

## S-491 Pre-course Work

### FireFamilyPlus

16 Possible Points

#### OBJECTIVES:

1. Demonstrate the ability to operate FireFamilyPlus basic functions.
2. Demonstrate the ability to define a working set in FireFamilyPlus.
3. Demonstrate the ability to produce a climatological graph.
4. Demonstrate the ability to read FireFamilyPlus graphs.

FireFamilyPlus is a powerful tool that allows you to summarize and analyze various aspects of climatology and fire business and to analyze the relationships between the two. This software works with an integrated Microsoft Office Access® database containing both fire weather and fire occurrence data.

In S-491 you will be using this program to troubleshoot NFDRS outputs as well as to analyze relationships between various NFDRS outputs and fire occurrence to determine which of the outputs will be the best indicator of your unit's fire problems.

The purpose of this section of pre-course work is to ensure basic familiarity with the screen layout and general functionality of FireFamilyPlus. You will go through the various steps outlined below. Steps you will take are highlighted in **bold print**, but do not skip the other information that is not in bold print. The > symbol between words indicates a series of command steps in FireFamilyPlus.

The FireFamilyPlus User's Guide, installation files, Tech Tips, and the database used for the S-491 Course can be found on the Internet at <http://FireModels.org>.

Examples in the User's Guide and Tech Tips can be very helpful in becoming familiar with the program. You will be asked to perform certain FireFamilyPlus functions and **return the output products and quiz questions**, located at the end of this tutorial, with your completed pre-course work package.

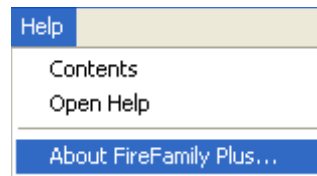
## I. DOWNLOAD/UPDATE PROGRAM AND DATABASE

Check your FireFamilyPlus version (if currently installed), update if necessary, or install FireFamilyPlus if it is not on your computer.

- A. Do you have FireFamilyPlus 4.0.2 (or later) installed on your computer? You can tell from the start menu (**Start > All Programs**) and look for the **FireFamilyPlus 4** program group. You may also have, or can create a shortcut to FireFamilyPlus 4.



You can determine the exact version by starting FireFamilyPlus 4 and clicking on the task bar item **Help** and then click on "**About FireFamilyPlus**" from the drop-down menu.



The text should read "**FireFamilyPlus, Version 4.0.2**" (or later).

- \* If a current version of FireFamilyPlus 4 **is not installed** on your computer, continue with step B (below).
- \* If a current version of FireFamilyPlus 4 **is installed** on your computer, (skip step B) go directly to step C.

- B. You can download the latest version of FireFamily Plus from the Internet site <http://FireModels.org>.

Click on "**FireFamilyPlus**" then "**Downloads**" to access the download page.



Follow the instructions to **download and save** the installation file "ffp4setup.msi" which contains everything needed to install the program.

*Note: You may also review the online release notice for detailed installation instructions ([firefamilyplus4\\_release\\_note.pdf](#)).*

Depending on your agency, you may need assistance from your computer staff to install the software. Install FireFamilyPlus by double-clicking on the file **ffp4setup.msi** in Windows Explorer and clicking the **Next** button each time it appears, and then click the **Finish** button to complete installation.

- C. There are two recommended methods for downloading the S-491 Class Database from the FireFamilyPlus Training Page (Support > Training) at <http://FireModels.org>.

The screenshot shows the FireModels.org website. The left sidebar contains a navigation menu with categories: Home, National Systems, Introduction, BehavePlus, FlamMap, FARSITE, FireFamilyPlus, Software, Support, WFAS, and Research Systems. The 'Training' link under the 'Support' category is highlighted with a red arrow. The main content area is titled 'FireFamilyPlus Training' and contains the following text:

Home > FireFamilyPlus > Training

### FireFamilyPlus Training

FireFamilyPlus is used in the S-491 - Intermediate National Fire Danger course.

The Pre-Work for S-491 requires that you download and use a FireFamilyPlus database, including all the files necessary for the pre-work and classroom exercises. It is available in two formats:

- A Microsoft Office Access® database: **s491\_class.mdb**; 13,576 Mb).
- A ZIP file containing the same database: **s491\_class\_database.zip**; 1,861 Mb).

The FireFamilyPlus program can be downloaded from the [Downloads](#) page.

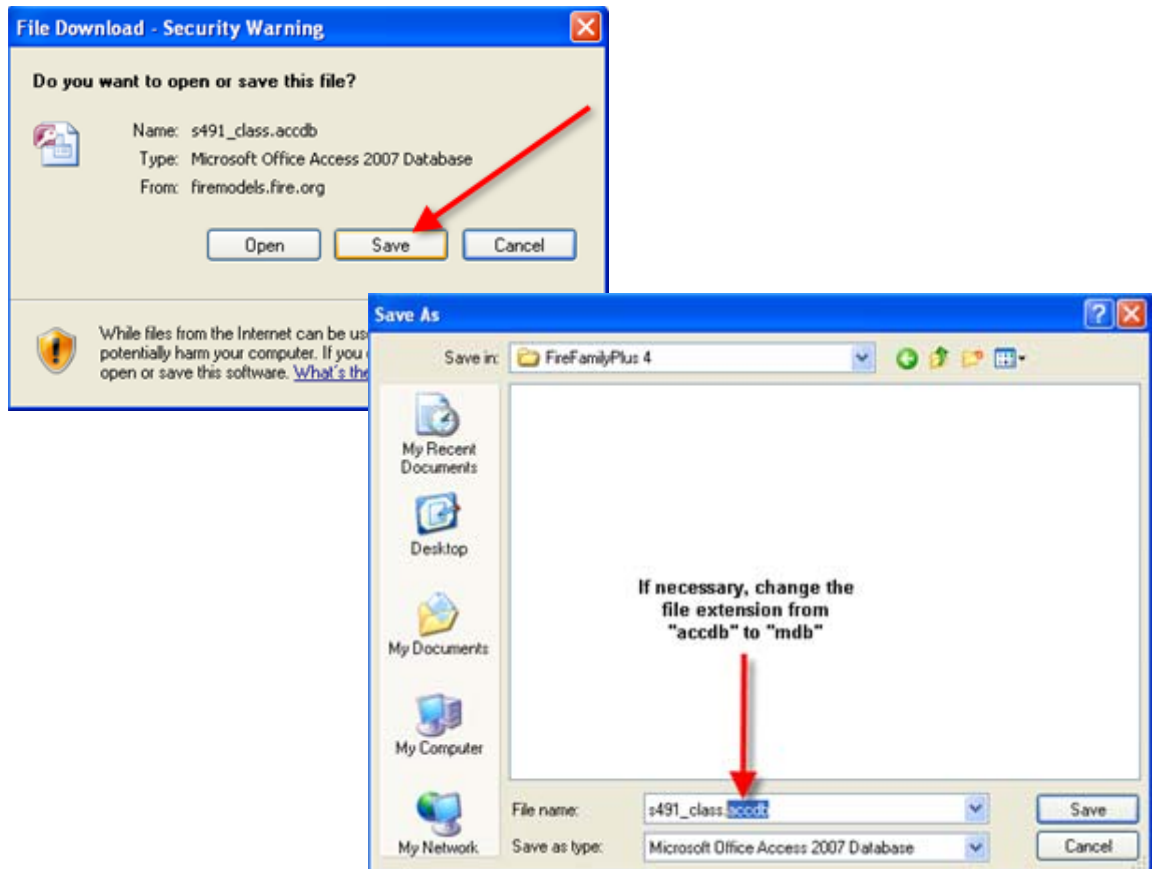
More information on S-491 can be found at the [National Wildland Fire Training](#) website.

[ Back ]      < Prev      Next >

Do one of the following:

1. Left-click on the Microsoft Office Access® database: [s491\\_class.mdb](#)

**Save** the database in a location of your choice. This example puts it in the FireFamily Plus program directory. In some cases, the file extension defaults to "accdb" (Microsoft Office Access® 2007 Database). **Before saving the file, make sure the file extension is "mdb".**



2. Right-click on the PKZip® file containing the database: [s491\\_class\\_database.zip](#)

**Save** the database in a location of your choice. Navigate to the directory containing the file and double-click on the ZIP file to extract the S-491 Class Database ([s491\\_class.mdb](#)).

## II. FIREFAMILYPLUS

A. Start FireFamilyPlus by one of the following methods:

1. Double/clicking on the FireFamilyPlus 4 Icon (shortcut) located on the desktop
2. Start Bar > Programs > FireFamilyPlus 4 > FireFamily Plus 4
3. Double/click on the application file (*fireplus4.exe*) in the FireFamilyPlus 4 program directory

*Note: The program will automatically open the last database used.*

B. Open the s491\_class.mdb FireFamilyPlus dataset for the exercise:

1. From the Main Menu: Click on **File > Open**
2. **Browse** to the C drive folder (section I.C. on page 3)
3. **Select** s491\_class.mdb, and click **Open**

*Note: FireFamily is a Microsoft Access database hence the .mdb extensions on all dataset files.*

C. Working Set

The window that opens is called the Working Set, which is the heart of FireFamilyPlus. Almost everything FireFamilyPlus does relies on the configuration of the working set. Yours will probably contain information that is a little different from that shown below.

Database Name: G:\s491\_update\491\_data\_bases\s491\_class

Description: S491 Prework & Exercises Database (FFPV4)

Active Working Set Definition

SIG/Station: 101028 - MOOSE CREEK

Data Years (1980 - 1998): 1980 thru 1998

Enable Auxiliary Year Overlays

Analysis Period Length (Days): 1

Annual Filter (Time of Year): Month: April, Day: 1 thru Month: October, Day: 31

Fire Associations

SIG/Station Metadata:

StationID	Name	NFDRS Fuel Model	Use 88 Model	Slope Class	Climate Class	Gr
101028	MOOSE CREEK	H - Short-Needle (Normal Dead)	<input type="checkbox"/>	3	3	04/1!

The working set is essentially a filter of the active database and the Active Working Set Definition is stored as part of the open database. FireFamilyPlus allows you to create and populate new databases, and have multiple databases open. (Only one is 'active' at a time, although several may be open).

Why is the working set important? Again, it is your filter into the database and controls what data you will be looking at.

There are several important input areas on the working set window:

1. Database Name - this computer file will always end in .mdb. The database name is shown with complete address so you can see where it is filed.
2. Description - descriptive information about the database that the user can supply.
3. Active Working Set Definition - the most important part of the working set is the Active Working Set Definition.

The screenshot shows the 'Active Working Set Definition' dialog box. It contains the following elements:

- SIG/Station:** A dropdown menu showing '101028 - MOOSE CREEK'.
- Data Years (1980 - 1998):** Two year pickers showing '1980' and '1998' with a 'thru' label between them.
- Enable Auxiliary Year Overlays:** An unchecked checkbox.
- Analysis Period Length (Days):** A spinner box showing '1'.
- Annual Filter (Time of Year):** A section with two sub-sections:
  - Month:** A dropdown menu showing 'May' and a spinner box showing '1'.
  - Day:** A dropdown menu showing 'October' and a spinner box showing '31'.
- Fire Associations:** A button at the bottom right.

SIG/Station - where a weather station or Special Interest Groups (SIG) is selected. **Press the f t q r/down arrow to the right of the field and see which stations are currently in this working set.**

Data Years (yyyy thru yyyy) - identifies the years of weather that are available to the working set for each station or SIG. There may be more years of data available outside FireFamilyPlus, but what is shown are the years that have been put into this dataset. The years that appear in the two windows below the Data Years title are the years for which the current analysis (Analysis Years) will be performed. **Click the small up or down arrow at the right side of year each to increase or decrease the year.** You can also highlight the year (using the left mouse key) and type in a year.

Enable Auxiliary Years Overlays - Checking the Enable Auxiliary Years Overlays allows you to specify whether you want to overlay years outside the years shown in the Analysis Years windows on a statistical graph. A check in this field activates the function. Auxiliary year data are not used in statistics (average, max/min). Most commonly it is used when you want to overlay the current year over a previous set of data, such as this year plotted over the average for the past 10 years. **Click in the small box to the left of the Enable Auxiliary Years Overlays to add and then click again to remove the check mark**

Analysis Period Length (Days) - allows the user to specify the length of time represented by a plotted point. It can be set from 1 to 28 days. If the value is set at 1, you will get each day plotted individually. If set to three day, for example, the program groups the data in three day periods, takes the average and uses that average to represent those three days... then the next three days etc. Here's an example of a three day average using letters in the alphabet to represent numbers: abcdefghijkl = average of (abc), average of (def), average of (ghi), average of (jkl). **Click the down arrow and scroll down to view the choices.** If you chose 28 days, the analysis is completed by one-month periods.

Annual Filter - you can pick specific dates (Month and Day) to start (top fields) and end (bottom fields) your analysis. This allows you to analyze data for various lengths of fire seasons or for the full year. **Click on the ftqr/down arrow to the right of the field under Month to view the month pick list.** Start and end months are selected from this list. The day of the month is chosen by clicking the up or down arrows under Day or by highlighting the number in the field and entering your choice directly.

Fire Associations - will open a window for selecting or viewing fire occurrence data from the area represented by the weather station or SIG shown in the active working set definition window. **Make sure the Moose Creek station is selected. Click the Fire Associations button and view the window that opens.** It will show the Northern Region highlighted from the Regions list and it will highlight the National Forest associated with the particular station listed in the SIG/Station field. Notice there are tabs for all of the national wildland fire agencies. States and local agencies can also be created as custom agencies. **Click the cancel button on the Set Fire Association window to close the window without making any changes.**

4. SIG/Station Metadata - is the final part of the Working Set. It is a set of NFDRS station catalog information for the weather station or SIG selected in the Active Working Set Definition. **Slide the bar at the bottom of the screen to see all the fields available.**

SIG/Station Metadata:							
StationID	Name	NFDRS Fuel Model	Use 88 Mode	Slope Class	Climate Class	Greenup DOY	Free
101028	MOOSE CREEK	H - Short-Needle (Normal Dead	<input type="checkbox"/>	3	3	05/12	09/11

## D. Menus and Buttons

Summary of Main Menu drop-downs: 

As you read through the descriptions below, **click on each of the items in the drop-down menus** to become familiar with their location in FireFamilyPlus and xlogy the various windows that open up.

### 1. **File** >

**New** - Create a new database. The database will contain weather and fire records but contain the default Agency Structures for fire occurrence and station catalog data for most fire weather stations.

**Open** - Open an existing database file.

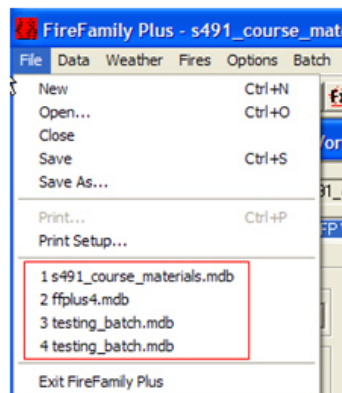
**Close** - Close the current working set but does not exit FireFamilyPlus.

**Save** - Save the current working set.

**Save As** - Save the current working set with a new name or location.

**Print** - Print active window or choose which graph to print.

**Print Setup** - Define printer characteristics.

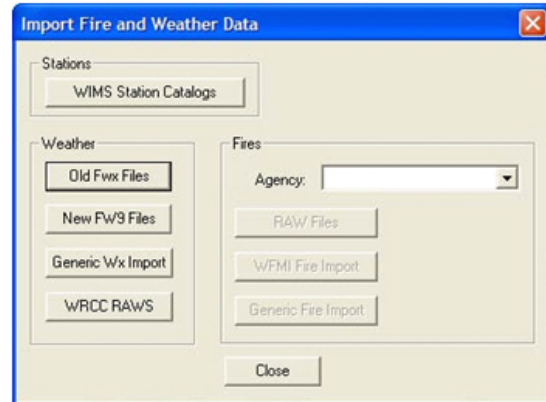


*Note: FireFamilyPlus also keeps track of the four most recently used files and will present paths to these files on the File menu option.*

**Exit FireFamilyPlus** - Save the current working set and exit.

## 2. Data >

**Import** - Import station metadata, weather data and fire occurrence data file types.



These files can be obtained from the FAMWEB Data Warehouse, from agency prepared CDs, or other data sources.

Stations - imports catalog information for weather stations cataloged in WIMS.

Weather - imports weather observations from several sources.

- Old FWX Files (\*.fwx)
- New FW9 Files (\*.fw9)
- Generic Weather Import
- WRCC RAWs import option allows you to import hourly RAWs data from the Western Region Climate Center's Data Lister (<http://www.raws.dri.edu>).

Fires - imports agency specific fire occurrence data.

To support the integration of fire occurrence data in FireFamilyPlus, the default database is populated with the current organizational structures (up to three levels) of Forest Service and DOI agencies. Generically it is considered to be region/unit/subunit.

The program is designed to correctly import a variety of fire occurrence types:

- Forest Service data is imported as a RAW fire occurrence file, organized by Region/Forest/District.
- The DOI agencies use the Wildland Fire Management Information System (WFMI). The WFMI Fire import option is used for these agencies, organized by NWCG unit identifiers.

- A generic import function allows other agencies to import other fire occurrence data, organized by your custom defined structure.

**Stations** - Shows a list of all the stations in the database that have weather data. You can edit (or view) the station catalog information. You can also delete a station, create a new station catalog, or export the list. Checking the “Show All” box at the lower left of the dialog box will display all station catalogs available in FireFamilyPlus.

**SIGS** - Allows you to set or edit characteristics of Special Interest Groups (create a new SIG, edit, delete, set station weights, and export). Each observation is averaged across the stations in the SIG. FireFamilyPlus uses these averages for graphs and statistics. Stations can each be given a unique weight when computing averaged values. Special care must be taken when using SIGS to ensure that station catalogs are specifying the same NFDRS fuel model and fuel model set (78 or 88) if meaningful outputs are to be obtained.

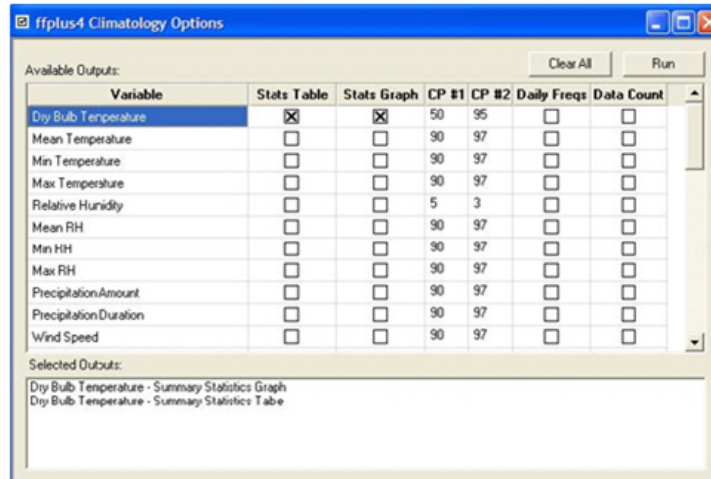
**Agencies** - Create, edit (identify administrative structure for unique fire occurrence datasets) or delete agencies added to FireFamilyPlus database.

**User Variables** - Allows import of user-defined variables. Users can associate variables with an existing weather station (manage, import data and view observations).

**Compact** - Compacts database removing spaces left by deleted weather stations or fire occurrence records. Typically when records are deleted from the FireFamilyPlus database, they are marked for deletion and are not visible, but occupy storage space until the database is compacted, packed, or saved with a new file name.

### 3. Weather >

**Climatology** - Display of historical information, both weather observations and calculated NFDRS output values, to get a feel for previous conditions or make comparisons between years. Reports and graphs in climatology are based on the working set.



There are two action buttons:

- **Clear All** will clear any previous selections
- **Run** will start the climatology analysis based on your selections

This window contains six columns of options for each data output variable.

Stats Table: Generates a table displaying base statistics for the selected variable. These statistics are grouped by time period, and then summarized by month.

Stats Graph: Statistical graphs are produced with two-part graphical display of values. The left graph is a plot of the average and historical maximum and minimum values for the weather for the fire danger element selected for display (grouped by analysis period length). The right graph is a cumulative frequency distribution curve of daily values. The lower right hand corner of either graph displays the number of observations in the dataset used to produce the graphic display.

**CP#1 and CP#2** - These define two different critical percentile levels to be overlaid on the graphic displays as horizontal lines or listed in reports. These could represent different critical values such as 80th and 95th or 90th and 97th percentile climatological breakpoints.

CP #1: This is the first critical percentile for the variable. This percentile is displayed on Stats Table reports, percentile graphs, and optionally on Bar Graphs.

CP #2: This is the second critical percentile. The second critical percentile is always visible on percentile graphs.

Daily Frequ: Selecting this option will generate a daily frequency report for the variable. It shows a tabular display of the count, relative and cumulative frequencies of each value in a distribution. A quick way to determine percentile values as the selected Critical Percentile values are generated at the top of the report.

Data Count: Selecting this option will cause a data count report to be generated for the variable. It shows a tabular display of the number of observations available by analysis period group (number of days) for each year in the active working set. This report is useful for determining if the dataset is complete.

To make a selection, click inside any of the boxes. This will place a check mark in the box. Click again and the check will be removed.

**Event Locator** -"a tool for searching for events or combinations of events based on weather values and /or calculated indices. This tool is useful for searching for rare occurrences, and is also useful for checking for bad or erroneous data. You can also specify one or more variables and a value or percentile to use as a benchmark in a search. FireFamilyPlus will list all dates and the value of the variables meeting the criteria.

**Fire Danger Projections** - Enter historic or forecast weather to calculate NFDRS outputs for that projected weather.

**Hourly Data Analysis** - Allows processing for hourly weather statistics.

- Calculates and graphs diurnal fluctuations in fire danger indices and weather values.
- Creates hourly listing of data and indices.
- Exports FARSITE weather and wind files.
- Includes the Nelson Dead Fuel Moisture Model for analysis options (hourly values and comparison with daily NFDRS).

**Pocket Card** - a Pocket Card, used for firefighter safety, can be created after an analysis has been completed on the fire and weather data. It is a color coded card illustrating current fire danger as it relates to average and important fire seasons.

**Season Reports** - Generates a variety of tables/reports useful for weather data analysis.

- Persistence Probability - reports based on the question: Given these conditions, what is the probability of having these conditions tomorrow?
- Severity List - lists all of the occurrences of an index above or below a specified percentile value.
- Severity Summary - analyzes cumulative and daily departures of an index value above or below a specified percentile value by time period.
- Probability Analysis - reports based on the question: Given these conditions for variable "a", what are the chances of having these conditions for variable "b."
- Daily Listing - lists user selected weather and/or NFDRS outputs.
- Percentile Weather - reports fuel moisture values and wind associated with user defined adjective class fire danger for a selected variable, often spread component. The output is used in RERAP (Rare Event Risk Assessment Process) analysis.
- FlamMap Fire Risk Export

**Winds** - produces tables and wind roses summarizing wind speed by wind direction.

**Term** - function used to analyze waiting times to season-ending or fire-stopping events. Can be linked to dates found in the Event Locator. (Term is included in releases greater than 4.0.2.1)

**View Observations** - opens an editable display of weather observations that meet the criteria you have designated in the working set. You can edit, delete or export data from here. Selecting View Observations > All, all 24 hours of data (both "R" and "O") are displayed. Selecting View Observations > Daily only the once daily observation ("O" type) is displayed.

**NFDRS Calculator** - Opens the calculator. User can input fuel model choices and fuel moistures and calculator displays NFDRS Indices.

**Custom Yearly Inits (Initialization)** - Supports the Canadian systems snow-off start up and allow for variable greenup dates from year to year.

#### 4. **Fires >**

**Associations** - Links fire occurrence data records to *current working set weather station or SIG* via agency(s) and their organizational structures. Note that this is the same function as the button located in the working set.

**Summary** - Graphical summary of fire numbers, size, cause, etc.

- General - displays graph for all years for the unit(s) identified by Fire Associations in this option.
- Working Set - displays graph for *only* date ranges and fire associations in the Active Working Set.

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

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

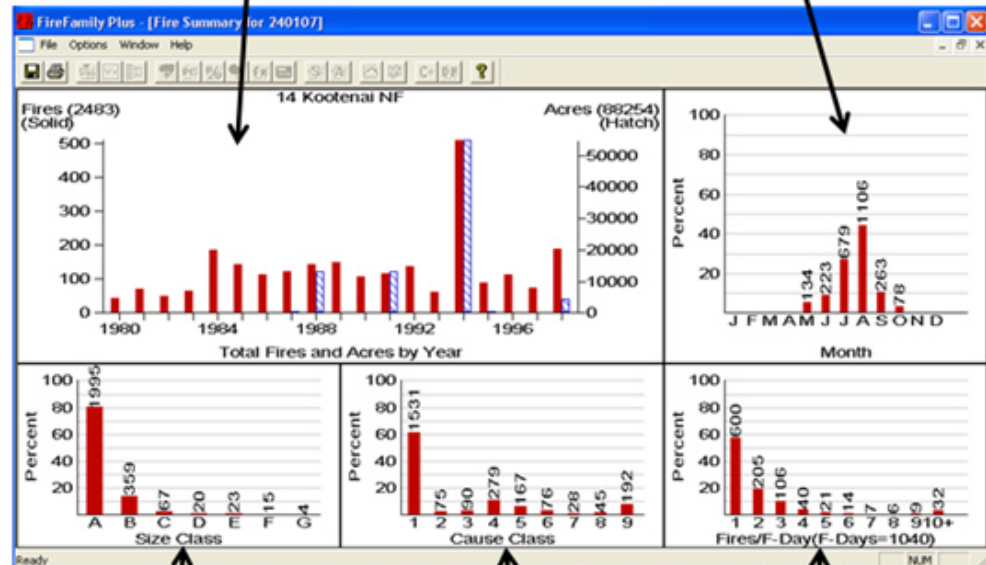
To review the fire occurrence summary graphic, click **OK**.

The fire summary has five sections displaying fire data. The box on the top left shows total fires and acres by year. On the left axis is the information about the number of fires and the right axis is the acres. The top right box is the number of fires by month. Remember, if you select by Working Set you can limit the months you want to see.

The illustration below was limited to May 1 through October 31. The number of fires by size class and cause class are shown on the bottom panel. If you click **Options > View Class Definitions**, you can see the size and cause classes. The bottom right panel shows the number of fires by fire day. The illustration below shows that most fire days (600) had only 1 fire per day, but there were 205 days that had 2 fires, 106 days that had 3 fires, etc.

Total fires by year in solid red. Total acres by year are hatched.

Number of fires by month.



Number of fires by size class.

Number of fires by cause class.

Number of fires per fire day.

*Fire Summary Graph*

**Fire Analysis** - performs cumulative probability and logistic regression analysis of joint fire weather and fire occurrence datasets.

**Fire Business Candidates** - goodness of fit statistics from Fires Analysis are collected in the candidates table. Saved statistics can be viewed using the Fires > Fire Business Candidates function.

## 5. Options >

**Graph Options** - FireFamilyPlus task bar allows adjusting the graphic display format for various outputs of FireFamilyPlus. These are more advanced applications and will be covered in detail in the course or learned through subsequent use of the program, User's Guide, or the Help System. They include setting graph style and content, line color, style and width, and fire-day definition. Some of the graph options include type (Bar vs Line), what statistics to include (ranges, percentiles, etc), line colors and thickness, and what fire-days to include on overlay years.

**Report Options** - Define what metadata to include in report headers and if desired, a column delimiter to enable easy import of a daily list report into a spreadsheet.

**Batch/Run Options** - Define default run titles and where auto generated batch output files are saved.

**LFI Options** - Set parameters for Live Fuel Index, including thresholds and averaging periods.

## 6. Batch >

FireFamilyPlus v.4 has two batch functions:

- Interactive batch generates many reports for any number of stations at once.
- Batch Runs enable a number of specified reports to be repeated for new data using the same working set parameters. Fundamental to using batch is the concept of saving runs. If you enable run saving, all the elements are saved as sequentially numbered runs.

**Create new batch** - Create a new batch from two or more saved runs.

**Manage batch list** - Edit or delete existing batch lists.

**Interactive** - Start an interactive batch session.

**Restore previous run settings** - Restore working set settings from a previously saved run.

**Saved run maintenance** - Employ a saved run maintenance strategy.

**Enable Run Saving** - Toggle run saving on or off.

## 7. Windows >

**Cascade** - Display open windows cascade style.

**Tile Horizontal** - Display open window tiles horizontally.

**Tile Vertical** - Display open window tiles vertically.

### **Close All**

- **Reports and Graphs** - Close all report and graph output windows associated with the active working set, but not the working set.
- **Windows** - Close all report and graph output windows including the working set.

**Switch to Selected Window** - If a number of display windows are open, you can go directly to the window from the window list below the **Close All** line.

*Note: the **Arrange Icons** does not work at this time.*

## 8. Help >

**Help** takes you to a FireFamilyPlus Help Utility. You can either locate topics by going to the Contents or by doing a Topic search

**Contents** - Open the Help file to search or display table of contents.

**Open Help** - Open the Help file to search or display table of contents.

Summary of Main Menu Buttons (shortcuts):

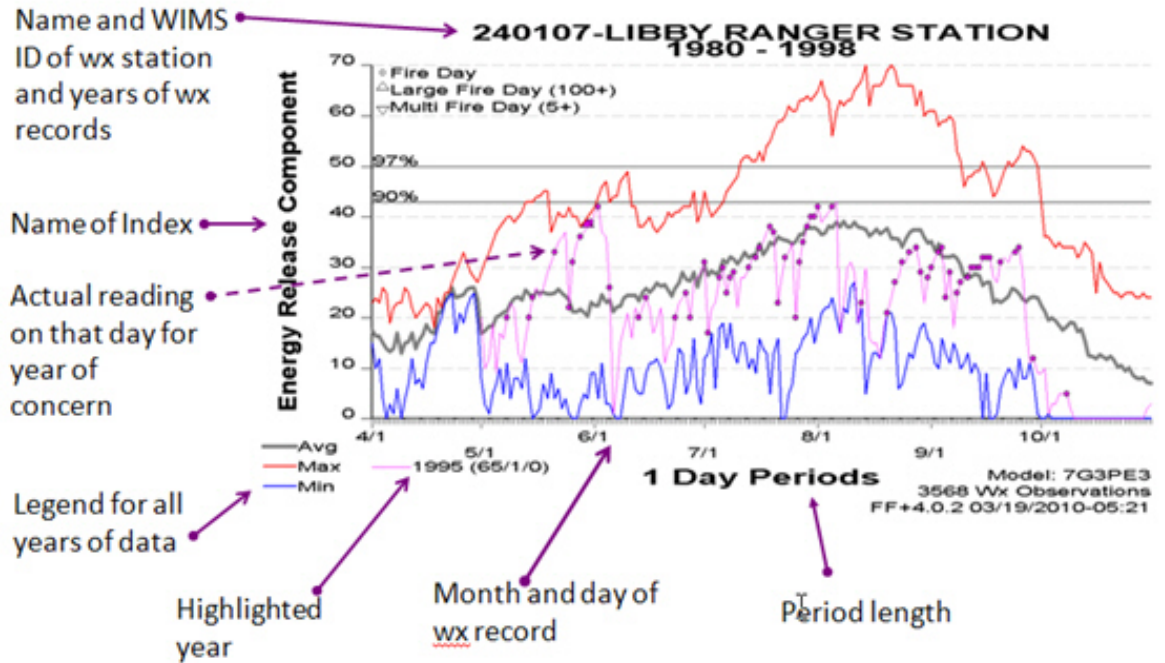


The Main Menu Buttons are shortcuts to some of the frequently used tasks in FireFamilyPlus. To see where a Button takes you, **hover the mouse cursor over the button** and a tiny definition window will open. Buttons are only active when they can be used.

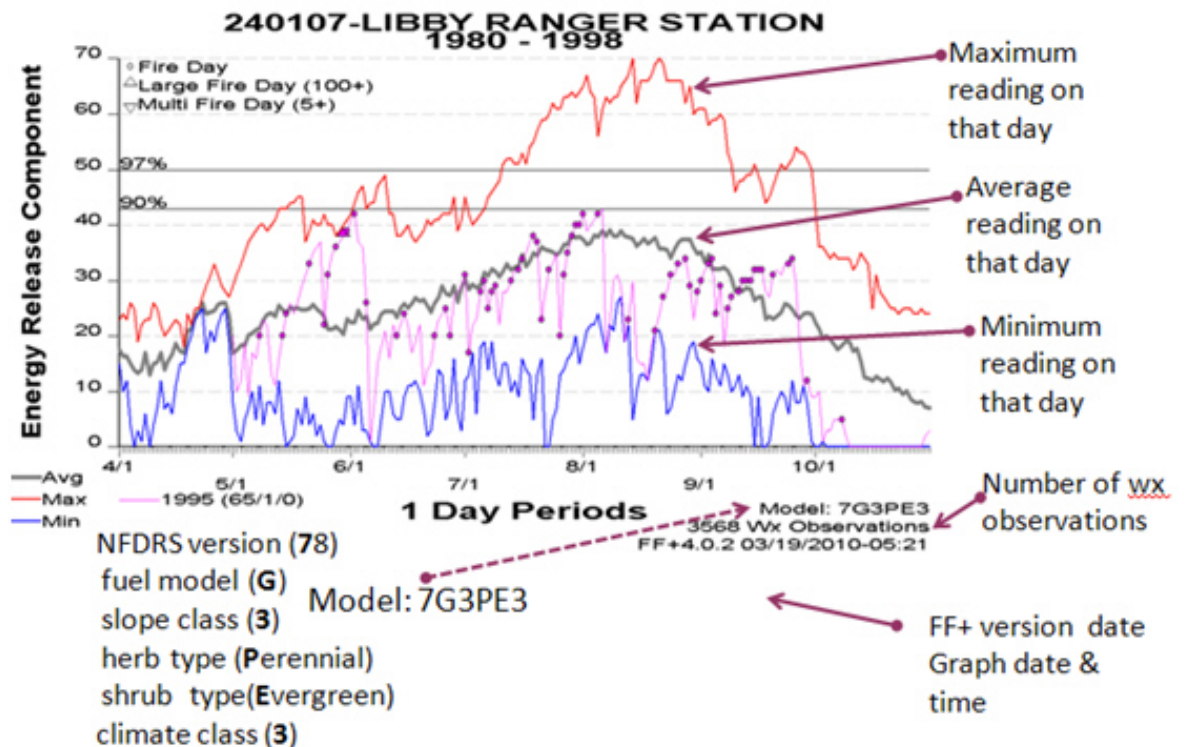
E. FireFamilyPlus Graphs

The following two illustrations point out the parts of a climatology graph produced in FireFamilyPlus. **Become familiar with the graphs**, as you will be creating them in the S-491 class.

### How to Read a FireFamily Plus Chart



### How to Read a FireFamily Plus Chart



Name: \_\_\_\_\_

Date: \_\_\_\_\_

S-491 Pre-course Work  
FireFamilyPlus  
16 Possible Points

1. What is the default description associated with the **S491\_class** database?

\_\_\_\_\_

2. How many Stations and how many SIGS are included in the **S491\_class** database?

\_\_\_\_\_ **Stations**                      \_\_\_\_\_ **SIGS**

3. What data years are available for Logan (020107) and Mammoth (480111) and what stations are in Sample SIG (SIG)?

**Logan**                      \_\_\_\_\_                      **Mammoth**                      \_\_\_\_\_                      **Sample SIG**                      \_\_\_\_\_

4. Produce a Statistics Graph display showing the historic maximum, minimum and average daily dry bulb temperature for Moose Creek covering the period 7/1-9/15 for the years 1988-1997. (Weather => Climatology => Stats Graph for Dry Bulb Temperature).

**PRINT THE GRAPH (File => Print => Graph in FireFamilyPlus) attach it to this page and return with the other pre-course work questions.**

5. How many observations are used to produce the above Statistics Graph display?

\_\_\_\_\_

6. Within the active working set used in question 4, how many Class C and larger fires occurred during the period covered by the active working set? (Fires => Summary => Working Set).

\_\_\_\_\_

7. What is the last item listed under the Index display of the FireFamily Help function? (Help => Contents => Click on the Index tab => scroll down)

\_\_\_\_\_

*For the following two questions, you will be asked to list sequential menu selections. For example, if the question asks: "What two menu steps will open an existing database in FireFamilyPlus", you would answer **File > Open**.*

8. Which two menu steps allow you to view all of the stations in the database?

\_\_\_\_\_

9. Which menu steps open a table of daily weather observations for the working set data?

\_\_\_\_\_