



Selecting a Single Weather Station within a Fire Planning Unit (FPU) for Fire Program Analysis (FPA) Large Fire Simulations

Topic

Selecting a single weather station within an FPU for Large Fire module simulations.

Introduction

The FPA Large Fire module requires data input from a single weather station to formulate weather scenarios within an FPU. This paper provides FPUs guidance when selecting a single weather station for use with the FPA Large Fire module.

Background

For large fire modeling purposes, each FPU will identify one weather station that best represents weather conditions for their area. Weather station data is used in the simulation process for the entire FPU, so it is important that the selected weather station represent as much as possible the overall weather patterns of the FPU during a typical fire season.

Issues

FPUs are concerned about representing the historic weather for their entire FPU using a single weather station. These concerns are valid because:

- Microclimates within a region are not adequately represented by the readings of one weather station.
- Data from several weather stations would, in theory, capture the weather complexity of each FPU, particularly the larger ones with more spatial heterogeneity.

Simulation results are used for strategic purposes to characterize overall fire behavior in the FPU, not to model individual fires. The simulation program, FPA FSPro, uses a single weather station's historic data to create tens of thousands of fire season weather scenarios, each based on the probability of specific weather occurrence from the historic weather data. These weather streams capture the scope of most FPU weather scenarios.

Historic fires are attributed to the same weather data in order to develop the probability of large fire occurrence based on a correlation with Energy Release Component (ERC).



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Considerations and Techniques for Selecting a Single Weather Station

FPU's should consider the following information when choosing the weather station that best represents their area. The weather station should:

- Most accurately represent the FPU's weather during the typical fire season, and
- Have at least a 20-year record of high quality weather data.

FPU's can use the following techniques in FireFamily Plus version 4 (available for download at <http://www.fire.org/>) for identifying candidate weather stations:

- Run the fire probability analysis for each station. Compare the relationship between ERC and large fire occurrence for each station, and then consider which single station provides broad representation for the FPU.
- Run the climatology program with ERC selected as the index using a recent high volume fire season. The resulting graph displays a relationship between large fire and high ERC days.

When selecting among candidate weather stations, FPU's should look for a strong correlation between ERC and large fires. To determine the quality of data, FPU's should also check candidate weather stations for accuracy and completeness of data. FPU's can also ask local and/or GACC Predictive Services staff which weather stations they recommend to use for tracking fuel conditions and fire danger.

Future Direction

The Missoula Fire Sciences Lab is developing technology to use multiple weather station data in Large Fire simulations; however, it is unlikely this technology will be available for FPA's June 2008 operational release. This functionality may be added to FPA's Large Fire module software in future planning cycles.



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Review History:

Date	Initials	Change Summary
January 15, 2008	GB/BE	Reviewed, added additional content.
January 4, 2008	KSH	Incorporated edit.
January 3, 2008	JH	Reviewed with edit.
January 2, 2008	KSH	Converted document to new white paper template. Edited for clarity & readability.
December 20, 2007	JH	Initial version.