

Job Aid 13. FireFamilyPlus Fires Analysis (UPDATED)

Introduction

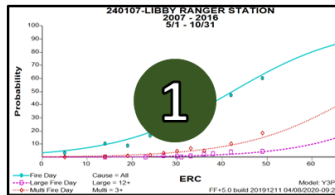
The goal of a fires analysis is to select several candidates for use in future decision making. Consider all three steps when deciding which fuel model/NFDRS output to use for further analysis and application.

Creating a Fires Analysis in FireFamilyPlus

- Set up the Working Set for your station of interest in the main FireFamilyPlus window.
- Use Interactive Batch (**Batch > Interactive > Select Station > Run**) to examine the weather and fire occurrence data.

Use the three-step process to identify several candidates that meet all of the requirements. Remember, once you have completed a step, those criteria are no longer considered. All candidates are considered equal in the next step.

Step 1. Statistical Analysis



- Use Interactive Batch to examine all of the fire danger candidates.
- Look at the Fires Analysis Report and the Fires Analysis Graph for each one.
 - What is the Chi-Squared for this candidate?
 - Does it meet the criteria outlined in the Summary of Statistics?
 - Should you consider this candidate for further analysis? Why or why not?
 - Document your results.
- Remember, do **NOT** change your definition of a large or multiple fire day to improve your statistics.
 - The statistics are what they are. Don't try to make them better than that.
 - Your large and multiple fire day definitions are based on local capacity.
 - Changing these values to improve the statistics is NEVER a good idea. Your goal is not to have "pretty numbers" but to have the *best possible* candidates.
- Make sure to include at least one slow and one moderate or fast candidate in your final selection.

Summary of Statistics

Your goal is to rate models (indexes) by reviewing the following statistics, keeping in mind that these are not the most robust statistics available, but they are the statistics currently available in FireFamilyPlus.

They are only Step 1 of a 3-step process.

Goodness-of-Fit

Chi Square (χ^2): A measure of the relationship between a fire danger candidate and fire occurrence data for a given Working Set. The Chi Square is more useful for testing how well a given model fits the data.

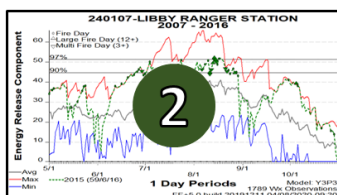
Note: The Chi Square is a relatively weak metric, but we will use it until a better statistical method is available in FireFamilyPlus.

- Lower Chi-Square values are better.

Note 2: The following values apply only to the logistic regression used in FireFamilyPlus.

- 0 is a perfect fit,
- <13 is excellent,
- <20 is good,
- >26 is not so good.

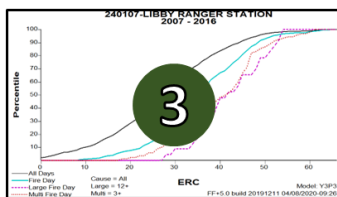
Step 2. Candidates and Fire Occurrence



Once you have selected candidates in Step 1, do not consider the statistics any further. ALL candidates selected during Step 1 are considered equally in Step 2. A viable candidate from Step 2 will reflect the fire occurrence in the FDRA.

- Generate Stats Graphs and overlay several years of fire data (“normal”, “busy”, and “slow” years).
- Do fires generally occur during times of high fire danger?
 - In generally, values for NFDRS and CFFDRS outputs increase as the fire danger increases.
 - Fuel Moisture and Relative Humidity show the highest fire danger at the lowest values.

Step 3. Decision Space & Memory



Once you have selected candidates in Step 2, do not consider the statistics or the relationship to fire occurrence any further. All candidates selected during Step 2 are considered equally in Step 3. A viable candidate from Step 3 will have enough decision space for the applications for which they are used. A large decision space is more desirable because it allows more flexibility in setting levels for most applications. Keep in mind the applications you are using and the number of classes for each of them. Remember that Decision Space is not the range of *values*, but rather the distribution of the percentiles across the range of values.

- Generate a Fires Percentile Graph for each candidate from Step 2.
 - Is there separation between lines for All Days, Fire Days, Large Fire Days, and Multiple Fire Days?
 - Is the range in values enough to make decision(s) for one of your applications?
 - Is there a viable candidate for all of the applications?
- Because we want to report outputs in terms of percentiles, the decision space is 0-100%.

- Therefore, Decision Space is not based on the range of values in the range (e.g., 1-6 or 1-60). Rather, it is the distribution of the variable
 - Can you distinguish between All Days (aka Weather Days); Fire Days; and Large or Multiple Fire Days?
 - Does the curve of the line start at the lower values and rise as the output value increases (e.g., Temperature; left)?
 - Or, does the curve of the line start at higher values and rise as the output value decreases (e.g., 1000-hr fuel moisture; right).
 - Is the change in the candidate spread across the range of values, or is there a sudden, sharp change from low to high fire danger?
 - Spreading the change across the range of the candidate allows you to identify several decision points, so that you can identify several classes (e.g., Adjective Fire Danger Rating).
 - A sudden, sharp change may only allow you to identify a single decision point (e.g., Go/No-Go).