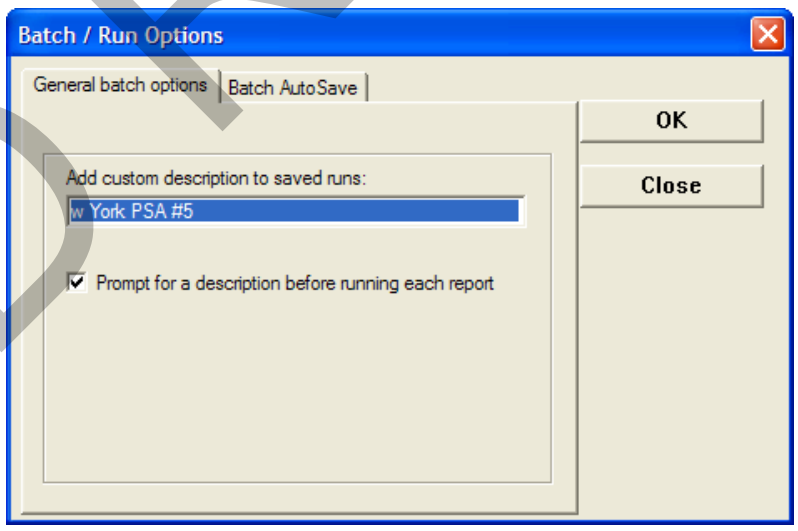


2 The following **Batch/Run Options** dialog box will open. (The dialog box shown in the example is open to the **General batch options** tab).



3 The **General batch options** tab allows you to override the default "Run" description as runs are saved. You can add custom descriptions to your saved runs.

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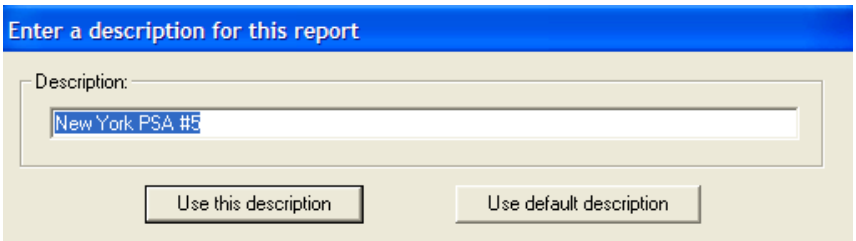
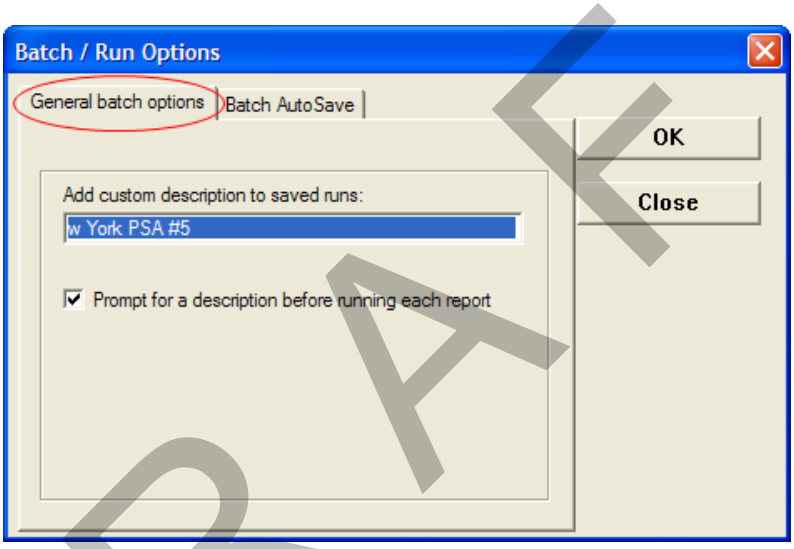


4 If the **Prompt for a description before each report** box is checked, you can edit the run description before every run as shown below. Or, you can select the default description. If this box is not checked the custom description is used and you cannot modify it.



5 Click on the **Batch AutoSave** tab in the **Batch/Run Options** dialog box to save images to a location of your choice. Click the **Browse for folder** button to navigate to a directory/folder. (See section 6.18 for additional information).

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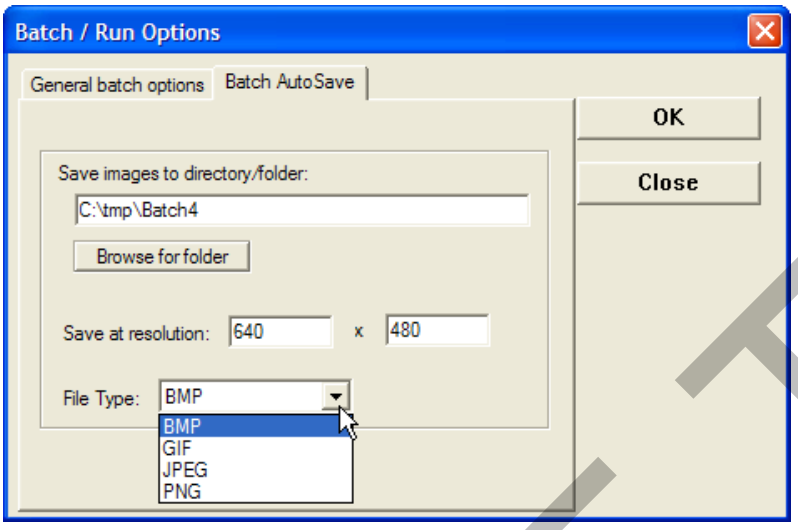
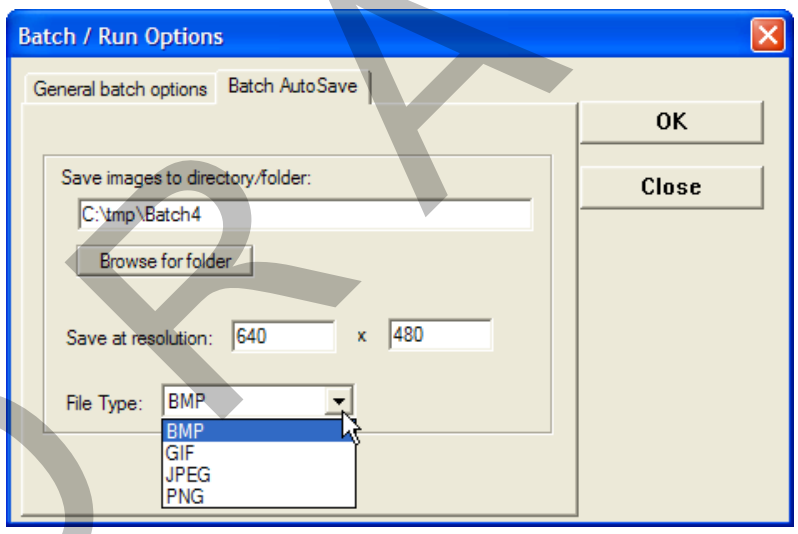


6 Set the resolution if necessary.

7 Use the drop-down menu shown below to select a file type from the options available.



8 Click **OK** to continue.

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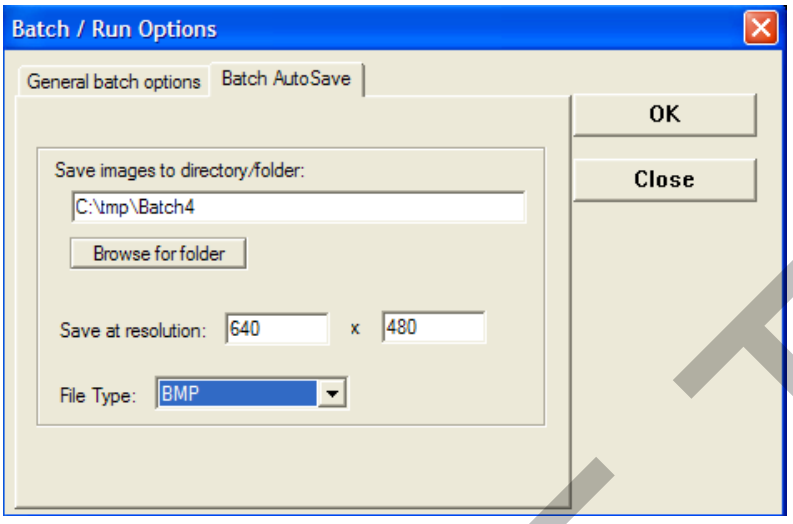
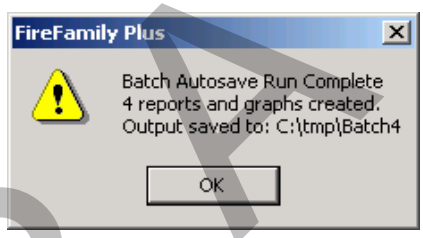
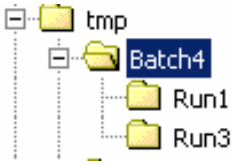


You will see a completion window noting the initial directory of the batch files. The following dialog box shows an example of a FFP completion window.



In this example, reports are saved in subdirectories **Run1** and **Run3** since those are the runs in the batch.



File names are self-generated by FireFamily Plus and cannot be edited by the user. They should be decipherable by the report (or file) name.

*All **Batch Autosave** files are overwritten in subsequent executions of the same batch run.*

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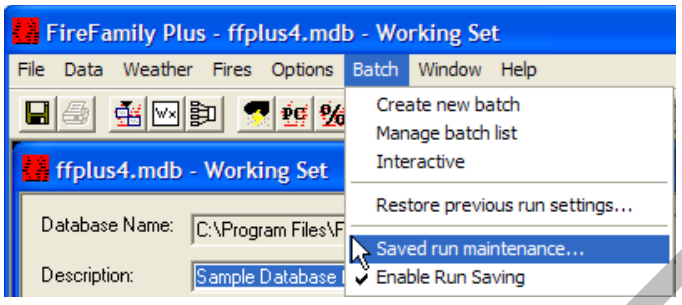
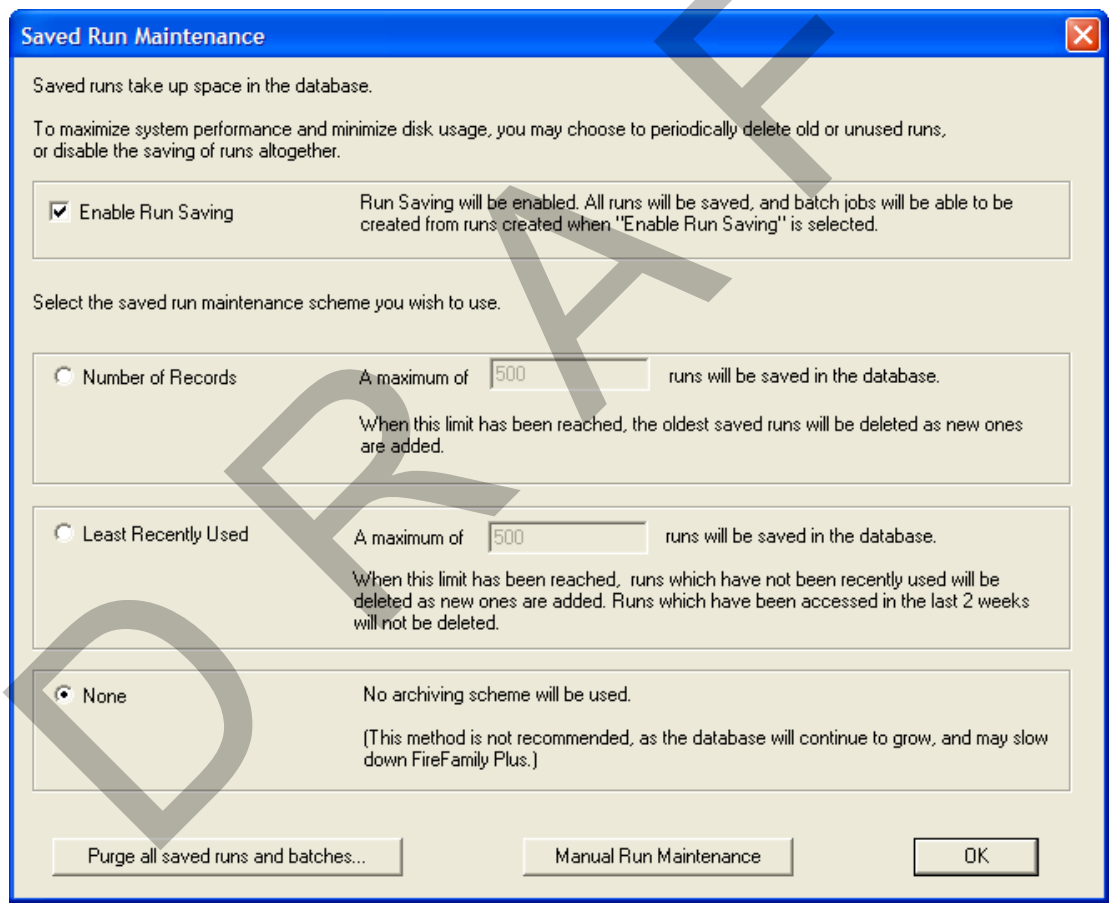
Saved run maintenance



Maintenance is completed by selecting the **Batch -> Saved run maintenance...** option which opens the **Saved Run Maintenance** dialog box.



This dialog box can be used to:

- Disable run saving (no runs will be saved until it is turned back on).
- Select the **Number of Records** to be included in the database that you will save.

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- Select the **Least Recently Used** runs (a specified number of runs will be saved, but runs which have not been used recently will be deleted as newer ones are added).

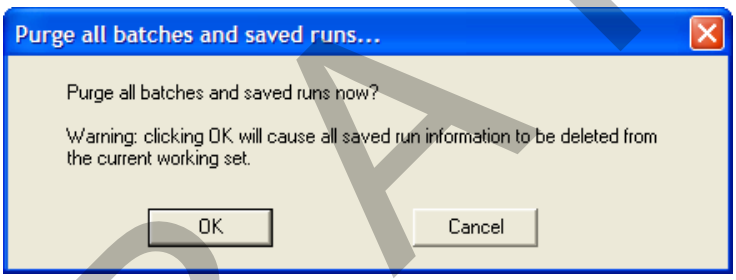
  Runs that you have accessed within the last two weeks will not be deleted.

- Specify that no archiving scheme will be used.

You can toggle **Enable Run Saving** on or off. If you wish to limit the number of runs saved in the database uncheck the box.

You can also delete all runs using the **Purge all saved runs and batches** button or remove only selected runs by clicking on **Manual Run Maintenance** at the bottom of the **Saved Run Maintenance** dialog box.

Click on **Purge all saved runs and batches** and the following dialog box opens.

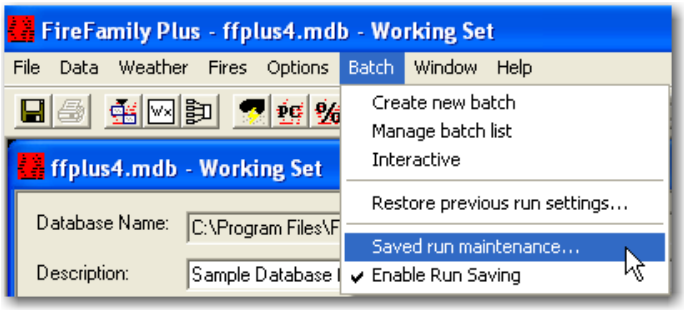


Click **OK**, only if you are certain that you would like to delete all information.

Manual run maintenance

Manual run maintenance is both flexible and useful. This feature allows you to view the basic run information, including information on whether the run is used in any batches. You can delete all runs or only selected runs.

1 Click on **Batch -> Saved run maintenance**.



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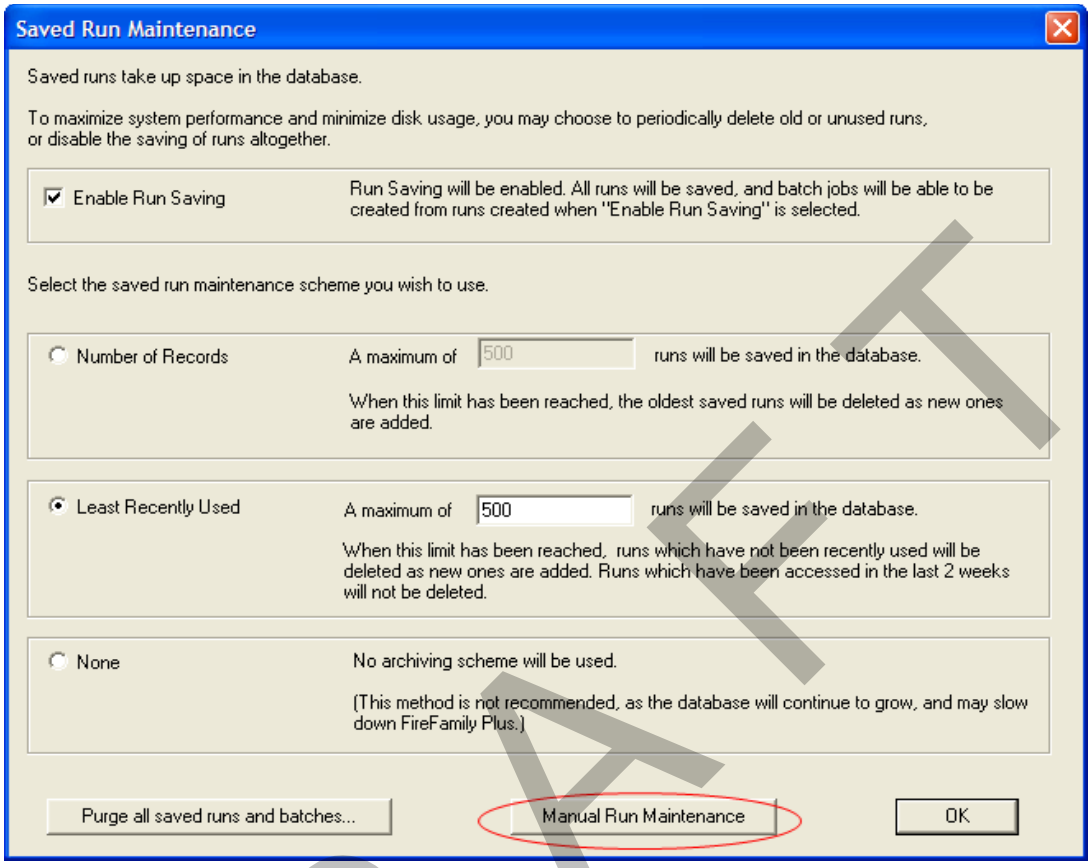
2 Click on the **Manual Run Maintenance** button at the bottom of the dialog box.



3 The **Manual Saved Run Dialog** box will open as shown.

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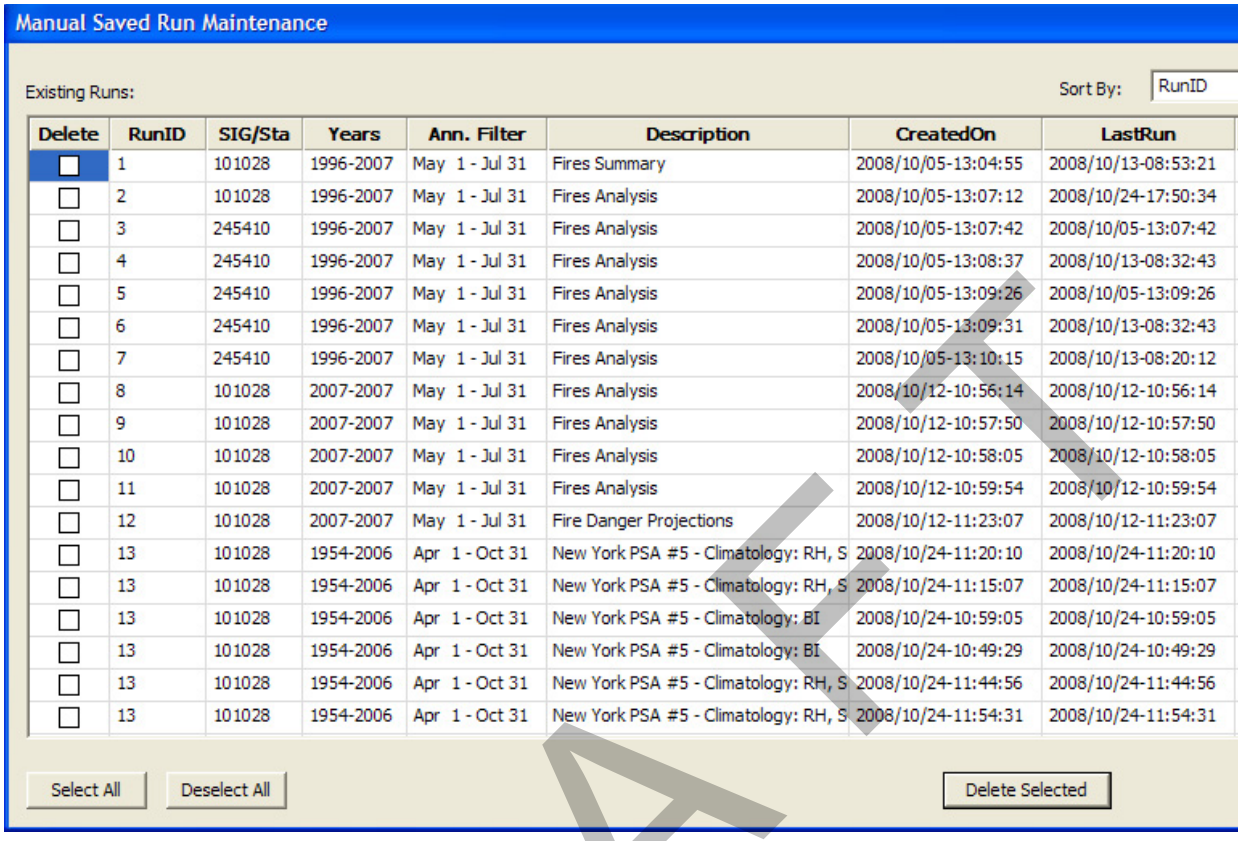
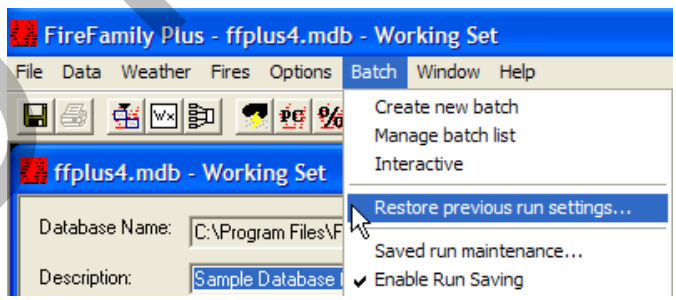


Delete	RunID	SIG/Sta	Years	Ann. Filter	Description	CreatedOn	LastRun
☐	1	101028	1996-2007	May 1 - Jul 31	Fires Summary	2008/10/05-13:04:55	2008/10/13-08:53:21
☐	2	101028	1996-2007	May 1 - Jul 31	Fires Analysis	2008/10/05-13:07:12	2008/10/24-17:50:34
☐	3	245410	1996-2007	May 1 - Jul 31	Fires Analysis	2008/10/05-13:07:42	2008/10/05-13:07:42
☐	4	245410	1996-2007	May 1 - Jul 31	Fires Analysis	2008/10/05-13:08:37	2008/10/13-08:32:43
☐	5	245410	1996-2007	May 1 - Jul 31	Fires Analysis	2008/10/05-13:09:26	2008/10/05-13:09:26
☐	6	245410	1996-2007	May 1 - Jul 31	Fires Analysis	2008/10/05-13:09:31	2008/10/13-08:32:43
☐	7	245410	1996-2007	May 1 - Jul 31	Fires Analysis	2008/10/05-13:10:15	2008/10/13-08:20:12
☐	8	101028	2007-2007	May 1 - Jul 31	Fires Analysis	2008/10/12-10:56:14	2008/10/12-10:56:14
☐	9	101028	2007-2007	May 1 - Jul 31	Fires Analysis	2008/10/12-10:57:50	2008/10/12-10:57:50
☐	10	101028	2007-2007	May 1 - Jul 31	Fires Analysis	2008/10/12-10:58:05	2008/10/12-10:58:05
☐	11	101028	2007-2007	May 1 - Jul 31	Fires Analysis	2008/10/12-10:59:54	2008/10/12-10:59:54
☐	12	101028	2007-2007	May 1 - Jul 31	Fire Danger Projections	2008/10/12-11:23:07	2008/10/12-11:23:07
☐	13	101028	1954-2006	Apr 1 - Oct 31	New York PSA #5 - Climatology: RH, S	2008/10/24-11:20:10	2008/10/24-11:20:10
☐	13	101028	1954-2006	Apr 1 - Oct 31	New York PSA #5 - Climatology: RH, S	2008/10/24-11:15:07	2008/10/24-11:15:07
☐	13	101028	1954-2006	Apr 1 - Oct 31	New York PSA #5 - Climatology: BI	2008/10/24-10:59:05	2008/10/24-10:59:05
☐	13	101028	1954-2006	Apr 1 - Oct 31	New York PSA #5 - Climatology: BI	2008/10/24-10:49:29	2008/10/24-10:49:29
☐	13	101028	1954-2006	Apr 1 - Oct 31	New York PSA #5 - Climatology: RH, S	2008/10/24-11:44:56	2008/10/24-11:44:56
☐	13	101028	1954-2006	Apr 1 - Oct 31	New York PSA #5 - Climatology: RH, S	2008/10/24-11:54:31	2008/10/24-11:54:31

4 Select the runs you wish to delete by checking the boxes in the **Delete** column at the left of the dialog box.

Restore settings from a previously saved run

1 Select **Restore previous run settings** from the **Batch** drop-down menu.



2 If **Enable Run Saving** is checked on the **Batch** drop-down menu as shown above, subsequent restored runs will create new RunIDs in the database, even if you do not make any changes. If **Enable Run Saving** is off (not checked), runs will not be saved.

3 The following **Restore settings from a previously saved run** dialog box will open.

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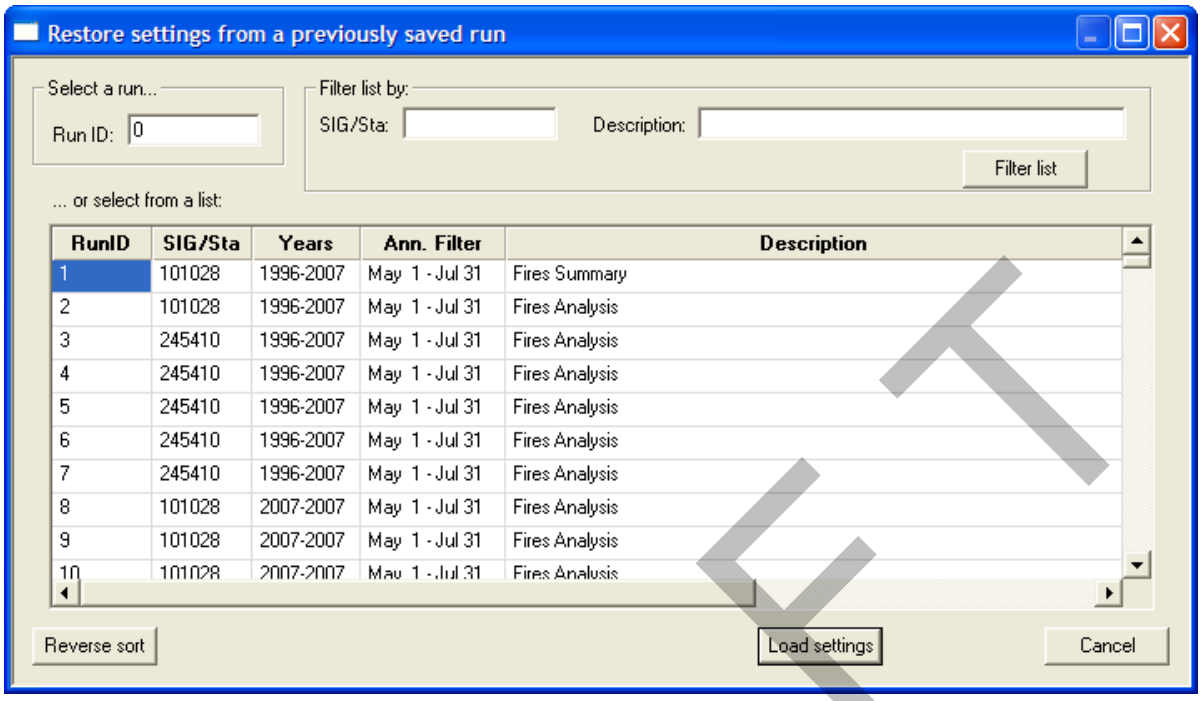
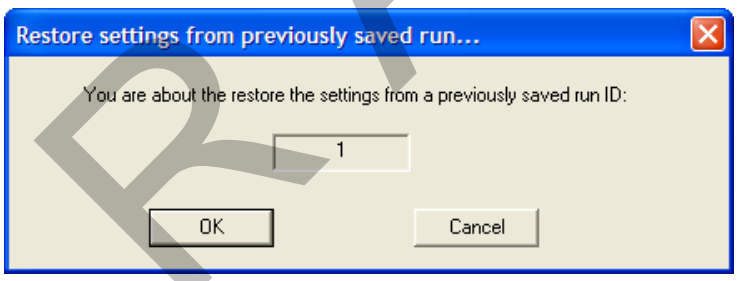


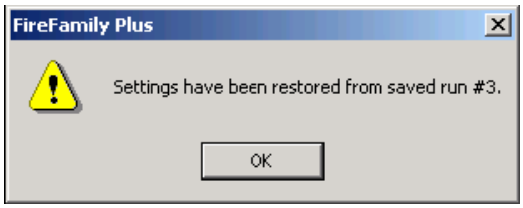
4 Select a **RunID** and click the **Load settings** button to confirm your selections. The following dialog box will open.



5 Click **OK**. When you click on **OK**, the run parameters are restored. This option will set the working set, annual filters, and analysis period from the previous run.

The working set will be established from the settings for the selected Run.

The following dialog box confirms that settings have been restored.



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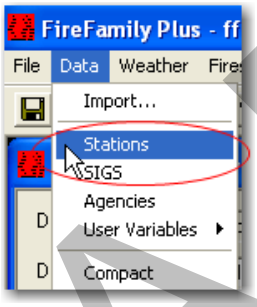
Chapter 12. Interactive batch

This chapter explains how to work with the Interactive Batch function in FireFamily Plus. Topics include:

- Using the interactive batch function.
- Making changes in the interactive batch session.
- Using interactive batch icons on menu bar.

The initial NFDRS parameters (Fuel Models) are taken from the station metadata in the station catalog. This is editable through the Working Set dialog in the SIG/Station metadata box or by selecting **Data -> Stations (or SIGS) -> Edit**.

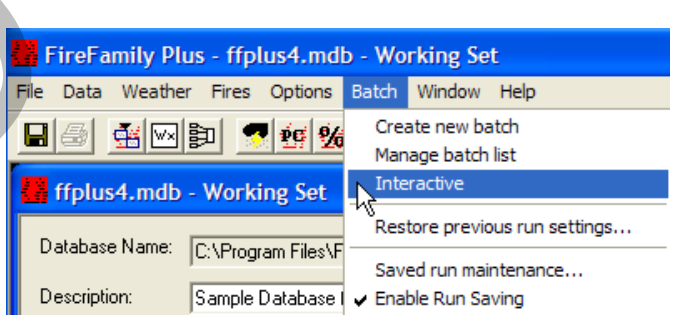


Using interactive batch

Interactive Batch allows you to select any number of stations and SIGS, and run all reports for all weather variables and indices.

To use interactive batch

1 Click **Batch** -> **Interactive**.



2 The following dialog box will open.

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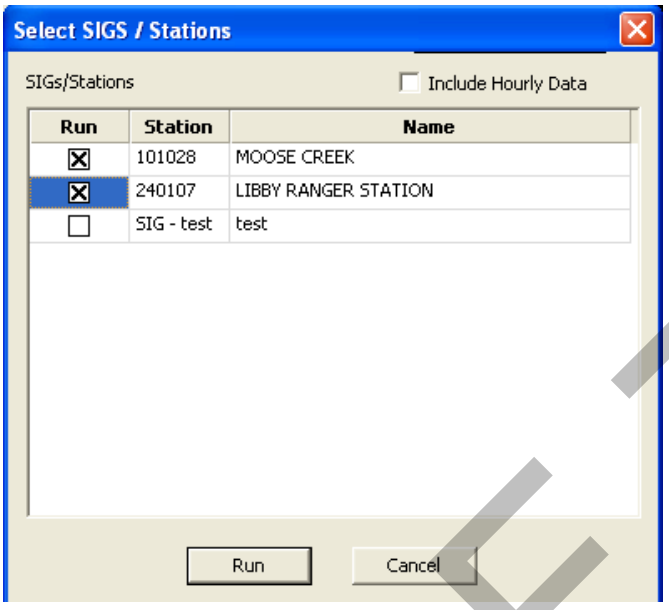
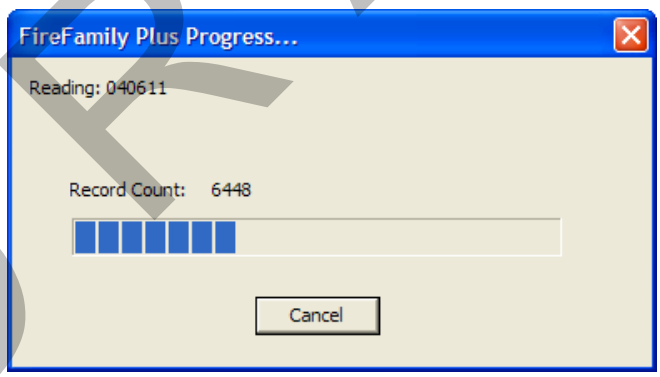


3 Use the **Select SIGS/Stations** dialog box to select the SIGS and/or Stations of your choice.

4 When you have made your selections, click **Run** to begin the interactive batch process.

5 You will see the following **FireFamily Plus Progress** box indicating that the run is proceeding.



When the run is finished, you can view reports of your choice. Results are displayed in a dialog window with a row for each selected SIG/Station and columns for each FFP report. The right/left arrows access additional report tabs.

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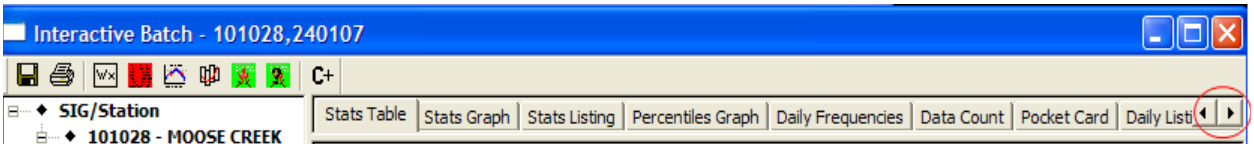
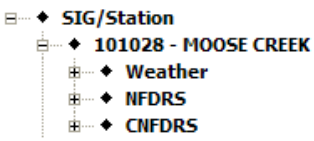
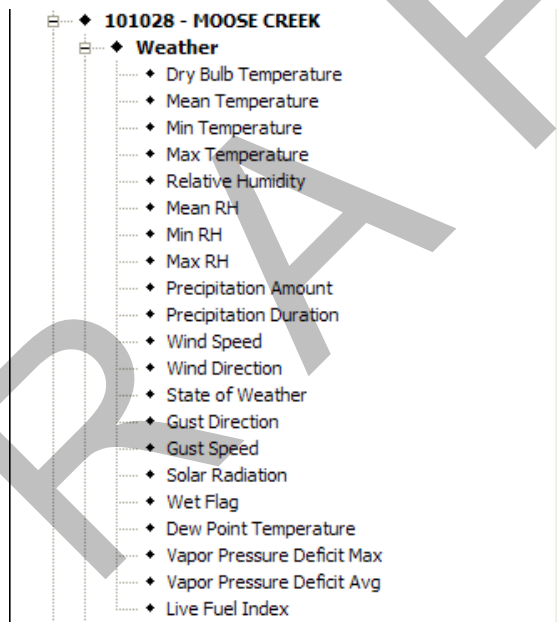


Expanding the Station (or SIG) by clicking on "+" displays groups of variables - Weather, NFDRS, and CNFDRS.



Expanding the **Weather** tree displays the weather variables as shown below.



Expanding the **NFDRS** tree displays the US Fire Danger variables.

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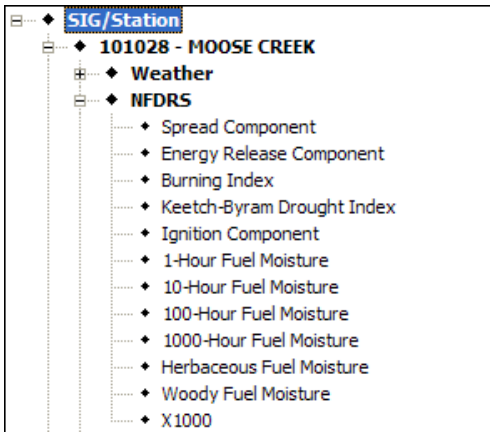
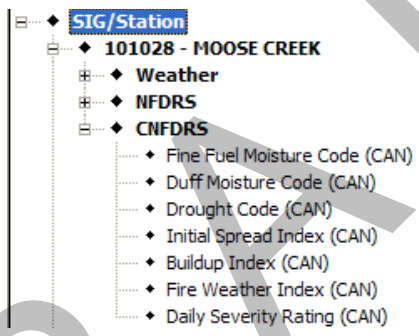


Finally, expanding the **CNFDRS** tree displays the Canadian Fire Danger variables.



Click on **Burning Index** and the **Stats Graph** tab opens that report in the main window.

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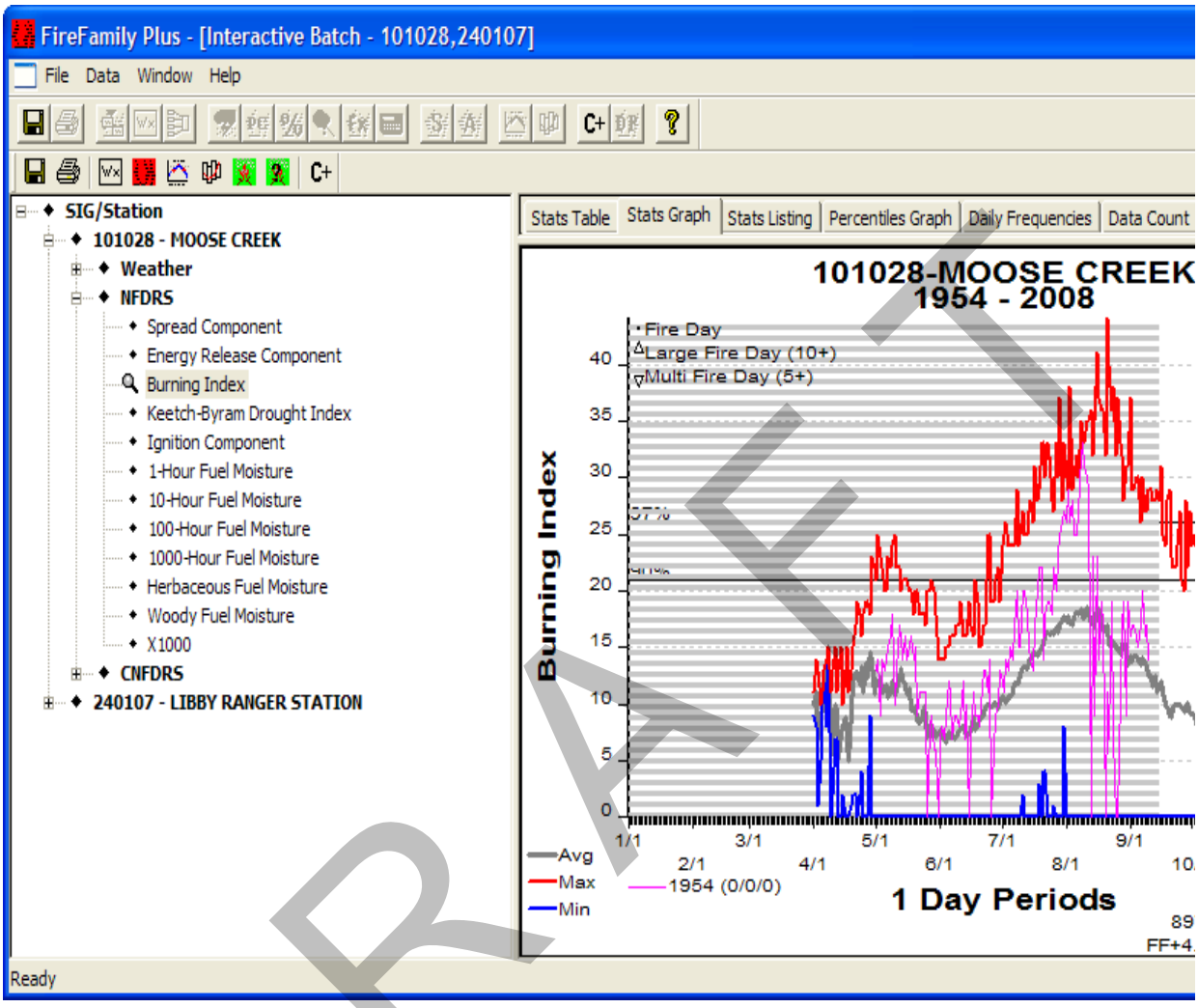

At the beginning of an interactive batch session:

- All data for selected Station/SIGs are processed and initially displayed. The data years, annual filters, and analysis periods in the "normal" working set windows are ignored.
- The NFDRS fuel model parameters in the "normal" working set are used.
- Most changes made to Interactive Batch working set definitions and options are saved in the "normal" working set, but not all.

Once the interactive batch output window is open, several new icons appear on the toolbar and become active.

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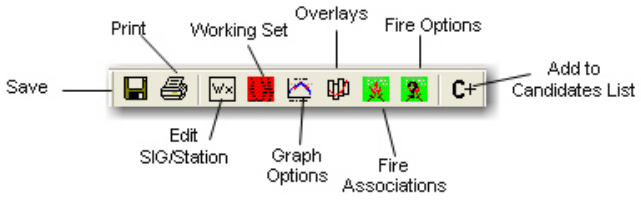
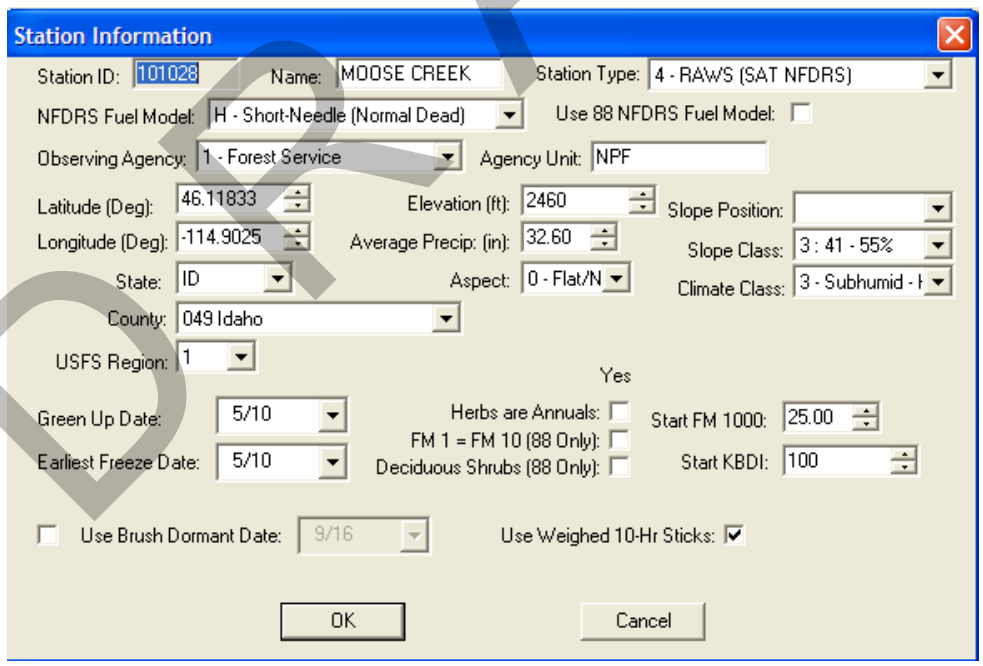


When you select an icon and modify the values, results are updated in all reports.

Changes you can make in the interactive batch session

Using the toolbar icons in the Interactive Batch mode you can make the following changes:

- **Change NFDRS parameters.** Clicking on this icon opens the **Special Interest Group Attributes** or **Station Information** dialog box. Changes made here are applied only to the currently viewed Interactive Batch station/SIG and are updated in the base working set for that station or SIG.



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- **Reset the Working Set**. Changes made here are applied only to currently viewed Interactive Batch Station/SIG. It appears that the "last" set values of data years and analysis periods are updated in the "classic" working set for that station/SIG, but the annual filter is not. Remember, however, that if you change the analysis period from "1" day to "10" in the Interactive Batch, the 10-day grouping will be ignored the next time you use this station in interactive batch. It will be applied in the standard (or non-interactive batch) mode.

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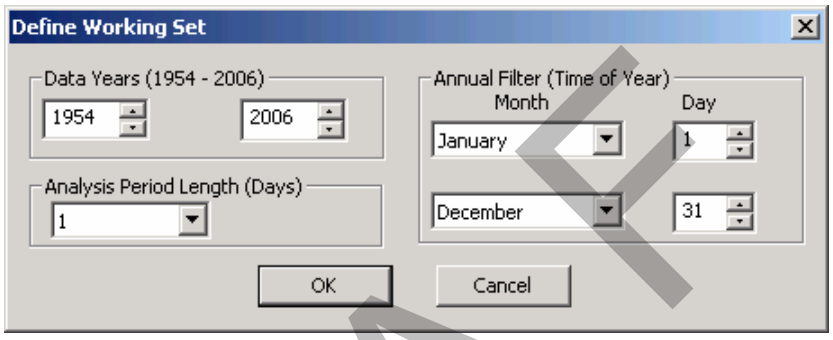

- **Update Graph Options**. Changes made here are applied to all checked stations/SIGs in the Interactive Batch session and are updated in the "classic" working set for those stations/SIGs.

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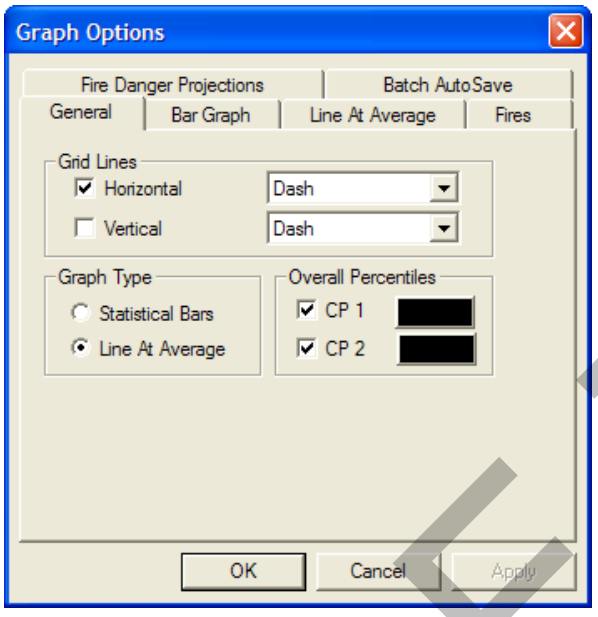
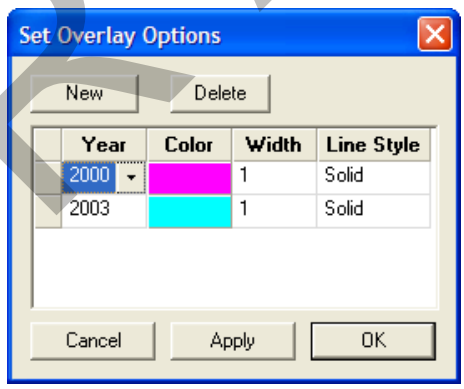


- **Change overlays**. Changes made here are applied to all checked stations/SIGs in the Interactive Batch session and are updated in the "classic" working set for those stations/SIGs.



- **Modify the Fire Associations**. Changes made here are applied only to the currently viewed Interactive Batch station/SIG and are updated in the "classic" working set for that station/SIG.

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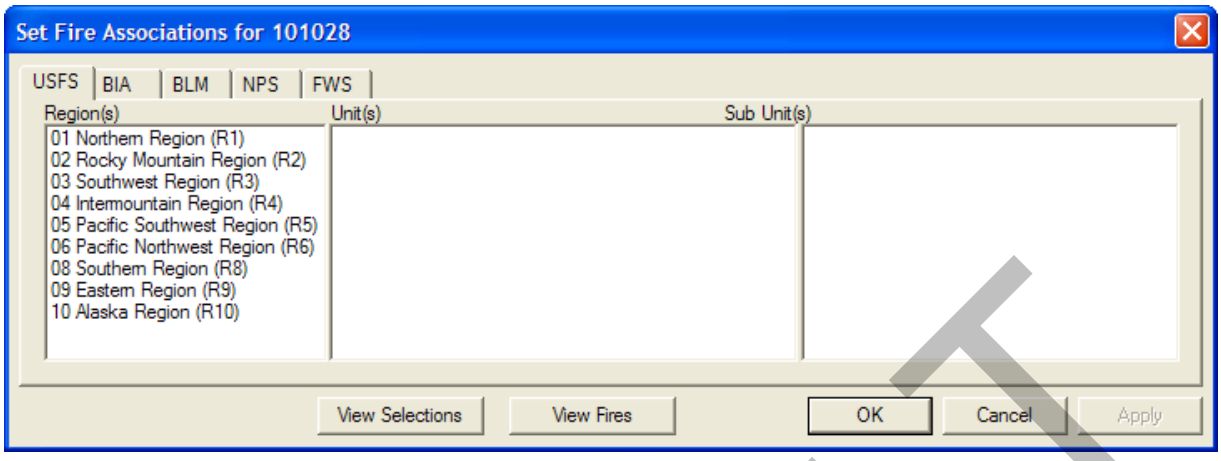
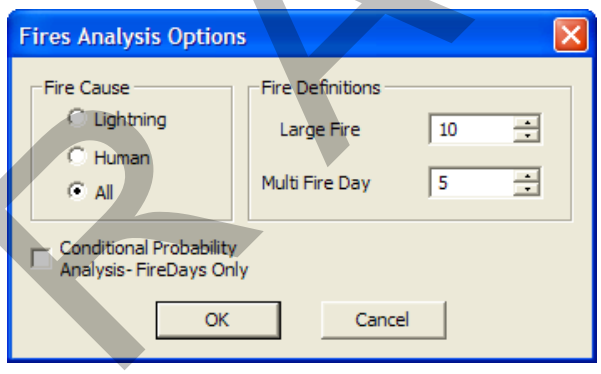


- **Modify Fire-Day Parameters** (**Fire Options**). Changes made here are applied only to the currently viewed Interactive Batch stations or SIGs and are updated in the "classic" working set for that station/SIG.



- **Add Goodness of Fit Statistics to a Candidates Table** (**Add to Candidates List**). This icon allows you to add the selected variable in a batch run to the "Fire Business Candidates List."

This information is also available through the classic Fires Analysis. ***Data -> Add to Candidates List.***

- When viewing the statistics from a Fires Analysis report, you can add the goodness of fit statistics to an FFP table called "Fire Business

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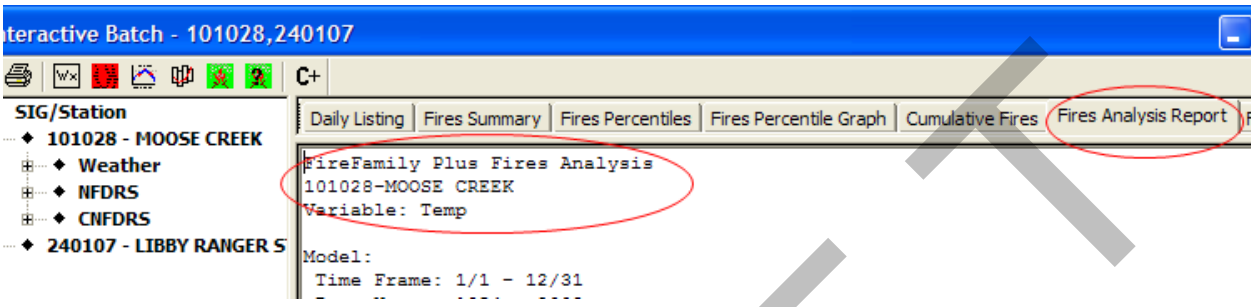
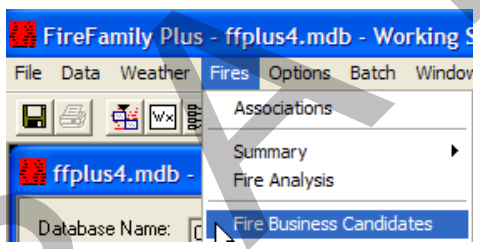
Candidates" by clicking on this icon. Almost all of the information about the model run is stored along with the goodness of fit statistics.

*Information kept in the **Candidates List** can be examined by selecting **Fires -> View Candidate List** (see Chapter 7).*



You can view the accumulated model candidates from **Fires -> Fire Business Candidates** when the working set window is active. This can be viewed from Interactive Batch but is not restricted to it.



Changes made to metadata in Interactive Batch are not reflected in the master station catalog metadata. That is, if you start with model "A," and in Interactive Batch change to model "G," the "A" model is still the master.

In the **Fire Business Candidates** table you can limit the fire-type statistics (fire-day, large fire-day, or multiple fire-day), delete rows, and export the table to a .csv file to open directly in a spreadsheet program. You can also sort on columns and add comments to a row (far right column).

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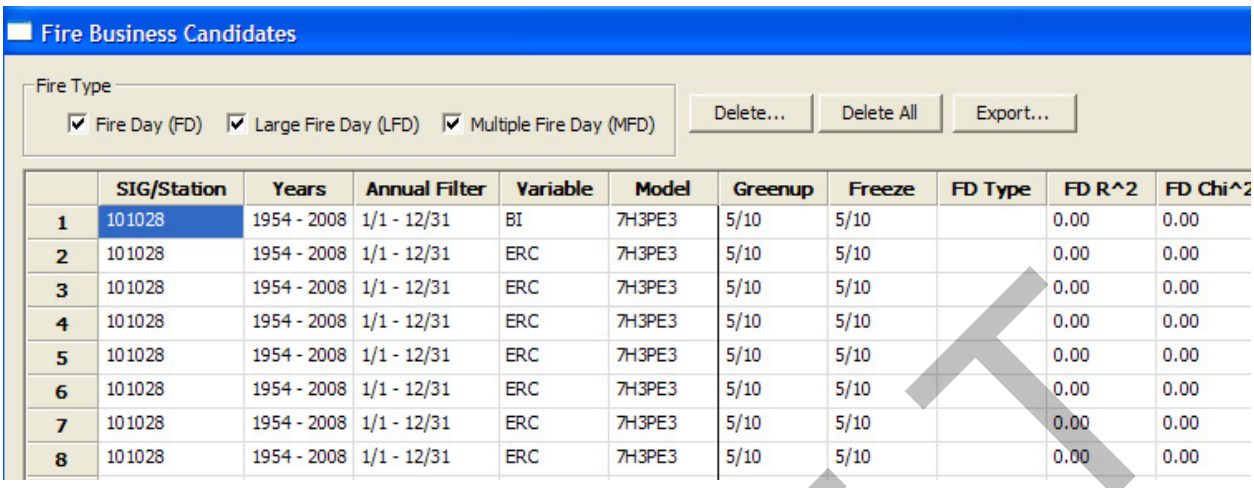

	SIG/Station	Years	Annual Filter	Variable	Model	Greenup	Freeze	FD Type	FD R^2	FD Chi^2
1	101028	1954 - 2008	1/1 - 12/31	BI	7H3PE3	5/10	5/10		0.00	0.00
2	101028	1954 - 2008	1/1 - 12/31	ERC	7H3PE3	5/10	5/10		0.00	0.00
3	101028	1954 - 2008	1/1 - 12/31	ERC	7H3PE3	5/10	5/10		0.00	0.00
4	101028	1954 - 2008	1/1 - 12/31	ERC	7H3PE3	5/10	5/10		0.00	0.00
5	101028	1954 - 2008	1/1 - 12/31	ERC	7H3PE3	5/10	5/10		0.00	0.00
6	101028	1954 - 2008	1/1 - 12/31	ERC	7H3PE3	5/10	5/10		0.00	0.00
7	101028	1954 - 2008	1/1 - 12/31	ERC	7H3PE3	5/10	5/10		0.00	0.00
8	101028	1954 - 2008	1/1 - 12/31	ERC	7H3PE3	5/10	5/10		0.00	0.00

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Chapter 13. Exporting data

This chapter explains how to export data while working with FireFamily Plus. Topics include:

- Exporting station metadata.
- Exporting SIGs station metadata.
- Exporting fire data.
- Exporting weather data.

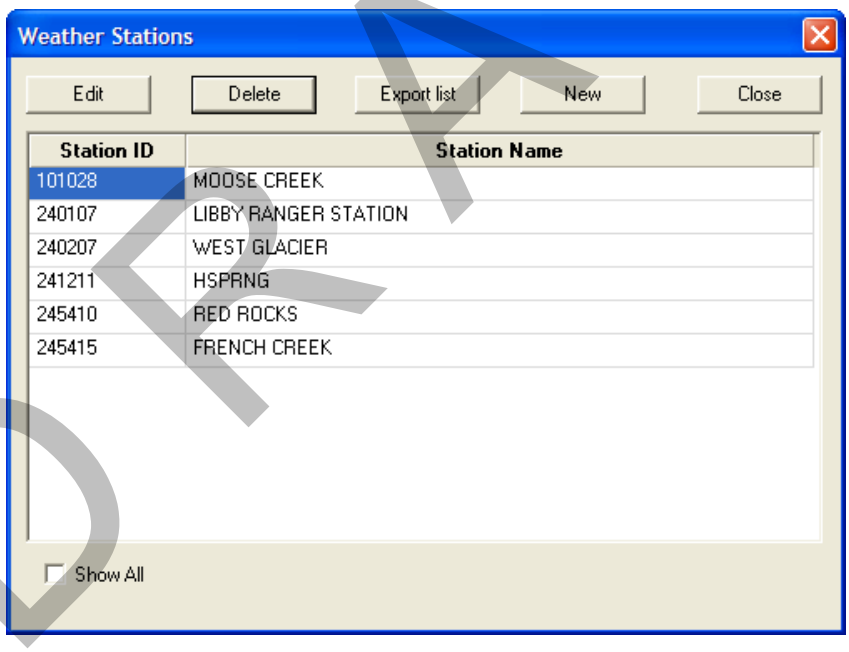
Exporting data

Exporting station metadata

Station metadata can be exported to a text file.

1 Select **Data** -> **Station** from the menu bar.

2 The following **Weather Stations** dialog box will open, showing the choices to export.



3 Select the **Station(s)** for which you would like to export metadata and click **Export list**.

4 The **Export Station Metadata** dialog box will open as shown.

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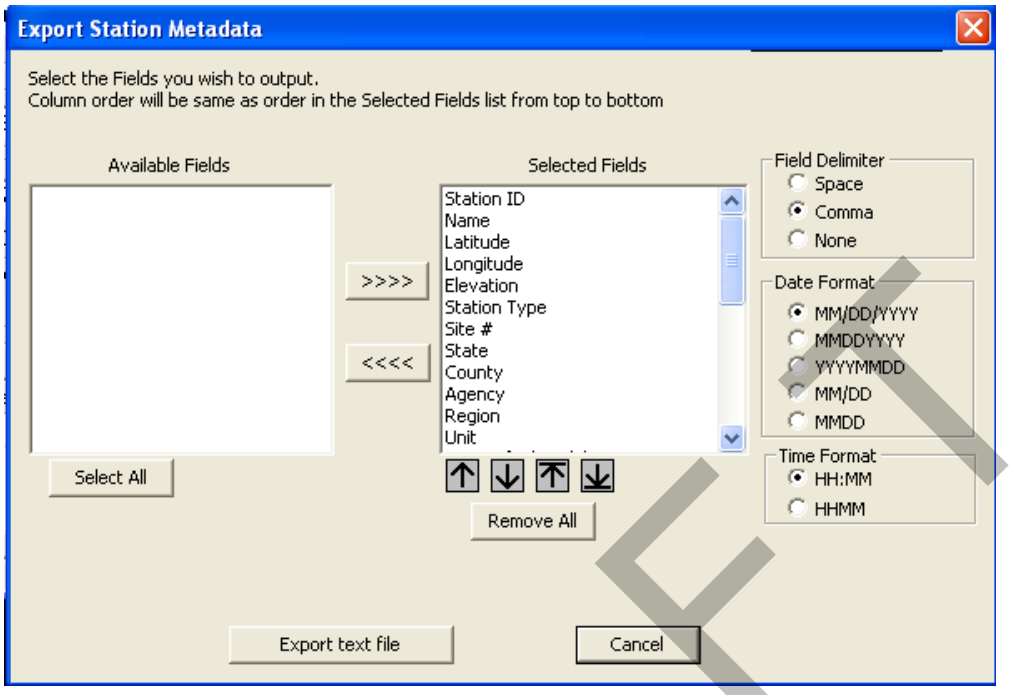

5 Select the fields you wish to export from the **Available Fields** column and move them into the **Selected Fields** column.

6 Select the data formats of your choice ("**Field Delimiter**," "**Data Format**," and "**Time Format**").

7 Click the **Export text file** button after you have made your selections and specify the file name and location.

The following is an example of a station metadata export.

```
FireFamily Plus Station Metadata Export
   printed on: 04/19/2007   at  03:04:25 PM  (from run # 34)
   using database: C:\Documents and Settings\lbradsha\My Documents\ffp4_data\ffp4_default

Station ID,Name,Latitude,Longitude,Elevation,Station Type,Site
#,State,County,Agency,Region,Unit,NFDRS fuel model,Use 88?,Climate class,Slope
class,Aspect,Position on slope,Herb annual?,Greenup date,Freeze date,Herb moisture,Shrub
moisture,Initial KBDI,Deciduous?,Avg. precip,Initial 1000h,FM 1=10 ?
015902,OPNPND,  31.09444, -86.54861,275,4,1,AL,Covington,USFS,09 Eastern Region
(R9),CONECUH,C,Y,3,1,4,,N,,,,,624,Y, 62.00, 25.00,Y
040611,REDDING,  40.51579,-122.29220,500,4,1,CA,Shasta,,,NWS,B,N,2,1,0, ,Y,04/24,11/01,,,100,N,
33.00, 15.00,N
245410,RED ROCKS,  44.69917,-111.82330,6690,4,1,MT,Beaverhead,USFS,01 Northern Region
(R1),BDF,G,N,3,1,5, ,N,05/23,10/15,,,0,N, 10.00, 25.00,N
245415,FRENCH CREEK,  45.33000,-112.91310,7422,4,3,MT,Beaverhead,USFS,01 Northern Region (R1),B-
D,G,N,3,3,5,,N,05/05,05/05,,,100,N, 14.50, 25.00,N
```

Since the file is "comma-delimited" in this example, you can export it into a Microsoft Excel spreadsheet as shown.

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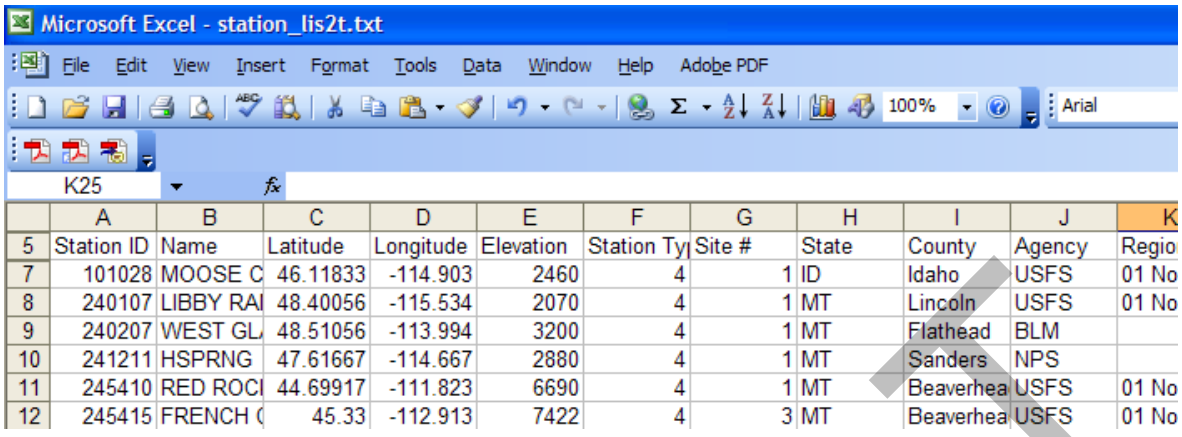


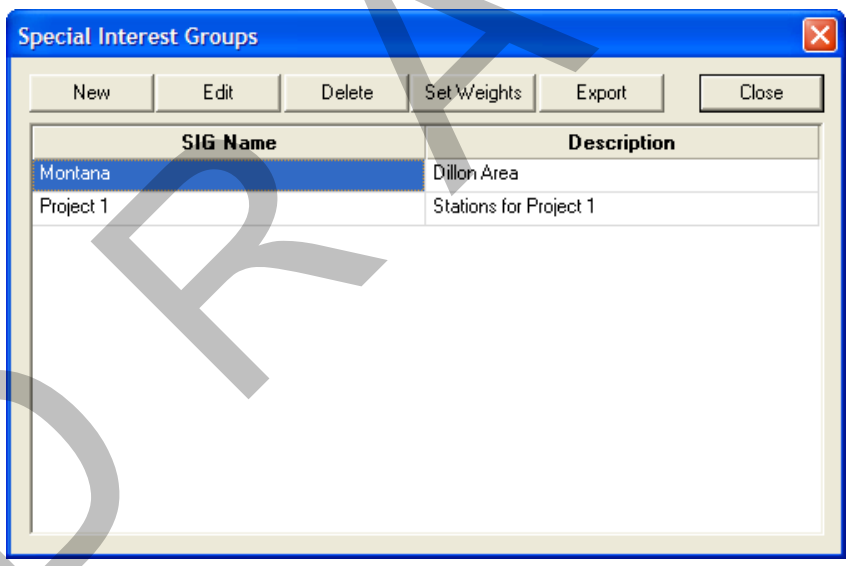
	A	B	C	D	E	F	G	H	I	J	K
5	Station ID	Name	Latitude	Longitude	Elevation	Station Ty	Site #	State	County	Agency	Regio
7	101028	MOOSE C	46.11833	-114.903	2460	4	1	ID	Idaho	USFS	01 No
8	240107	LIBBY RA	48.40056	-115.534	2070	4	1	MT	Lincoln	USFS	01 No
9	240207	WEST GL	48.51056	-113.994	3200	4	1	MT	Flathead	BLM	
10	241211	HSPRNG	47.61667	-114.667	2880	4	1	MT	Sanders	NPS	
11	245410	RED ROC	44.69917	-111.823	6690	4	1	MT	Beaverhea	USFS	01 No
12	245415	FRENCH (	45.33	-112.913	7422	4	3	MT	Beaverhea	USFS	01 No

Exporting SIGs

The same export functionality is available for stations in SIG groups.

1 Select the SIG you would like to export. Click **Data -> SIGS**.

2 Click **Export**.



3 Select the available fields and data format as described on pages 13.1 and 13.2.

4 Click the **Export text file** button after you have made your selections.

5 Specify the file name and location.

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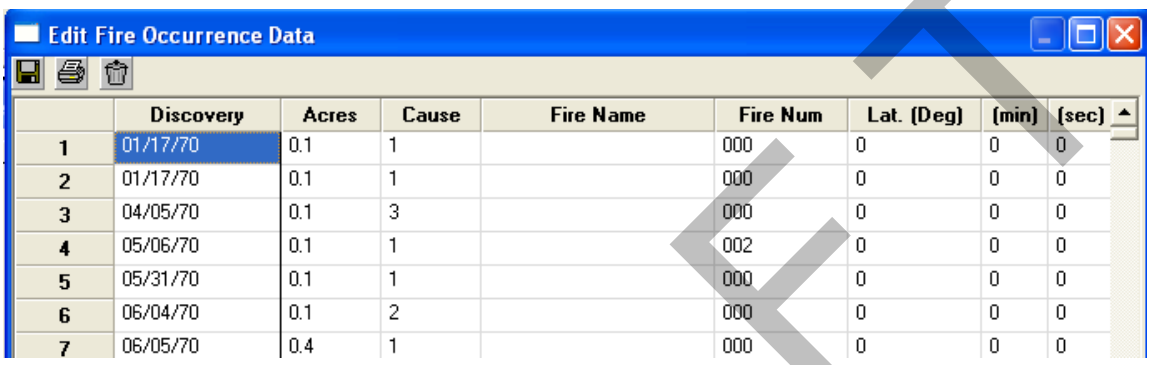
Exporting fire data

1 To view fires select **Fires -> Summary -> General** (or -> **Working Set).**

2 Highlight the units of your choice.

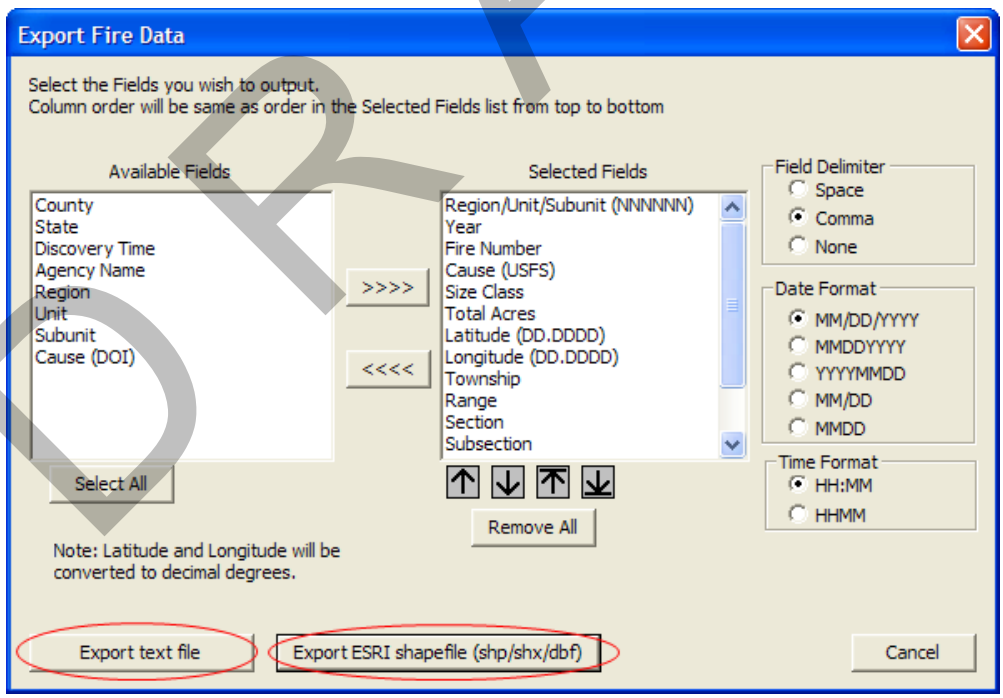
3 Click **View Fires**.

4 You can export the currently selected fires by clicking on the **Export Data** (Save) icon located at the upper left corner of the **Edit Fire Occurrence Data** dialog box.



	Discovery	Acres	Cause	Fire Name	Fire Num	Lat. (Deg)	(min)	(sec)
1	01/17/70	0.1	1		000	0	0	0
2	01/17/70	0.1	1		000	0	0	0
3	04/05/70	0.1	3		000	0	0	0
4	05/06/70	0.1	1		002	0	0	0
5	05/31/70	0.1	1		000	0	0	0
6	06/04/70	0.1	2		000	0	0	0
7	06/05/70	0.4	1		000	0	0	0

When the **Export Data** ("Save") icon is selected, the following **Export Fire Data** dialog box will appear.



5 Select the fields you wish to output from the **Available Fields** column.

There are two export options in the **Export Fire Data** dialog box. The first option (**Export text file**) will export the data as a simple text file. The second

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option (**Export ESRI shapefile shp/shx/dbf**) exports the data as a shapefile that can be used in GIS applications.

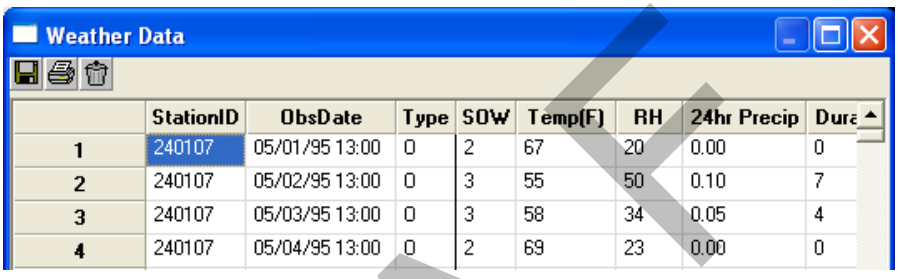
6 The **Save As** dialog box will open. Select the type and location of the export file.

Exporting weather observation records

While viewing weather data you can export observation records in a manner similar to that used for fire data.

1 Select **Weather -> View Observations**.

2 The **Weather Data** dialog box will open as shown.



	StationID	ObsDate	Type	SOW	Temp(F)	RH	24hr Precip	Dura
1	240107	05/01/95 13:00	0	2	67	20	0.00	0
2	240107	05/02/95 13:00	0	3	55	50	0.10	7
3	240107	05/03/95 13:00	0	3	58	34	0.05	4
4	240107	05/04/95 13:00	0	2	69	23	0.00	0

3 Click **Export Data** (or the **Save** icon) at the upper left corner of the dialog box.

4 Select the file format of your choice and save the file in a folder.

5 The following diagram shows the **Export Weather Data to a Text File** dialog box. The dialog box allows you to export weather data and save it in a variety of formats.

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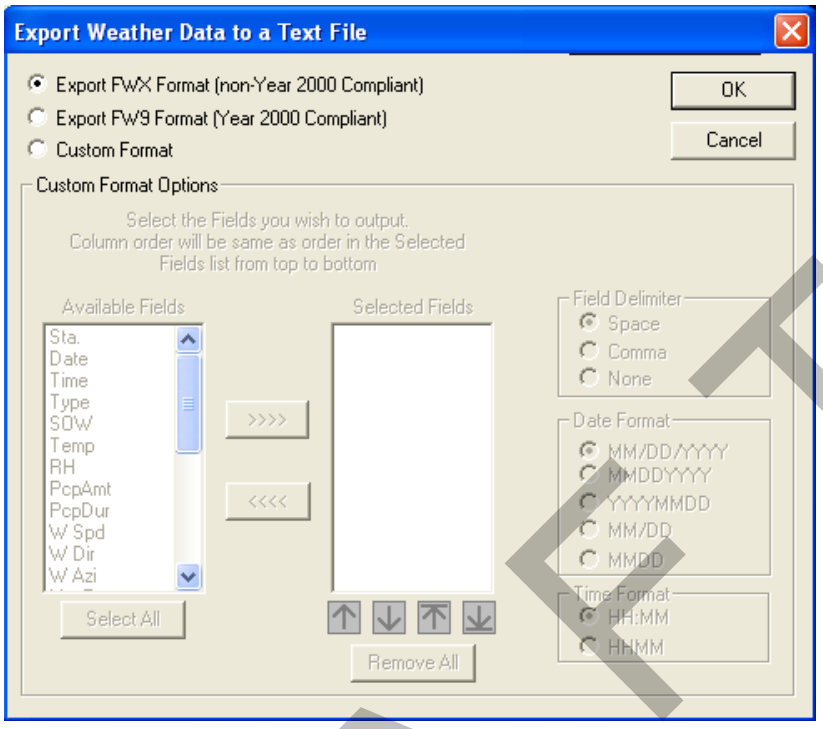

6 Select the export format, **Field Delimiter**, **Data Format** and **Time Format.**

7 Choose the variables of your choice from the **Available Fields** column.

8 After completing all of your selections, click **OK** to open the **SaveAs** window and export weather data.

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References

Refer to the following technical documentation for related fire and weather information, NFDRS topics, and FireFamily Plus background material.

Andrews, Patricia L., Larry S. Bradshaw, David L. Bunnell, and Gary M. Curcio. 1998. Fire Danger Pocket Card for Firefighter Safety. In. Proceedings from 2nd Symposium on Fire and Forest Meteorology, January 11-16, 1998. Phoenix, AZ. American Meteorological Society. Boston, MA.

Andrews, Patricia L. and Larry S. Bradshaw. 1997. FIRES: Fire Information Retrieval and Evaluation System - a Program for Fire Danger Rating Analysis. USDA For. Serv. Gen. Tech. Report INT-GTR-367, 64 p. Intermountain Research Station, Ogden, UT.

Andrews, Patricia L. and Larry S. Bradshaw. 1996--Fire Danger Rating and the Go/No-Go Decision for Prescribed Natural. Fire. In. Proceedings: Symposium on Fire in Wilderness and Park Management. March 1993. Missoula, MT. Gen. Tech. Report INT-GTR-320. Ogden, UT: USDA, Forest Service, Intermountain Research Station.

Andrews, Patricia L. and Larry S. Bradshaw. 1994. Interpretation of the National Fire Danger Rating System in Yellowstone National Park. Pages 211-216. In. Proceedings of Ecological Implications of Fire in Great Yellowstone. Bozeman, MT. Sept. 1993. International Association of Wildland Fire, Fairfield, WA.

Bradshaw, Larry S. and William C. Fischer, compilers. 1984. Computer Programs for Summarizing Climatic Data Stored in the National Fire Weather Data Library. USDA For. Serv. Gen. Tech. Report INT-164, 39 p. Intermountain Forest and Range Experiment Station, Ogden, UT.

Bradshaw, Larry S., John E. Deeming, Robert E. Burgan, and Jack D. Cohen, compilers. 1983. The 1978 National Fire-Danger Rating System: Technical Documentation. USDA For. Serv. Gen. Tech. Report INT-169, 144 p. Intermountain Forest and Range Experiment Station, Ogden, UT.

Burgan, Robert E. 1979. Estimating Live Fuel Moisture for the 1978 National Fire Danger Rating System. USDA For. Serv. Res. Paper INT-226, 16 p. Intermountain Forest & Range Experiment Station, Ogden, UT.

Burgan, Robert E. 1988. 1988 Revisions to the 1978 National Fire-Danger Rating System. USDA For. Serv. Res. Paper SE-273, 39 p. Southeastern Forest Experiment Station, Asheville, NC.

Carlson, J.D. and Larry S. Bradshaw.

Cohen, Erin, Rob Nostrant, Kelly Hawk, and Wayne Mitchell. 1994. pcFIRDAT/ pcSEASON User Guide: FireFamily for personal computers. 46 p. Calif. Dept.of Forestry and Fire Prot., Sacramento, CA.

Deeming, John E., Robert E. Burgan, and Jack D. Cohen. The National Fire-Danger Rating System - 1978. USDA For. Serv. Gen. Tech. Report INT-39, 63 p. Intermountain Forest & Range Experiment Station, Ogden, UT.

Loftsgaarden, Don O.and Patricia L. Andrews. 1992. Constructing and testing logistic

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regression models for binary data applications to the National Fire Danger Rating System. Gen. Tech. Rep. INT-286. Ogden, UT. USDA, Forest Service, Intermountain Research Station. 36 p.

Main, William A., Donna M. Paananen, and Robert E. Burgan. 1990. FIREFAMILY 1988. USDA For. Serv. Gen. Tech. Report NC-138, 35 p. North Central Forest Experiment Station, St. Paul, MN.

Main, William A., Robert J. Straub, and Donna M. Paananenn. 1982. FIREFAMILY: Fire planning with historic weather data. USDA For. Serv. Gen. Tech. Report NC-73, 31 p. North Central Forest Experiment Station, St. Paul, MN.

Nelson, Ralph.xxxx. Moisture Model.

Rothermel, Richard C. 1972. A Mathematical Model for Predicting Fire Spread in Wildland Fuels. USDA For. Serv. Res. Paper INT-115, 40 p. Intermountain Forest and Range Experiment Station, Ogden, UT.

USDA For. Serv. 1998. RERAP - Rare Event Risk Assessment Process User's Guide. February 12, 1998. 218 p. Washington, D.C

USDA For. Serv. 1995. WIMS - Weather Information Management System User's Guide. December 1, 1997. 394 p. Washington, D.C.

USDA For. Serv. 1993. National Interagency Fire Management Integrated Database (NIFMID) Reference Manual. USDA For. Serv., Fire and Aviation Management, Washington, D.C.

USDA For. Serv. 1982. Fire Management Analysis and Planning Handbook. USDA For. Serv. Handbook 5109.19, Washington, D.C.

Wittala, M. R., and Don W. Carlton. 1993 Assessing long-term fire movement risk in wilderness fire management. In. Proceedings from 12th Conference on Fire and Forest Meteorology, October, 1993. Jekyll Island, GA. Society of American Foresters. Bethesda, MD.

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Appendix A. Retrieving NIFMID data using KCFAST

This appendix explains how to use the Kansas City Fire Access Software (KCFAST) to download information into FireFamily Plus. KCFAST allows you to extract weather and fire occurrence data and station catalog information from the National Interagency Fire Management Integrated Database (NIFMID). Topics include:

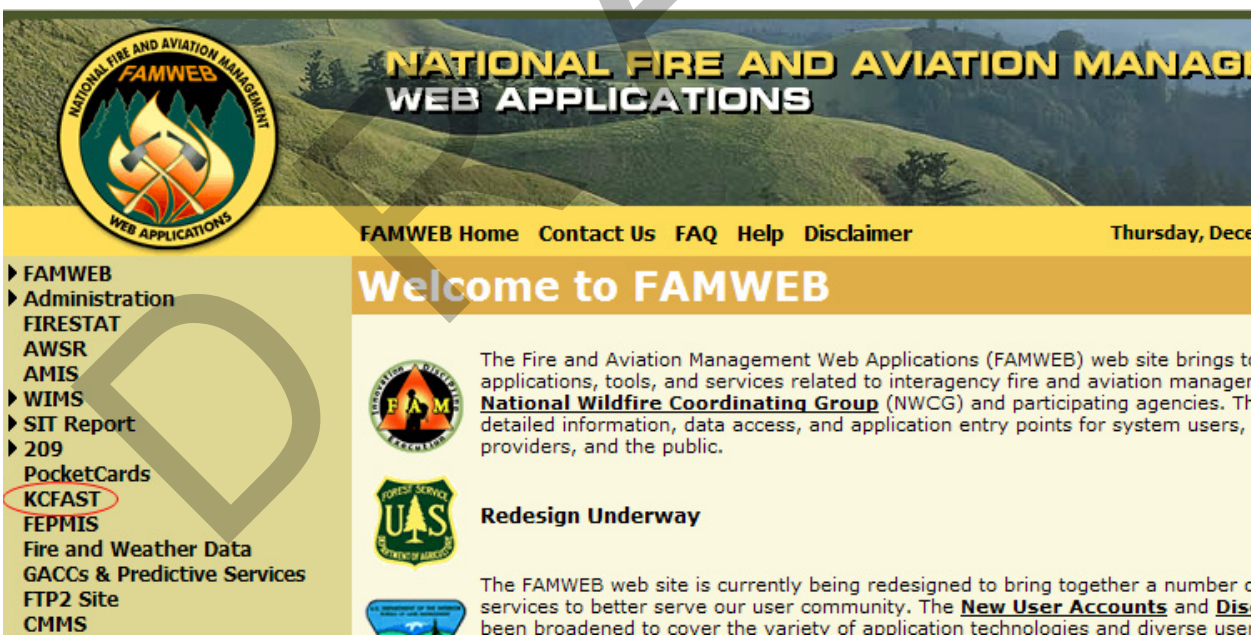
- Accessing KCFAST.
- Retrieving weather, fire occurrence, and station catalog data.
- Downloading files from the ftp site to your personal computer.

Accessing KCFAST

KCFAST is available on the Fire and Aviation Management web page by selecting **KCFAST** from the menu at the left of the page

http://fam.nwcg.gov/fam-web/

You must have a valid WIMS/NIFMID logon ID and password to retrieve data from NIFMID. For more information, send your request to fire?@fs.fed.us.



To access KCFAST from the Internet

1 Start your Internet browser.

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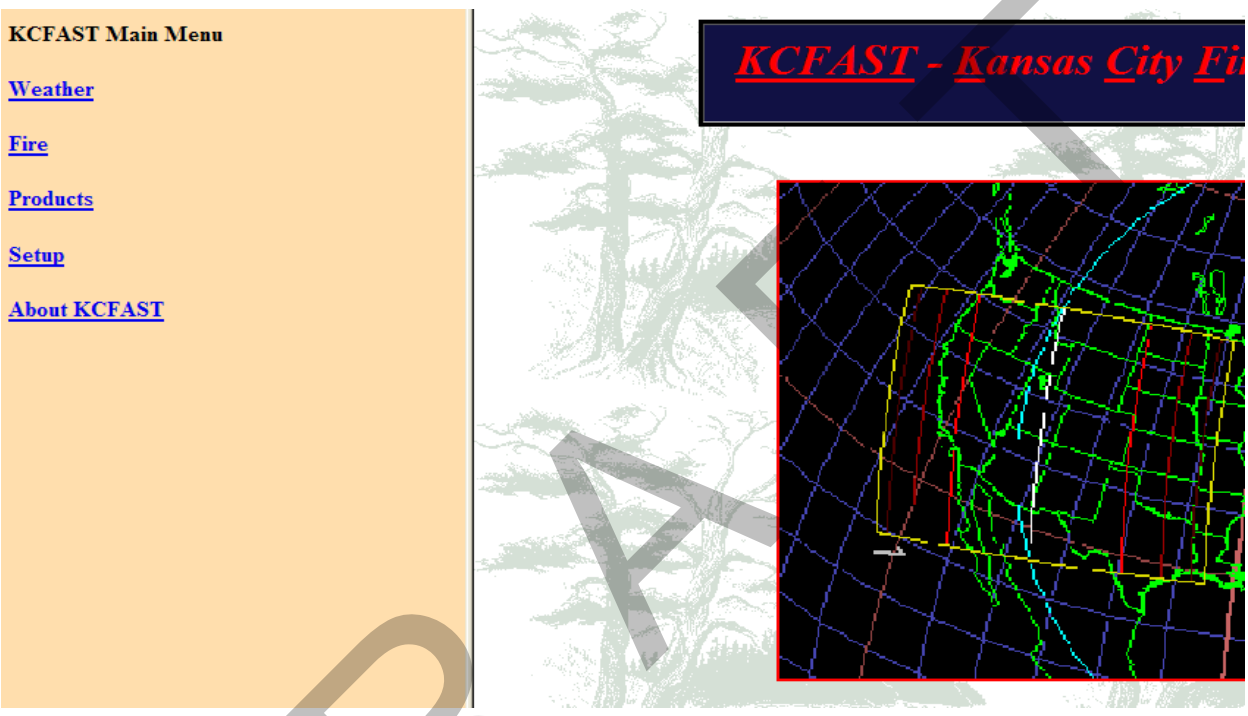
2 In the address box, type **http://famweb.nwcg.gov** then press **Enter**.

3 Click **KCFAST**.



After accessing this web page, you can save time later by adding this address to your browser as a bookmark.

To setup your WIMS/NIFMID logon ID for KCFAST retrievals

1 From the KCFAST Main Menu, click **Setup**.

2 Type your Username and Password, and then click **OK**.

3 Your Username is in the format:

ops$[WIMS/NIFMID logon id]

For example, "ops$fs1234" is a valid Username.

4 Type your Email address, and then click **Submit.**

The following User Profile Information screen shows a sample Email address.

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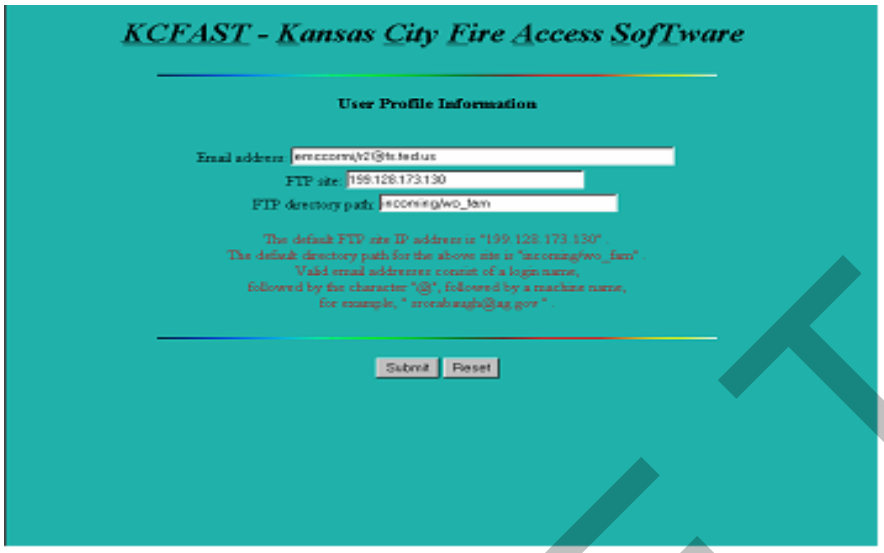

Retrieving weather, fire occurrence, and station catalog data

There are three basic types of data that you can retrieve from NIFMID:

- **Historical fire weather data** identifies data collected from specific weather stations.
- **Fire occurrence data** identifies data collected from the U.S. Forest Service.
- **Station catalogs** identify key weather station information.

*Be sure to select "**Send file to ftp site**" when retrieving weather data from KCFAST. Currently, FireFamily Plus does not reliably import raw file occurrence files retrieved with a browser*

To retrieve historical fire weather data

Although historical fire weather data is either saved in "72" format or "98" format, you will request most of your retrievals in the "72" format.

1. From the KCFAST Main Menu, click **Weather**.
2. Click **Data Extract**, and then click **Historical.**
3. Type the Station ID, and then **Begin** and **End** date range.
4. Click **Raw Datafile - 1972 Data Format**.
5. Select the E-mail notification option of your choice, and then click **Submit.**

The following **Historical Fire Weather Data Extract** screen shows a retrieval for station 101221 and spanning the month of July, 1995.

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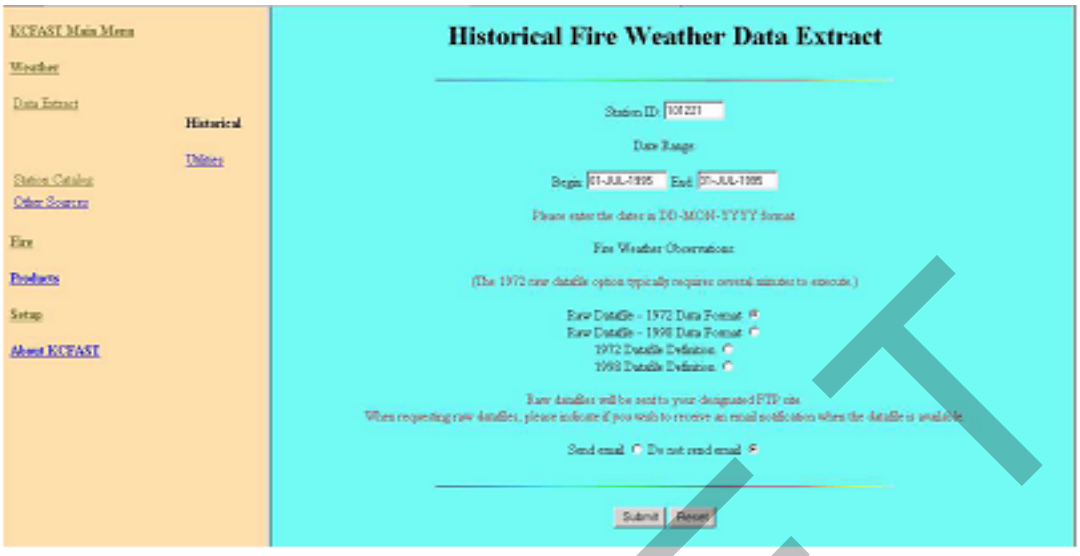

The following screen shows a sample FTP REQUEST CONFIRMATION message for station ID "050505."

Write down the file name so that you can locate this file when you access the site ftp2.fs.fed.us.

To retrieve US Forest Service fire occurrence data

1. From the KCFAST Main Menu, click **Fire.**
2. Click **Standard Extract**.
3. Type the two digit **Region** and two digit **Forest** numbers.
4. Type the **Begin Year** and **End Year Date Range**.
5. Click **NFMAS - PCHA** (PC Historical Analysis).
6. Click **Raw Datafile**.

*For more information about RAW and FPL data layouts, click **Datafile Definition**.*

7. Select the E-mail notification option of your choice, and then click **Submit**.

The following Fire Occurrence Data Extraction screen shows a retrieval for Region 04, Forest 8 and spanning the years 1985 through 1996.

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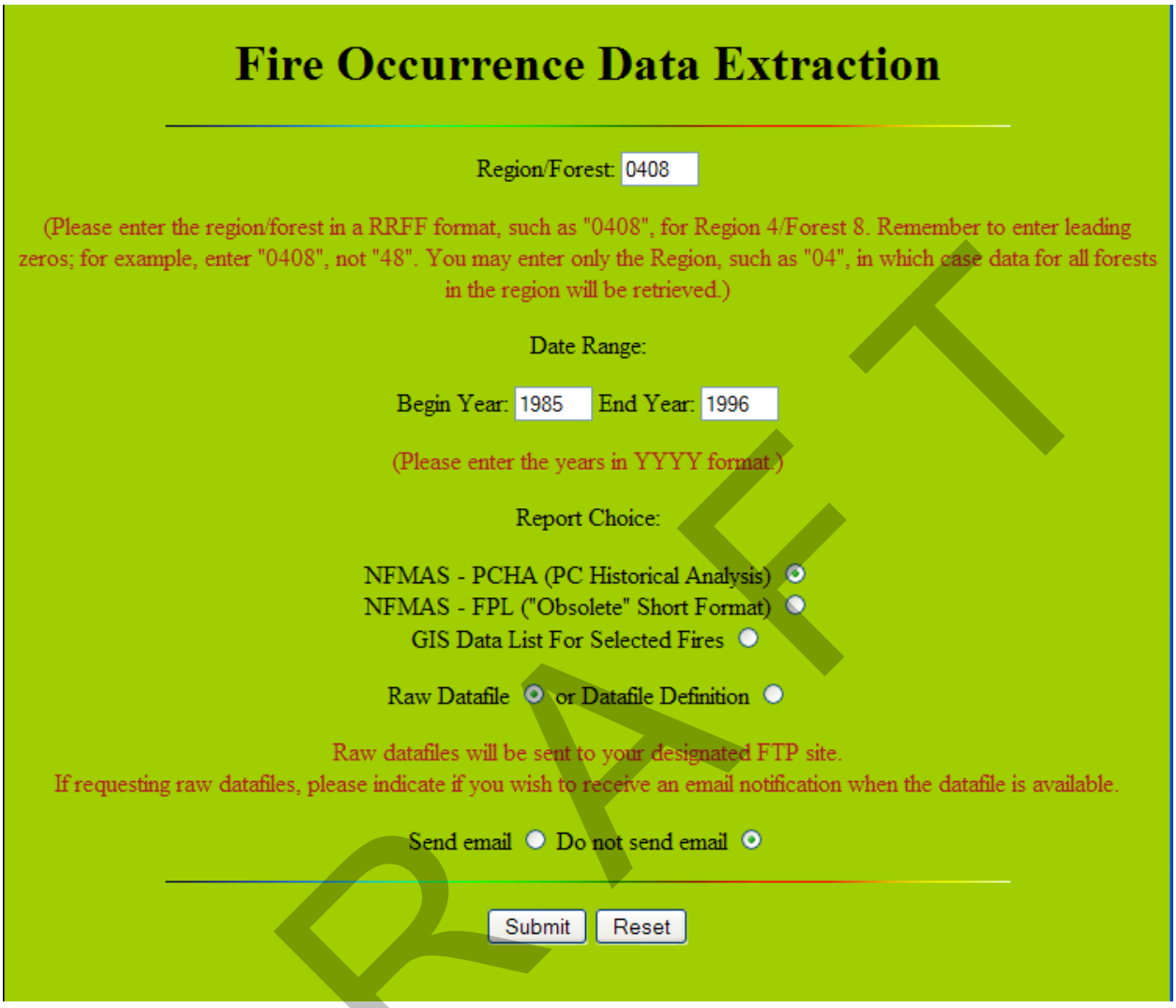
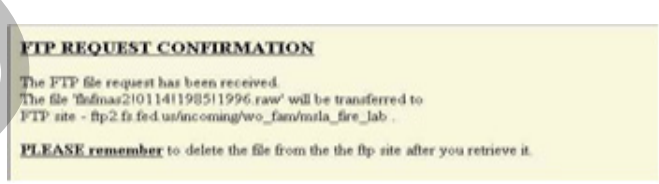


The following screen shows a FTP REQUEST CONFIRMATION message.



8 Write down the file name so that you can locate this file when you access the site **ftp2.fs.fed.us**.

To retrieve station catalog information for a single station

1 From the KCFAST Main Menu, click **Weather.**

2 Click **Station Catalog**, and then click **Station Information.**

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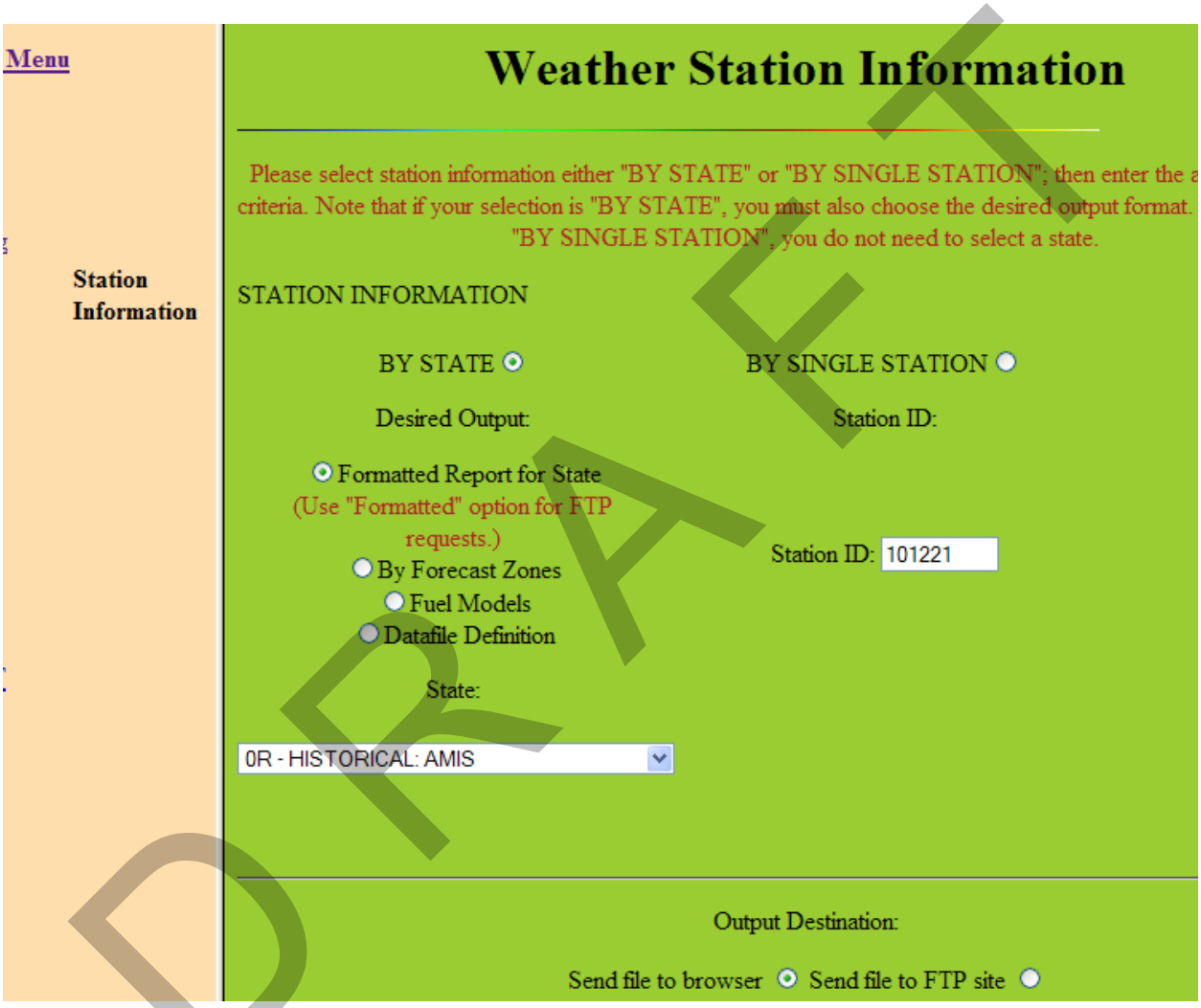
3 Click **BY SINGLE STATION**, and then type the desired **Station ID**.

4 Click **Send file to FTP site**.

5 Select the E-mail notification option of your choice, and then click **Submit.**

The following Weather Station Information screen shows a station information retrieval for station "1012211."



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Downloading files from the ftp site to your personal computer

In KCFAST, retrievals are named so that you can easily identify each file and its contents. For example, you can identify a KCFAST weather observation retrieval as follows:

Table 1:

[forestname].fpl	for fire occurrence files at the forest level, minus the fire name
wx[stationID].fwx	for weather observation files in the 72 format
wx[stationID].fw9	for weather observation files in the 98 format
[forestname].raw	for fire occurrence files at the district level, including fire name, in the full FS5100-29 report format
[name].txt	for text files to be imported into FireFamily Plus.

If you choose, you can rename KCFAST retrievals when you download the file. Use the following list as a guideline:

For record layouts of RAW and FPL files, follow the procedure outlined on page 2.4, "To retrieve U.S. Forest Service fire occurrence data." For step 6, click ***Datafile Definition****.*

Before downloading fire weather, fire occurrence, and station catalog files, you can better organize your retrievals by storing them in separate folders. For example, to store weather observation files, create the folder "fsapps/fam/ FireFamily Plus/FWX files." To store fire occurrence files, create the folder "fsapps/fam/FireFamily Plus/RAW files." To store a working set database, create the folder "fsapps/fam/FireFamily Plus/MDB files."

To download a file from ftp2.fs.fed.us

1. Start your Internet browser.
2. In the address box, type **ftp://ftp2.fs.fed.us/incoming/wo_fam** then press **Enter.**
3. Right-click the file name of your choice, click **Copy to folder**, then double-click the folder of your choice.

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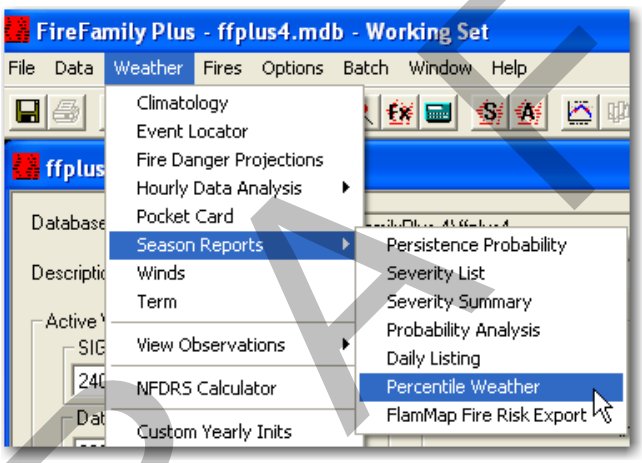
Appendix B. Using FireFamily Plus with rerap

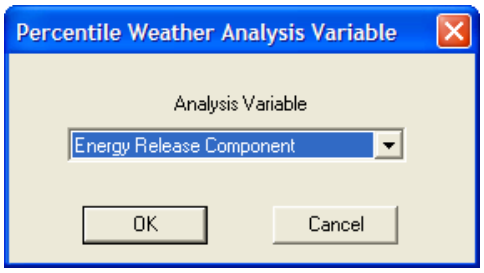
The **Percentile Weather** report allows you to select a variable and a wind direction for preparing a **Rare Event Risk Assessment Program (RERAP)** report. For example, given an ignition in an area approved for wildland fire use for resource benefits, you can use historical weather records, fuels, and weather conditions to calculate the probability of the fire being pushed to a particular point of concern.

To generate a Percentile Weather report

1 On the **Weather** menu, click **Season Reports**, and then click **Percentile Weather.**



The **Percentile Weather Analysis Variable** dialog box will open. The following diagram shows **Energy Release Component** selected as the percentile weather analysis variable.



2 Use the **Analysis Variable** drop-down list to select the desired variable, and then click **OK**.

The resulting diagram combines many RERAP calculations into one screen.

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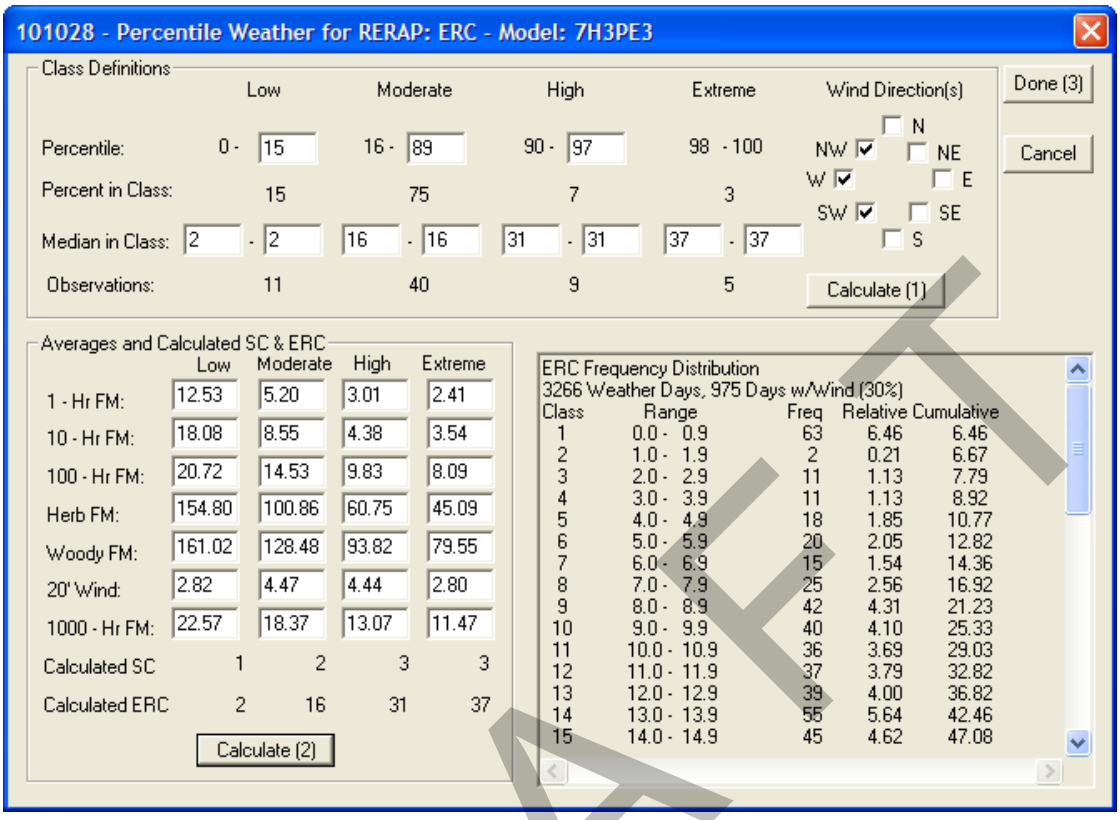

3 Check the desired **Wind Direction(s)** that would move the fire toward any points of concern.

4 To calculate fuel moisture and wind speeds associated with the ERC values, click **Calculate** (1).

5 To calculate an ERC and SC (Spread Component) from the fuel moisture and wind speed values, click **Calculate** (2).

6 To obtain a table and a printable report, click **Done** (3).

The following diagram shows the Percentile Weather for RERAP report.

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101028 - Percentile Weather for RERAP: ERC - Model: 7H3PE3

```
FireFamily Plus Percentile Weather Report for RERAP

 Station: 101028: MOOSE CREEK            Variable: ERC
 Model: 7H3PE3
         Data Years: 1988 - 2006
         Date Range: May 1 - October 31
Wind Directions: SW, W, NW

Percentiles, Probabilities, and Mid-Points
    Variable/Component Range        Low       Mod       High      Ext
            Percentile Range     0 - 15    16 - 89    90 - 97    98 - 100
       Climatol. Probability        15         75          7          3
          Mid-Point    ERC       2 -   2   16 -  16   31 -  31   37 -  37
            Num Observations        11         40          9          5
     Calculated Spread Comp.         1          2          3          3
              Calculated ERC         2         16         31         37

Fuel Moistures
        1 Hour Fuel Moisture      12.53       5.20       3.01       2.41
       10 Hour Fuel Moisture      18.08       8.55       4.38       3.54
      100 Hour Fuel Moisture      20.72      14.53       9.83       8.09
    Herbaceous Fuel Moisture     154.80     100.86      60.75      45.09
         Woody Fuel Moisture     161.02     128.48      93.82      79.55
              20' Wind Speed       2.82       4.47       4.44       2.80
     1000 Hour Fuel Moisture      22.57      18.37      13.07      11.47

 3266 Weather Records Used, 975 Days With Wind (29.85%)
```

For more information about RERAP, refer to "RERAP-Rare Event Risk Assessment Process User's Guide" at: http://www.fs.fed.us/fire/rerap/indexz.htm. This report can be imported directly into RERAP.

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Appendix C. Editing “unknown” fire reporting units

This appendix explains how to add missing subunits to your FireFamily Plus template database. Once you complete this task, every subsequent database that you create will display these subunits.

Using a generic region/unit/subunit internal structure, FireFamily Plus blends fire data based on the different organizational structures of each agency. Since many Forest Service Districts have been consolidated over the years (and in some cases impossible to track systematically), you may find that you need to add missing subunits to your FireFamily Plus template database.

The tasks in this appendix explain how to use Microsoft Access 2000 to edit a FireFamily Plus template database previously created in Microsoft Access 97. Exit FireFamily Plus before proceeding.

To open the template database

1. On the **Start** menu, point to **Programs**, and locate Microsoft **Access**.
2. In the **Microsoft Access** dialog box, click **Open**, and then double-click and browse to the appropriate file. The following diagram shows the Microsoft Access dialog box.
3. Open the **FireFamily Plus folder**.

This folder is usually located at “C:/ProgramFiles/FireFamilyPlus4.”

The following diagram shows the location of the template database.

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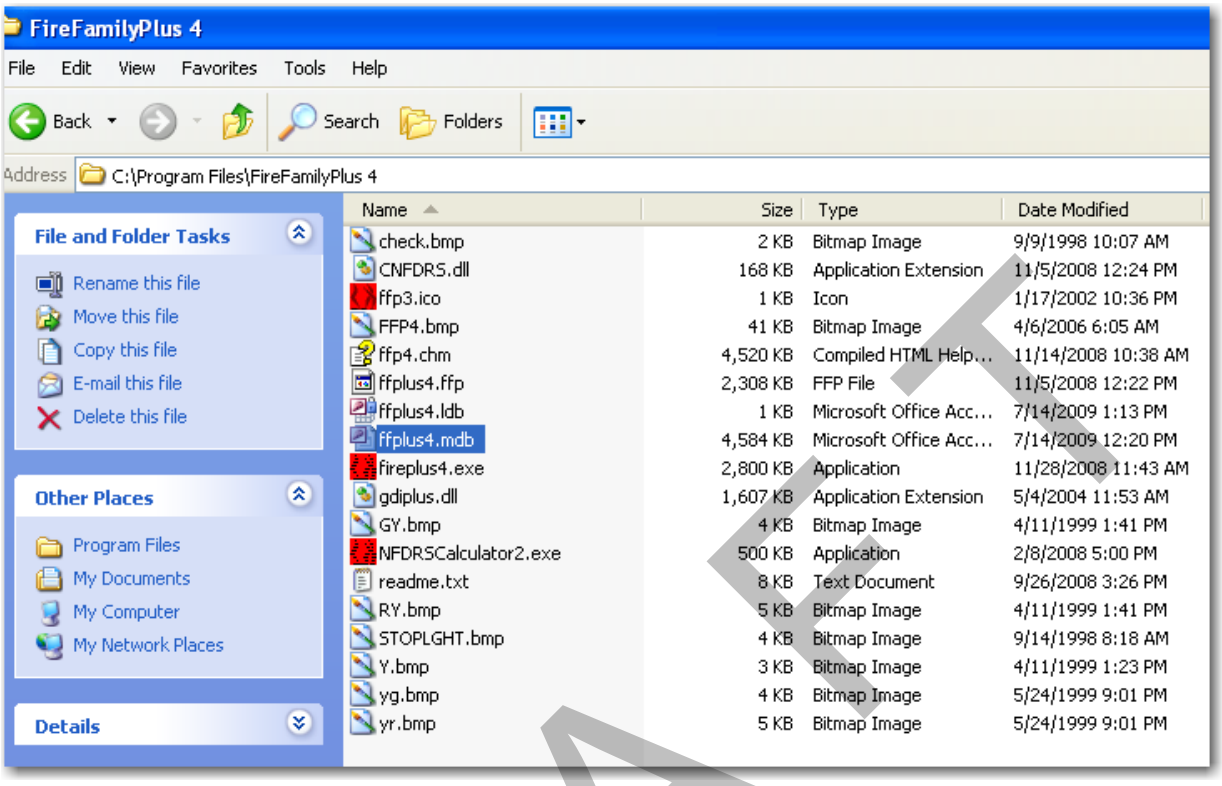
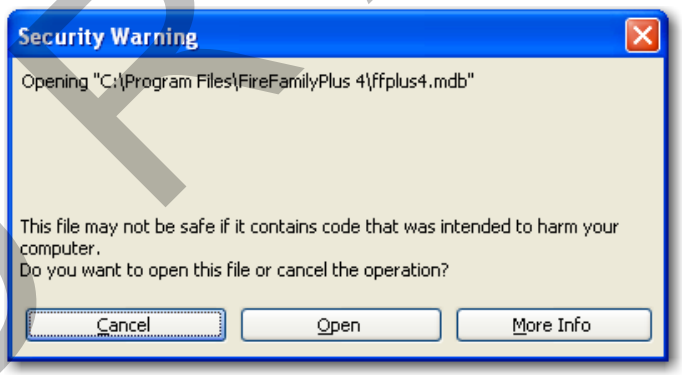


4 In the **Files of type** box, select **All Files**, and then double-click **ffplus4.mdb**. The following dialog box will open.



5 Click **Open**.

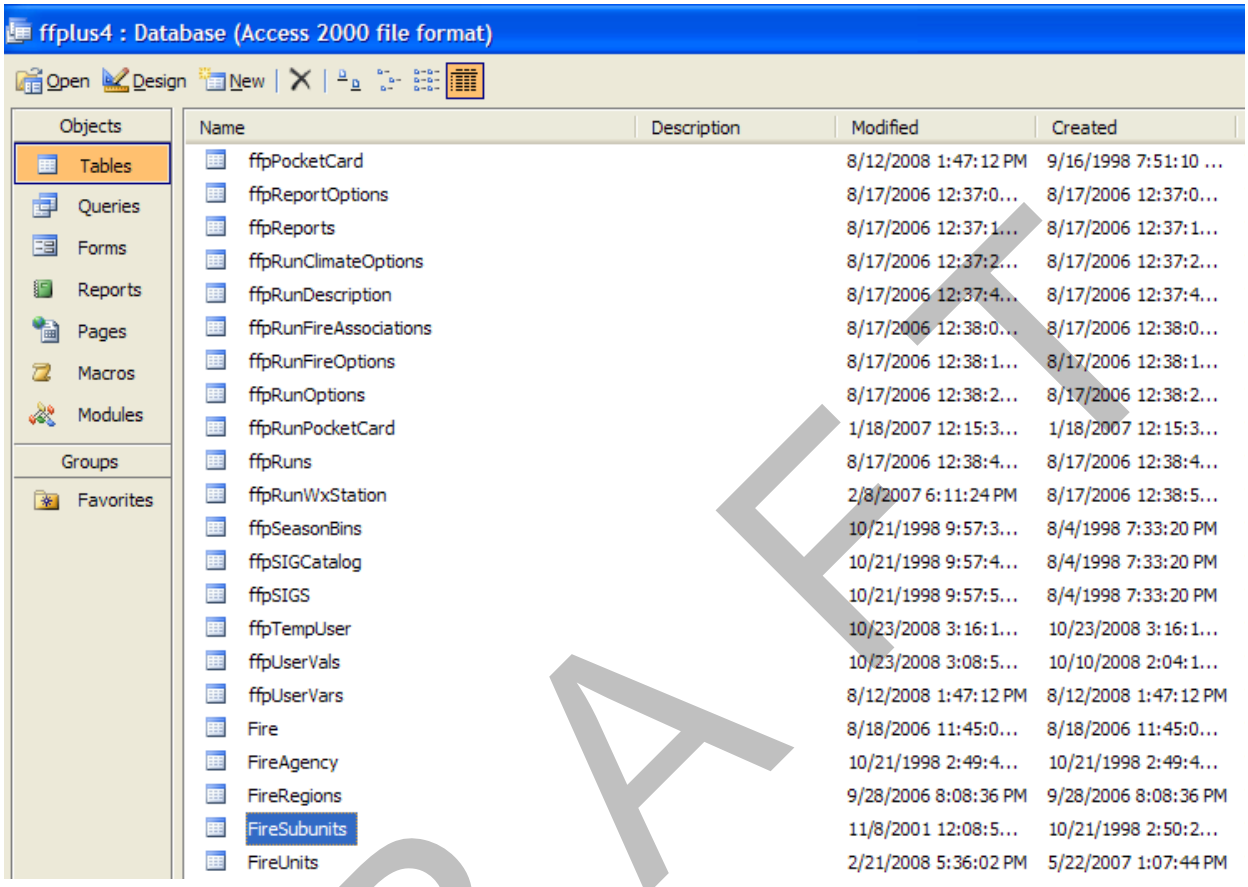
6 Double-click **FireSubunits**.

The following diagram shows the MS Access 2000 Convert/Open Database dialog box.

This dialog box does not display if you use MS Access 97 to update your template database.

DRAFT

The following diagram shows the “FireSubunits” table selected.



To add a subunit to the FireSubunits table - an example

This task explains how to add the missing subunit “38,” district “07 Woodsey RD” to the last row “666” on the FireSubunits table.

1. Scroll down until you display the appropriate districts for your area, then review the **FireSubunits Table** and determine if there are any missing subunits. Write down the **Unit ID** that pertains to any missing subunits.
2. Scroll down to the last entry in the **FireSubunits Table**.
3. In the ***** (asterisk) row, click in the **SubunitID** column, and then type the next sequential number in the table.

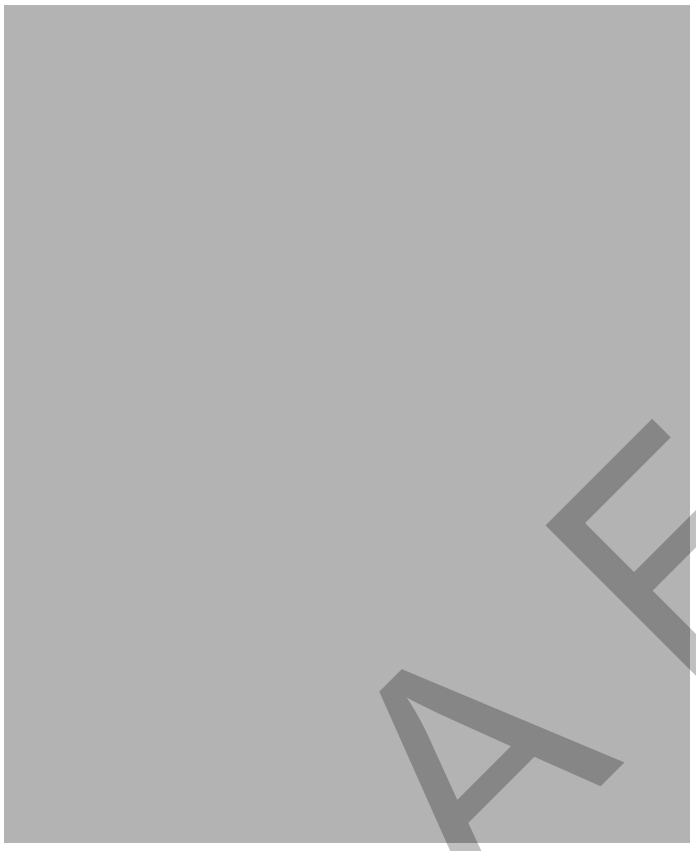
   Watch for zeroes (0) that may be inadvertently inserted in the table! For example, be sure to type “666,” not “6660.”
4. In the **UnitID** column, type the unit identifier.
5. In the **Name** column, type the name of the missing subunit.
6. To save and exit the **FireSubunits Table**, click **Exit** on the **File** menu.

DRAFT

The following diagram shows the **FireSubunits Table**. Notice the missing subunit on the Boise National Forest.

DRAFT

The following diagram shows the new subunit added to the end of the **FireSubunits Table**.



This example shows you how to change the template database. To import new fire occurrence data, you must create a new database from the modified template database.

You can also modify an existing working database in the same manner, but you must re-import the fire occurrence data again to update the fires in the existing database. More than likely, these fires were rejected during the previous import process due to invalid subunits.

DRAFT

Appendix D. Weather data sources

There are two standard formats for extracting fire weather observations from the National Interagency Fire Management Integrated Database (NIFMID) - the older FWX (Wxobs72) and the newer FW9 (Wxobs98) formats. There are now also other sources of these data. The table below explains the data sources and the attributes of the different sources. The 3rd format, the DAT format from the WRCC data lister is an unedited listing of hourly sensor values which FireFamily Plus tries to interpret and ingest based on header lines embedded in the file. It is currently the only source for wind gust data.

	FAMWEB-NIFMID							
	WEB[1]	*KCFAST*[2]		*WRCC Data Lister*[3]			*CEFA-FPA*[4]	
Attribute	FWX	FWX	FW9	DAT	FWX	FW9	FWX	FW9
Y2K	No	No	Yes	Yes	No	Yes	No	Yes
Hourly Data	No	No	Yes	Yes	No	Yes	No	Yes
NFDR "O/R"	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
State of Wx	Yes	Yes	Yes	No	No	No	Yes	Yes
Wet Flag	No	No	Yes	No	No	No	No	No
Solar Radiation	No	No	Yes	Yes	No	Yes	No	No
Gust Data	No	No	No	Yes	No	No	No	No
Data Current	No	Yes	Yes	Yes	Yes	Yes	No	No
Password Req.	No	Yes	Yes	Yes	Yes	Yes	No	No
NWS/WIMS Station ID	Yes	Yes	Yes	No	No	No	Yes	Yes
WRCC Station ID	No	No	No	Yes	Yes	Yes	No	No

1 **Y2K (compliant)**. FireFamily Plus uses a pivot year of 29. That is, when reading a 2-digit year, 00 through 29 is considered 2000 to 2029. Values of 30 to 99 are considered 1930 to 1999.

2 **Hourly Data**. Hourly data are available from RAWS stations. FAMWEB-KCFAST holds the last 18 months of hourly data for RAWS stations. The WRCC contains the period of record for RAWS stations, but only the sensor data - it does not have 'touched' data such as wet flag or state of the weather. Nor does it have daily or 24 hour summaries (i.e. 24 hour rainfall).

[1]FAMWEB - Fire and Weather Data. http://fam.nwcg.gov/fam-web/weatherfirecd/

[2] NIFMID. National Interagency Fire Management Integrated Database. http://fam.nwcg.gov/fam-web/kcfast/mnmenu.htm, Login ID and password required. The NIFMID database contains the entire period of record (POR) for a station. In many cases this is from the mid-1950's.

[3]WRCC - Western Region Climate Center, RAWS Data Lister. http://www.raws.dri.edu/index.html. The WRCC database contains observations only from RAWS stations transmitting through the GOES satellite system. The earliest date of these records in generally the late 1970's.

[4]CEFA-FPA. Desert Research Institute's Climate, Ecosystem and Fire Applications Program that performed RAWS Quality Control for the Interagency Fire Program Analysis (FPA). http://www.wrcc.dri.edu/fpa/. This dataset has a limited POR, generally from the mid 1980's through 2004.

DRAFT

3 **NFDR "O/R."** By default the FWX formatted observation is a once-daily (1300) NFDR fire weather observation. The FW9 format allows for "O" and "R" type observations. The FW9 "O" observation should also have a valid state of the weather code. WRCC climate data lister files may have the "O" designation at 1300 local time but will not have a valid state of the weather code (it is blank). FireFamily Plus will interpret the blank to be zero (0). Non "O" type records are typed "R" (for Raws).

4 **State of the weather (SOW)**. This is an ocular assessment of the sky conditions at the observing station used to indicate the amount of cloud cover, kind of precipitation, and/or restrictions to visibility at the fire-danger station at observation time. Within the NFDRS processor, the SOW is used to establish the ground/fuel level temperature and relative humidity at the weather station. These values are then used in the dead fuel moisture calculations. It also established some "values by rule" as noted in the table below.

State of Weather (SOW) Codes
0 - Clear, less than 1/10 cloud cover
1 - Scattered clouds, 1/10 - 5/10 cloud cover
2 - Broken clouds, 6/10 - 9/10 cloud cover
3 - Overcast, 10/10 cloud cover
4 - Fog
5 - Drizzle
6 - Rain
7 - Snow or sleet
8 - Showers
9 - Thunderstorms
NOTE - 5, 6, and 7 cause 1 and 10 hour fuel moistures to be set to 35% and indices (BI, SC, IC) to be set to zero because generalized precipitation over the protection unit is assumed. The ERC is computed as normal. Values 8 and 9 assume localized precipitation and will not zero indices or set fine fuels to 35%.

5 **Wet Flag**. This entry is used in the operational NFDRS to indicate when the fuels are wet at observation time. The Wet Flag is automatically set to "Y" by the danger-rating processor if State of Weather (SOW) code "5", "6", or "7" is entered and causes the "values by rule" noted in the State of Weather table above.

Both year round and seasonal stations should consider snow covered fuels. As long as the fuels have snow on them, the Wet Flag is set to Y regardless of the SOW.

With the wet flag set to Y in the snow-covered fuel scenario (SOW = 0,1,2,3,4 or SOW = 8 or 9), the NFDRS processor considers the maximum and minimum relative humidity to be 100 percent (a no drying situation) regardless of the ambient relative humidity. This will invoke the "values by

DRAFT

rule" of the wet flag setting. In addition this can be particularly important for spring snow events because the NFDRS processor will model snowmelt following the snow as noted in the following table as long as the wet flag remain on. This keeps the 1000 hr-time lag fuel moistures at more representative values of fuels covered with snow or melting snow.

Observation Time Temperature	Hours Fuels Wet
<= 35	0
36 to 40	2
41 to 50	4
51 to 60	6
> 61	8

6 **Solar Radiation Data**. This value is used to compute hourly fuel moisture with the Nelson dead fuel moisture model.

7 **Gust Data**. RAWS stations record maximum wind gust and direction for the hour in addition to the 10-minute average wind that is reported to NFDRS. These data are only available from the WRCC. Their inclusion in the FireFamily Plus database allows frequency distributions of 10-minute averaged, or gusts to be used when creating fire-risk tables.

8 NWS Station ID. WIMS and NIFMID use a 6 digit station ID, that at one time was issued by the National Weather Service. There is some "intelligence" in the numbering system. The first two digits was the state code, the second two the county code, and the third two the sequential station number in that count. These codes do not follow standard FIPS codes and does not work in states with more than 99 counties. The WRCC uses an internal station ID that is not related in anyway to the NWS station id. FireFamily Plus 4 has an internal cross reference that, when importing a data file from WRCC, will attempt to map a station id from the WRCC to the NWS Station ID. This cross reference is based on a spreadsheet from CEFA developed during their FPA-RAWS quality control work. If a match is found it will use to WRCC ID to identify the station but automatically use the station metadata from the associated NWS Station ID.

DRAFT

WxStation : Table

StationID	Name	WRCC_ID
101019	HELLS HALF ACRE	
101028	MOOSE CREEK	IMOO
101031	POWELL	IPOW
101037	SLATE CREEK	ISLA
101043	CHAIR POINT	
101044	LODGPL	ILOD
101045	RED RIVER	IRED
101048	GRANGEVILLE	
101049	ROUNDTOP	IROU
101090		
101097	CHUCK'S TEST	
101099	CORRAL	
101100	PITTSBURG LANDING	IPIT
101108	WEISRV	IWEI
101109	SNAKE	ISNA
101209	MCCALL	
101220	TEAPOT	ITEA
101221	BEARSKIN	IBEA

DRAFT

WXOBS72A, Weather Station Inventory (1972 Format)		
Field	**Field Name**	**Columns**
1	STATION NUMBER	1-6
2	YEAR	7-8
3	MONTH	9-10
4	DAY	11-12
5	STATE OF WEATHER (CODE)	13
6	DRY BULB TEMPERATURE (° F)	14-16
7	RELATIVE HUMIDITY (%)	17-19
8	HERBACIOUS GREENNESS FACTOR	20-22
9	HERBACEOUS VEGETATION CONDITION	23-24
10	HUMAN-CAUSED RISK	25-27
11	WIND DIRECTION (8 POINT)	28
12	WIND SPEED (MPH)	29-31
13	WOODY VEGETATION CONDITION	32
14	10-HR FUEL MOISTURE (%)	33-35
15	WOODY GREENNESS FACTOR	36-38
16	MAXIMUM TEMPERATURE (° F)	39-41
17	MINIMUM TEMPERATURE (° F)	42-44
18	MAXIMUM RH (%)	45-47
19	MINIMUM RH (%)	48-50
20	SEASON CODE	51
21	PRECIPITATION DURATION (HRS)	52-53
22	PRECIPITATION AMOUNT (IN)	54-57
23	LIGHTNING ACTIVITY LEVEL	58-60
24	RELATIVE HUMIDITY VARIABLE (see note)	61

Note: RH variable 1 = Wet bulb, 2 = RH%, 3 = dew point

DRAFT

Weather Observation Data Transfer Format, 1998 (WxObs 98)			
Item	**Cols**	**Type**	**Description**
1	01-03	3A	Record type (W98). All records begin with this record type identifier code.
2	04-09	6N	Station Number.
3	10-17	8N	Observation date (YYYYMMDD).
4	18-21	4N	Observation time (0000-2359).
5	22	1A	Observation type (O=NFDRS, R=RAWS other than at the standard NFDRS observation time, F=Forecast, X=Other).
6	23	1N	State of weather code.
7	24-26	3N	Dry bulb temperature (degrees Fahrenheit or degrees Celsius based on Measurement Type code [col. 63]).
8	27-29	3N	Atmospheric moisture (wet bulb temperature, relative humidity (percent), or dewpoint temperature based on Moisture Type code [col. 62]).
9	30-32	3N	Wind direction azimuth measured from true north. 0 (zero) means no wind direction, 360 is north.
10	33-35	3N	Average windspeed over a 10-minute period (miles or kilometers per hour based on Measurement Type code).
11	36-37	2N	Measured 10-hour time lag fuel moisture.
12	38-40	3N	Maximum Temperature (degrees Fahrenheit or degrees Celsius based on Measurement Type code [col. 63]).
13	41-43	3N	Minimum Temperature (degrees Fahrenheit or degrees Celsius based on Measurement Type code [col. 63]).
14	44-46	3N	Maximum relative humidity (percent).
15	47-49	3N	Minimum relative humidity (percent).
16	50-51	2N	Precipitation duration (hours).
17	52-56	5N	Blanks=no precipitation. *U.S. measurement:* inches with implied decimal nnnnn format; trace shown as 00005.
18	57	1A	Wet flag (Y/N).
19	58-59	2N	Herbaceous greenness factor (0-20).
20	60-61	2N	Shrub greenness factor (0-20).
21	62	1N	Moisture Type code (1=Wet bulb, 2=Relative Humidity, 3=Dewpoint).
22	63	1N	Measurement Type code: 1=U.S., 2=Metric. Affects temperature (Fahrenheit or Celsius), wind (miles or kilometers per hour), and precipitation (decimal inches or millimeters).
23	64	1N	Season code (1=Winter, 2=Spring, 3=Summer, 4=Fall).
24	65-68	4N	Solar radiation (watts per square meter).

DRAFT