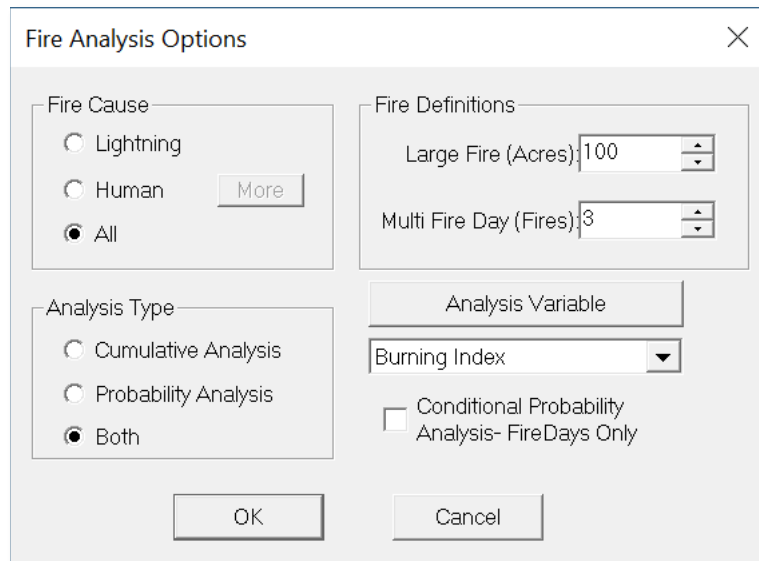# Creating a Fires Analysis in FireFamilyPlus

The following steps outline a process for creating a fires analysis (not using the batch process).

Fire Analysis Options

Upon clicking the Fires Analysis ![A] button, the *Fire Analysis Options* dialog box appears. This dialog box is important, as it will filter the fire occurrence data available for analysis.

Fire Cause

In most cases, we would want to include both Lightning and Human caused fires in our analysis. Usually, we are concerned about the fire danger conditions which result in large or multiple fires – regardless of the cause. In addition, by clipping fire occurrence to Fire Danger Rating Areas, the proportion of lightning-caused to human-caused fires in any given FDRA is resolved.

However, there may be reasons for excluding lightning or human-caused fires in the analysis if our resulting decisions and actions will be focused solely on fires caused by either lightning or humans, but not both. If either lightning or human-caused fires would be unrepresentative of the target group, the results could be subject to selection bias.

Fire Definitions

Values for these definitions are based on local experience and results from using the fire occurrence summary statistics. Each Fire Danger Rating Area (FDRA) should be considered independently of each other.

Large Fire (# of acres) – typically, this would be the acreage that would exceed the capability of the local unit to contain the fire during initial or extended attack. In addition, agency land management planning and policy documents may contain information pertaining to control objectives.

Multi-Fire Day (# of fires) – typically, this would be the number of fires occurring in a single day that would exceed the capability of the local unit to contain each fire during initial attack.

> CAUTION: Do not manipulate Large Fire or Multi Fire Day values to obtain better statistical correlation. Before conducting the analysis, decide what range of values would be acceptable based upon local experience and the fire occurrence summary statistics.

Analysis Type

Typically, Both are selected to include the Cumulative Analysis and Probability Analysis. However, the Probability Analysis must be selected to proceed with the Fires Analysis.

Cumulative Analysis – Selecting the Cumulative Analysis will display two panels. The left panel will show frequencies as stacked histograms (absolute frequencies). The right panel will show a cumulative frequency distribution curve (percentiles). These charts can provide meaningful visual insight to the chosen Analysis Variable.
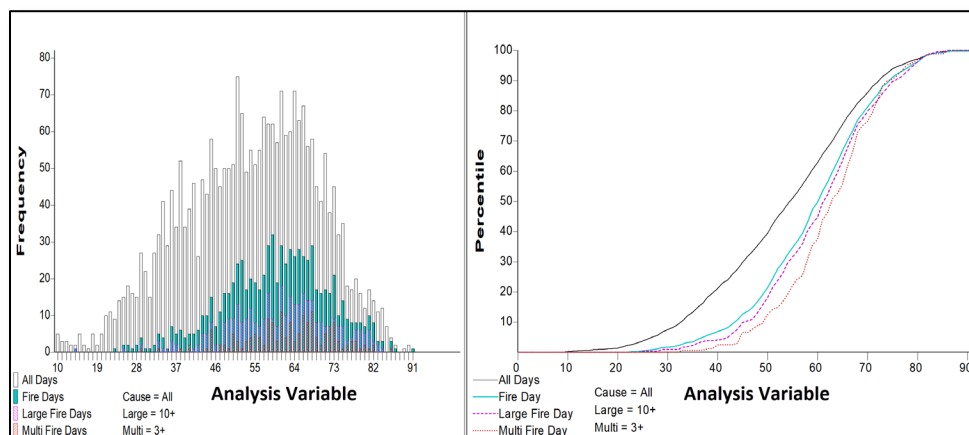
Probability Analysis – FireFamilyPlus will create a mathematical model that relates the Analysis Variable (such as BI, IC, ERC, SC, or KBDI) to a target binary variable. The binary variable has only two possible values (in this case, yes/no) to obtain the estimated probability for each of the two possible responses of the target variable (Fire-Day, Large-Fire-Day, or Multiple-Fire-Day).

- Was this day a Fire-day? (yes/no)
- Was this day a Large Fire-Day? (yes/no)
- Was this day a Multiple Fire-Day? (yes/no)

FireFamilyPlus will derive three probability equations (models) to answer the question: "Under a given set of [fire environment] conditions, what is the probability of experiencing a . . .

- Fire-Day,
- Large-Fire-Day, and
- Multiple-Fire-Day?

Analysis Variable

A dropdown menu provides options available to select as an analysis variable. When choosing an Analysis Variable, it is important to consider the sensitivity and intended meaning as it relates to the associated Target Group(s).

The determination of the analysis variable is going to depend upon the desired sensitivity which is appropriate for the Target Group and the statistical correlation of a fuel model and the analysis variable.

Conditional Probability Analysis

The checkbox 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. If the box is checked, a conditional probability analysis is created where only weather days with fires are included in the large and multiple fire day analysis probability. In most cases, we will be interested in a statistical correlation for all weather days – with the box unchecked – for preparedness decisions which focus primarily on the probability of a fire-day (such as Preparedness, Staffing, and Adjective Fire Danger Rating Levels). However, Response Level decisions are typically based on a reported wildfire and focus primarily on the probability of a large fire. Therefore, it makes sense that Response Level decisions are based upon the condition that a fire-day has already occurred – and the box would be checked.