

Job Aid 3. Reading FireFamilyPlus Graphs

Introduction

FireFamilyPlus allows you to view graphs of both fire and weather data. In this Job Aid, we introduce you to several of them.

Statistical Graphs

Stats Graphs are used to evaluate weather data, fuel moisture values, and fire danger outputs. Overlays can be added to Stats Graphs to highlight up to three years of interest. You can compare current values to historical ones or examine conditions during years of special significance. FireFamilyPlus provides overlays to add fires to Stats Graphs, showing the seasonal relationship between fire activity and fire danger. Percentile Graphs put these values in perspective, telling you, for example, the value of the output at the 90th percentile or the percentile values when the ERC-Y is 37.

Statistical Graphs, or Stats Graphs, are generated by selecting **Weather > Climatology** from the main menu or using the Climatology Options shortcut button (See Job Aid 2).

Selecting variables

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Select variables in the **Climatology Options** screen by checking boxes to create a Stats Table, Stats Graph, Daily Freqs, or Data Count (**Figure 1**).

In this example, the Stats Graph for Energy Release Component (ERC) has been selected.

Variable	Stats Table	Stats Graph	CP #1	CP #2	Daily Freqs	Data Count	Filter Value
Gust Direction	<input type="checkbox"/>	<input type="checkbox"/>	75	90	<input type="checkbox"/>	<input type="checkbox"/>	
Gust Speed	<input type="checkbox"/>	<input type="checkbox"/>	75	90	<input type="checkbox"/>	<input type="checkbox"/>	
Solar Radiation	<input type="checkbox"/>	<input type="checkbox"/>	75	90	<input type="checkbox"/>	<input type="checkbox"/>	
Wet Flag	<input type="checkbox"/>	<input type="checkbox"/>	50	50	<input type="checkbox"/>	<input type="checkbox"/>	
Dew Point Temperature	<input type="checkbox"/>	<input type="checkbox"/>	90	95	<input type="checkbox"/>	<input type="checkbox"/>	
Vapor Pressure Deficit Max	<input type="checkbox"/>	<input type="checkbox"/>	90	95	<input type="checkbox"/>	<input type="checkbox"/>	
Vapor Pressure Deficit Avg	<input type="checkbox"/>	<input type="checkbox"/>	90	95	<input type="checkbox"/>	<input type="checkbox"/>	
Growing Season Index	<input type="checkbox"/>	<input type="checkbox"/>	90	95	<input type="checkbox"/>	<input type="checkbox"/>	
Wind Azimuth	<input type="checkbox"/>	<input type="checkbox"/>	75	90	<input type="checkbox"/>	<input type="checkbox"/>	
Hourly Precip	<input type="checkbox"/>	<input type="checkbox"/>	75	90	<input type="checkbox"/>	<input type="checkbox"/>	
Fosberg FWI	<input type="checkbox"/>	<input type="checkbox"/>	90	95	<input type="checkbox"/>	<input type="checkbox"/>	
Spread Component	<input type="checkbox"/>	<input type="checkbox"/>	90	97	<input type="checkbox"/>	<input type="checkbox"/>	
Energy Release Component	<input type="checkbox"/>	<input checked="" type="checkbox"/>	90	97	<input type="checkbox"/>	<input type="checkbox"/>	

Selected Outputs:

Energy Release Component - Summary Statistics Graph

Figure 1. The Climatology Options window allows you to select reports and graphs for variables in FireFamilyPlus.

Critical percentiles

Critical percentiles (CP #1 and CP #2) columns in the Climatology Options dialog box in **Figure 1**, are cumulative frequency values that identify climatological breakpoints of interest. Percentiles can differ for every variable. For example, you may choose the 90th and 97th percentile values for ERC or the 80th and 95th percentile values for BI. Values associated with these percentiles are produced at the top of the Daily Frequency table and appear as lines on Stats Graphs (**Figure 2**).

CP #1 is the first critical percentile for the variable. This percentile is displayed on Stats Tables, Stats Graphs, Percentile Graphs, and optionally, on the Statistical Bar graphs.

CP #2 is the second critical percentile for the variable. It is shown in the same reports and graphs as CP #1, and it is always visible on Percentile Graphs.

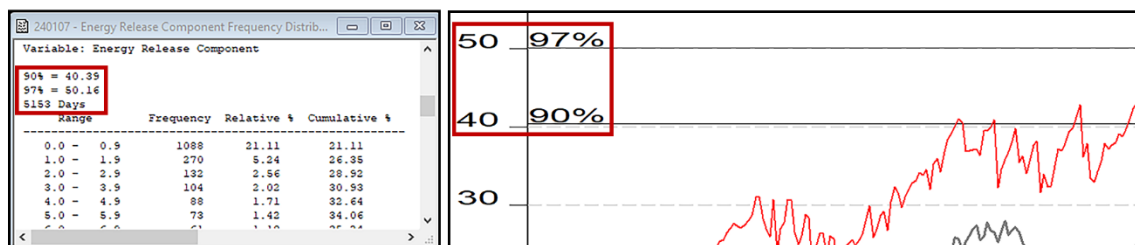


Figure 2. Frequency Reports (left), and Stats Graphs (right), show the specified Critical Percentiles.

Creating Stats Graphs

Once you have finished making your selections, click **Run** to generate a Stats Graph window.

The Statistics Graph window (**Figure 3**) is composed of two panes containing separate graphs (Graph View on the left and Percentile View on the right). The Graph View can be displayed as a Line At Average graph (default selection) or a Statistical Bars graph. A splitter bar in the middle of the screen allows you to resize the graphs. Double-click on either graph to enlarge it to full screen or drag the bar across the screen to resize both graphs. When you click on a graph, the X and Y values will appear in the lower right-hand corner.

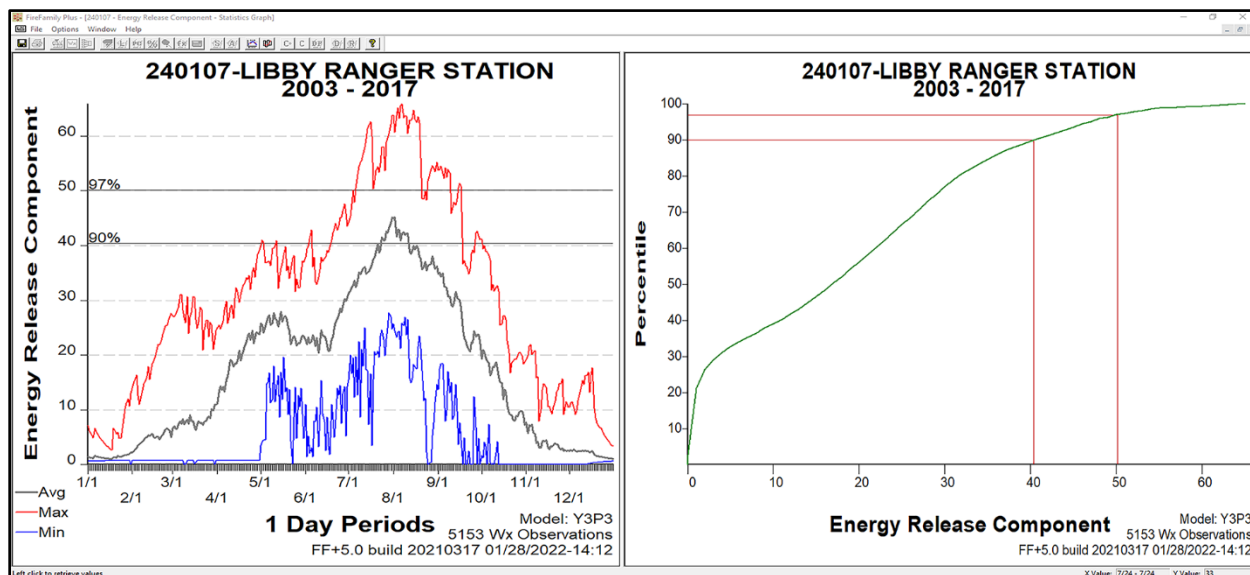


Figure 3. Statistical Graph of ERC for the Libby Ranger Station with the Graph View (left), and Percentile View (right), separated by a moveable splitter bar.

Graph View

Line at Average

The Graph View (**Figure 4**) displays lines for minimum, mean, and maximum values for each Period (e.g., 1 day) calculated for all years in the Working Set. Horizontal lines show the two Critical Percentiles defined in the Climatology Options window (CP #1 and CP #2). The model used to calculate the variable (if applicable) is shown in the bottom right-hand corner (e.g., Y3P3). This area also contains the number of weather observations (e.g., 5147), the FireFamilyPlus build, and the date/time of the run.

Components of the Line At Average graph are shown in the two diagrams for ERC in **Figure 4** and **Figure 5**. We added an overlay for the year 2013. Up to three overlays can be added to any Stats Graph.

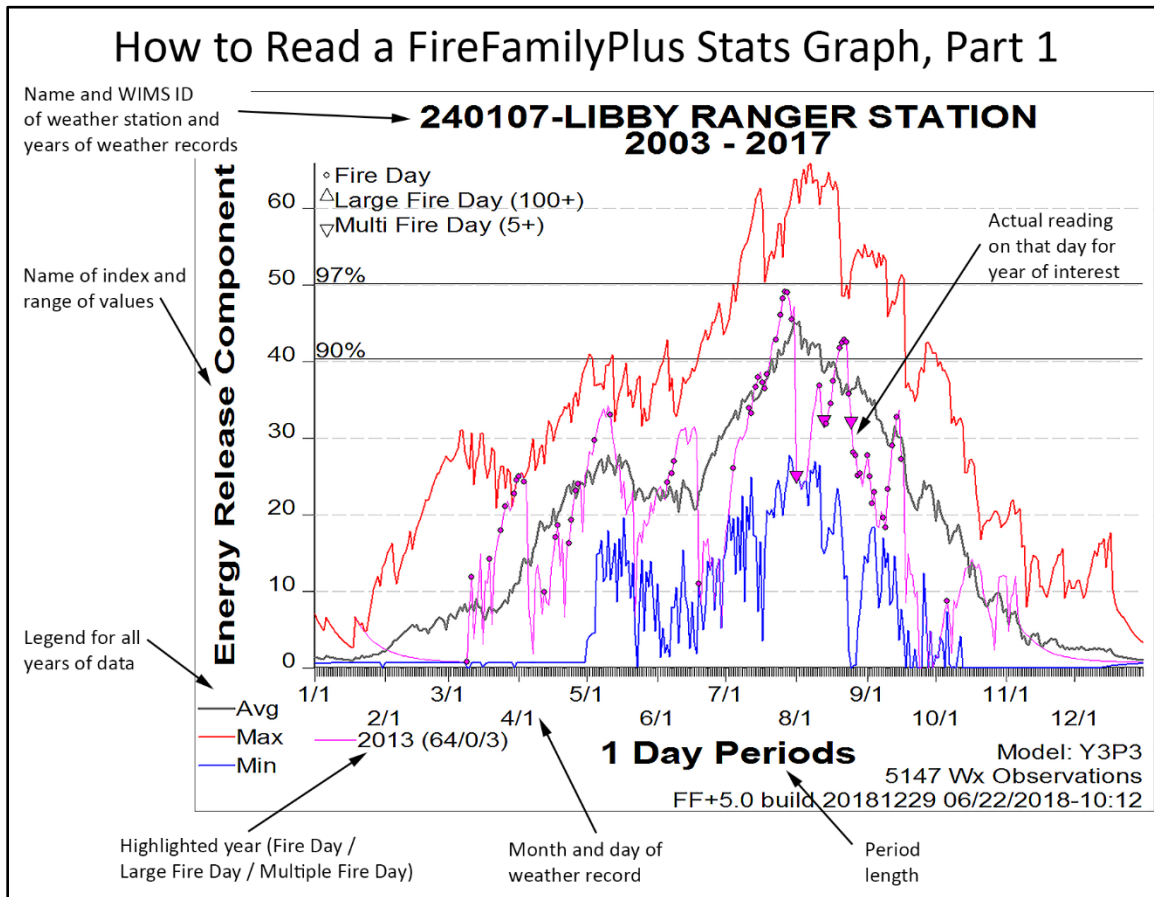


Figure 4. Starts Graph Part 1. This image describes the components displayed as Line-At-Average. Note the overlay for 2013.

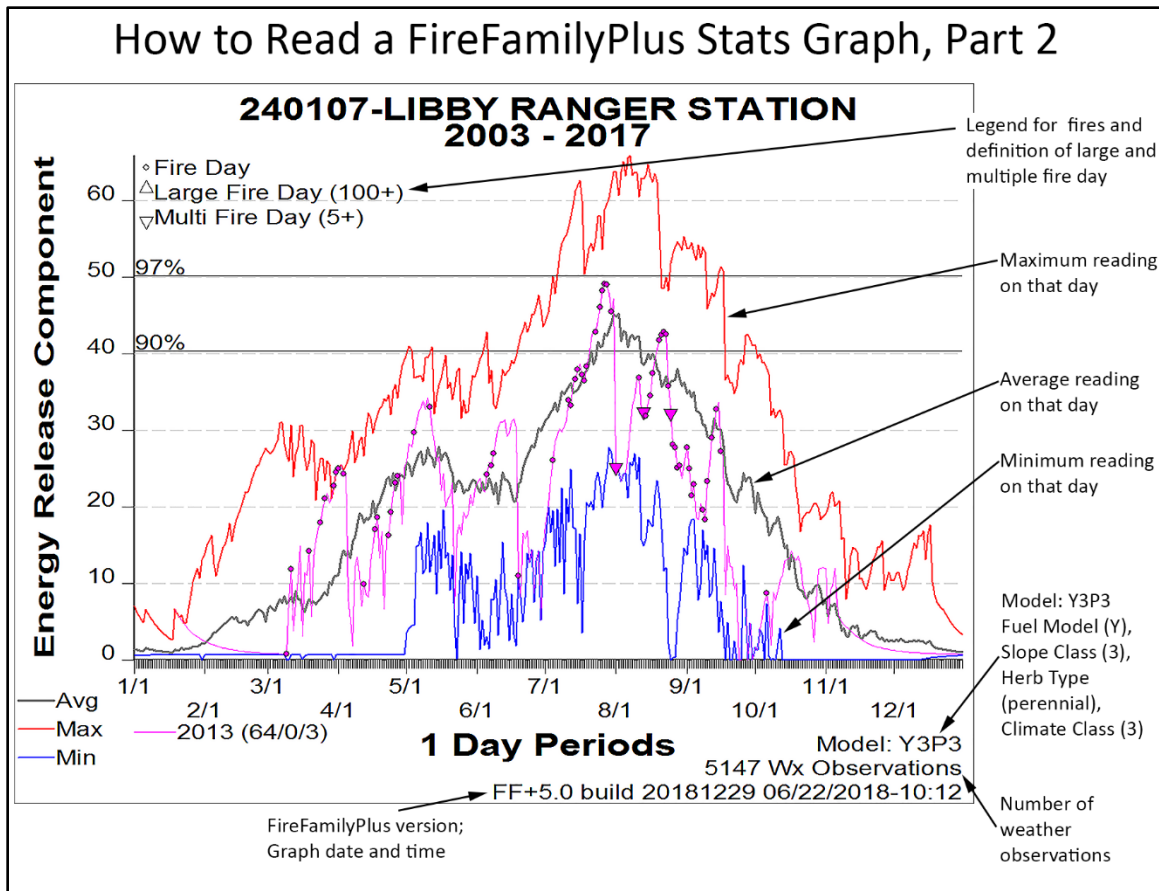


Figure 5. Stats Graph Part 2. This image describes the components displayed as Line-At-Average. Note the overlay for 2013.

Statistical bars

The previous example depicted the Line At Average graph, but you may prefer a Statistical Bars graph.

From the Working Set, select **Options > Graph Options > General** and select **Statistical Bars**.

When the Stats Graph is open, click on **Options > Graph Type > Statistical Bars (Figure 6)**.

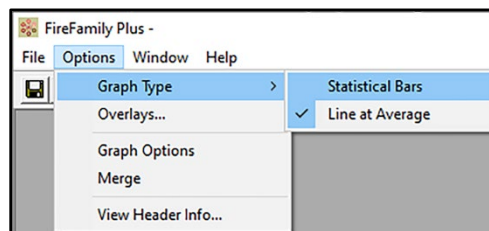


Figure 6. In Graph Type, you can select between Statistical Bars and Line At Average.

In the Statistical Bars graph, the gray bar indicates the range ± 1 standard deviation from the mean, which is shown as a black line across the center of each bar. In **Figure 7**, components of the Statistical Bars graph are shown for ERC. Each bar in this example represents a 7-day period. The statistical values are calculated using data for all 7 days for 15 years (2003-2017). As with Line at Average graphs, horizontal lines on Statistical Bars graphs show two Critical Percentiles as defined in the Climatology Options window. This graph also contains an overlay for 2013.

How to Read a FireFamilyPlus Stats Bar Graph

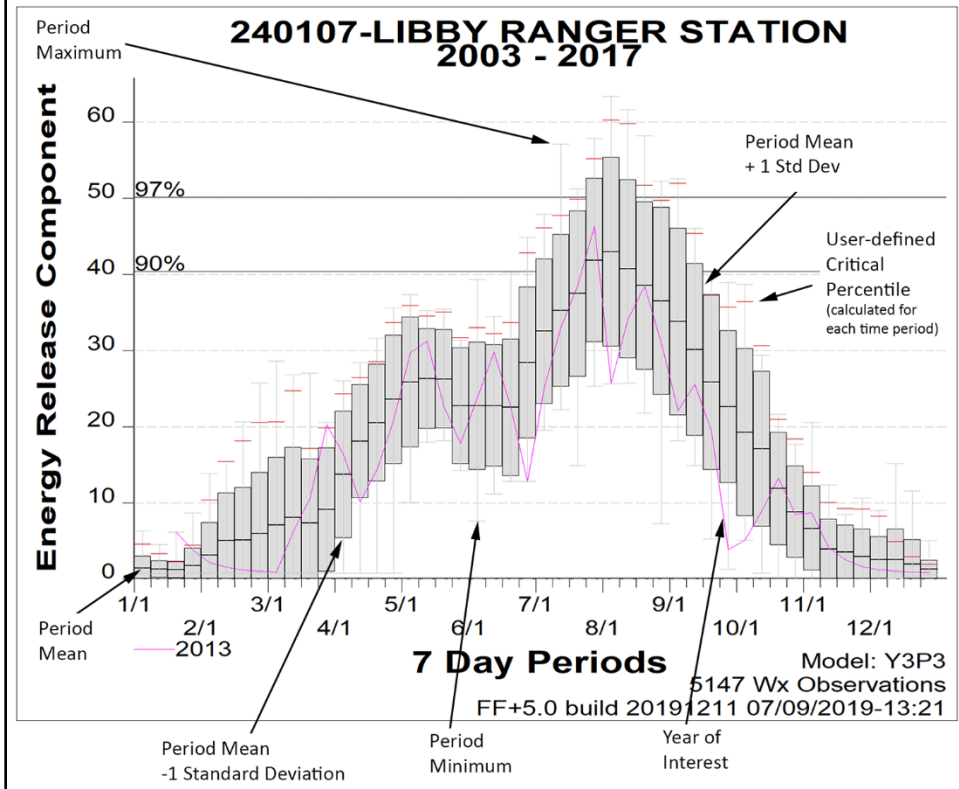


Figure 7. This image describes the components of a Stats Graph displayed as Statistical Bars. Note the overlay for 2013.

Percentile View

The Percentile View depicts the cumulative percentile for a variable from 0 to 100 percent. The right pane of a Statistics Graph window always displays percentiles (**Figure 3**). The green line is the cumulative percentile. A horizontal red line is drawn from the Y-Axis to the intersection with the percentile curves for the two critical percentiles (CP #1 and CP #2). A vertical red line is drawn from this intersection to the X-axis. The value for the percentile is indicated in the graph's status bar at the bottom right-hand side of the box. Components of a percentile graph are described in **Figure 8** (next page).

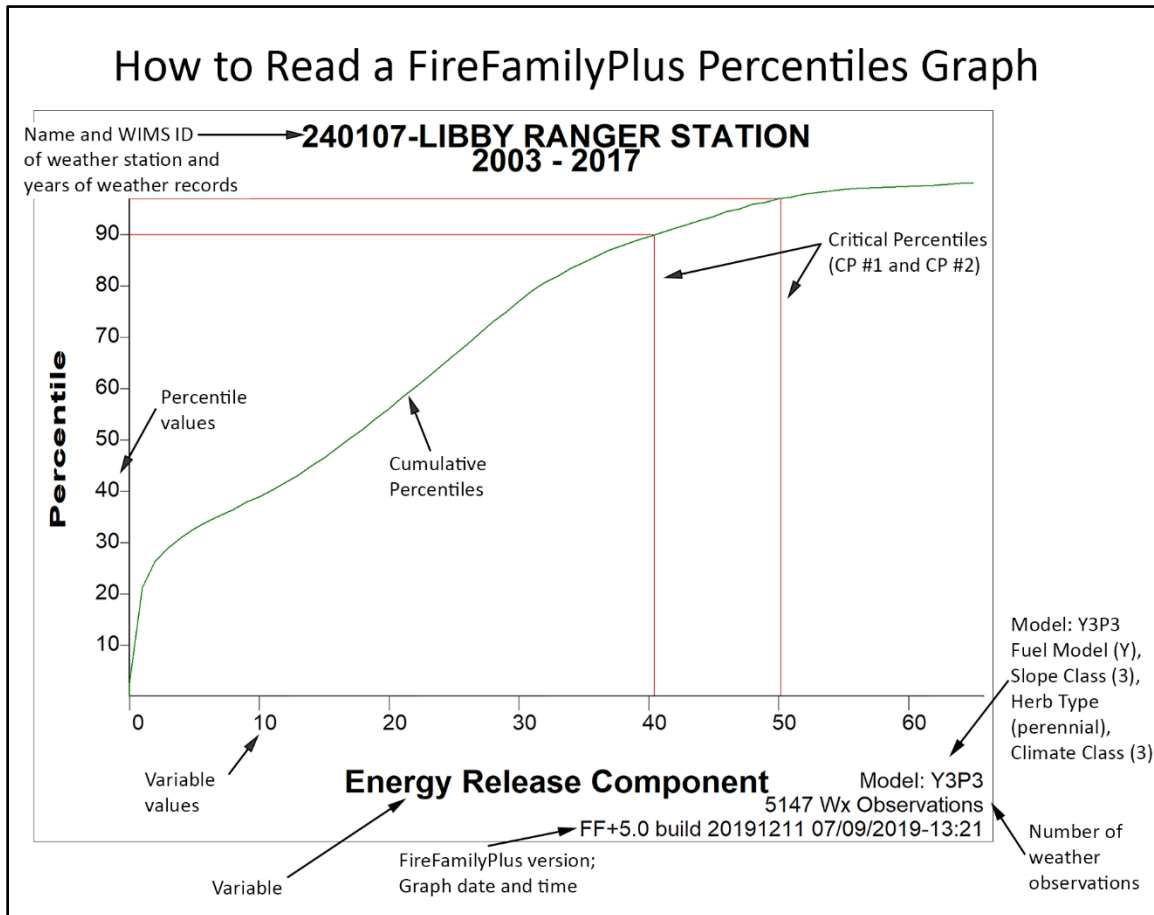


Figure 8. This image describes the components of a Percentiles Graph. Overlays are not added to Percentile Graphs.

Fires Summary Charts

Fires Summary Charts provide an easy look at fire data in several aspects, including annual summary of number of fires and acres burned, number of fires per month, number of fires per size class (A-G), number of fires by cause class (USFS 1-9), and number of fires per fire day.

The Fire Summary Chart is based on the Fire Association you establish with the local Working Set or generally. Change the Fire Association or the Working Set, and you will get a different set of graphs.

Before viewing graphs, you need to import fire data, which is described in Job Aid 5. Once the fires have been imported, the next step is to define the Fire Associations.

To define Fire Associations, select the weather station or Special Interest Group (SIG) to use, and click on the **Fire Associations** button in the Working Set window.

Note: The Fire Associations selection is for the specific station or SIG or station. It does not “carry over” to other stations or groups. For example, if you set the Fire Associations for a specific SIG, the individual stations will not change. You will need to select each weather station individually and add the desired Fire Associations.

The image below shows the FireFamilyPlus Fires Summary Chart and how to read each one.

How to Read a FireFamilyPlus Fires Summary Chart

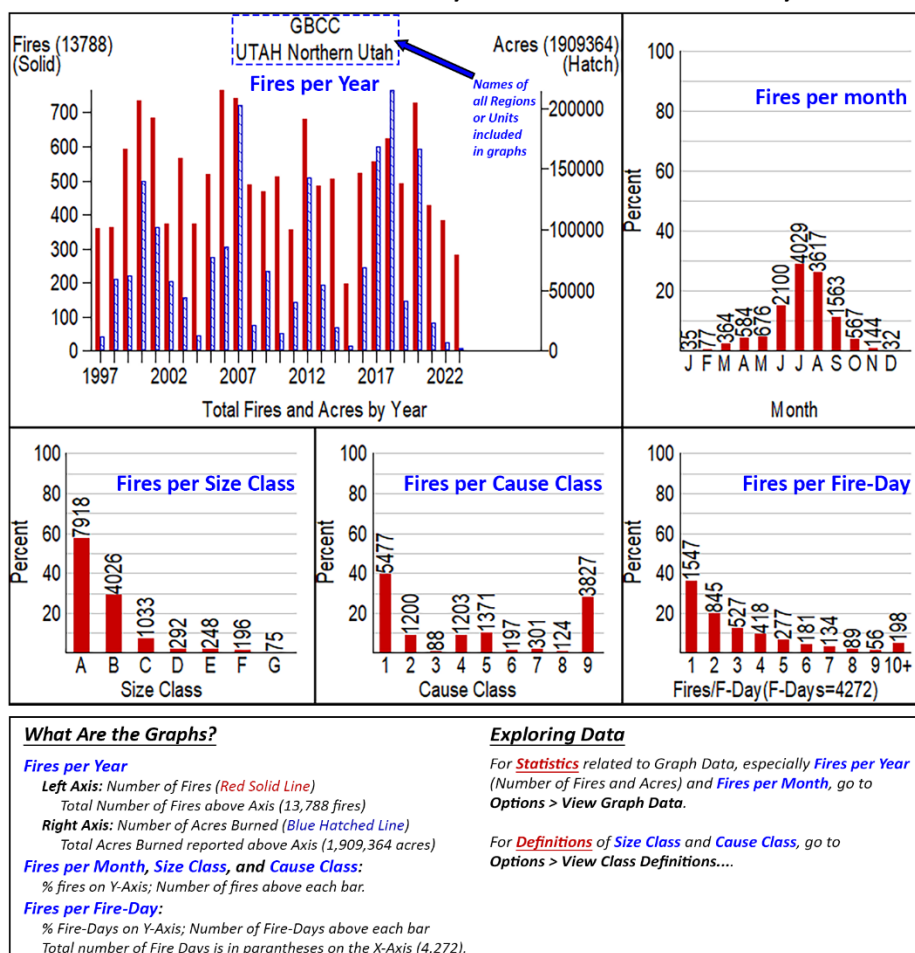


Figure 9. A Fires Summary Chart allows users to view fire data for a given location and time.

When viewing the graphs, there are two additional tabs that may be helpful.

With the Fires Summary Chart open, click on **Options > View Class Definitions....**

This page includes the definitions for the Fire Size Classes and the USFS Cause Class Definitions. The Class Definitions have changed with the advent of InFORM, but FireFamilyPlus can currently only use the nine classes created many years ago.

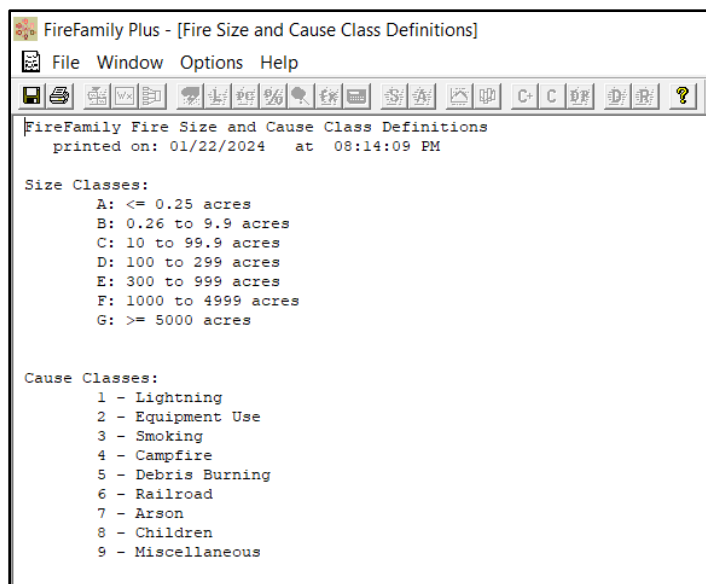


Figure 10. Standard Fire Size Class and Cause Definitions can be viewed in FireFamilyPlus.

With the Fires Summary Chart open, click on **Options > View Graph Data.**

Figure 11 on the next page contains six summaries of the information in the Stats Graph (**Figure 9**). The summaries include the following. As mentioned before, this information is based on the Working Set you have selected to create the graph.

1. **Fires By Year:** Total number of **Fires** and **Acres** burned based on the Working Set.
2. **Fires By Month and General Cause Class:** Total number of Fires per **Month**, followed by **Lightning** and **Human** caused fires per month.
3. **Fires by Size Class:** Number of Fires in each Size Class. Size Class is shown in **Figure 10**.
4. **Fires by Cause Class:** Currently the nine original USFS statistical cause classes are shown. A description of the Cause Class can be found in **Figure 10**.
5. **Number of Fires per Fire Day:** The number of fires that occur on a given day. When one fire occurs, the day becomes a Fire Day, and the total number of fires that occur on that day are added together.
6. **Fire Size Percentile Distribution:** Fires are grouped into distributions, and the cumulative percentile at each level is calculated. This is the only not shown on a graph and can be useful when identifying the size of a “large fire” for the area.

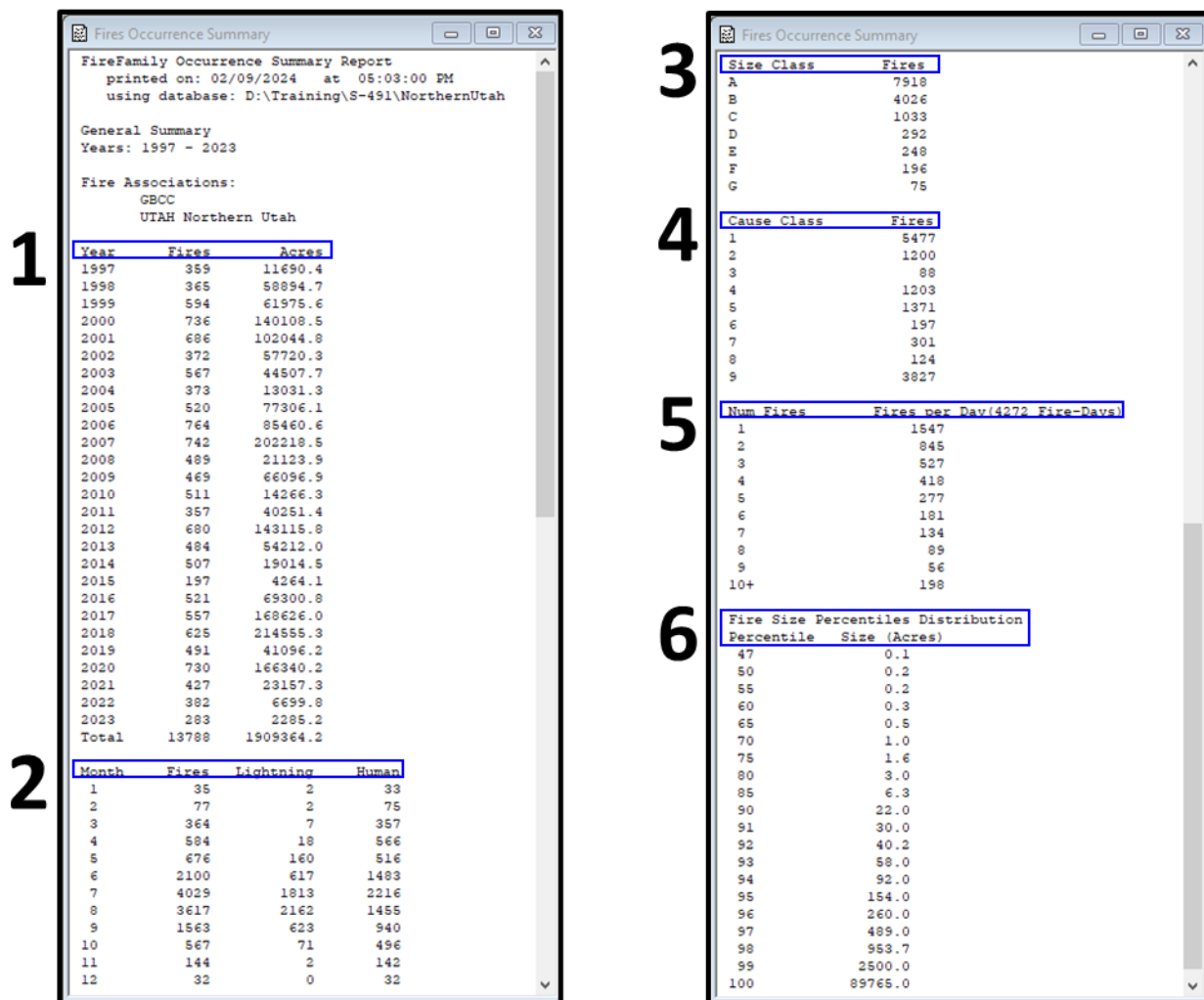


Figure 11. Fire Occurrence Summary Reports include information used to create the graphs shown in Figure 9 as well as a size distribution of fires as a cumulative percentile.