Building a Fuels Treatment Prescription for Fire Program Analysis (FPA) Large Fire Module Simulation LF_002_TP

Fuels Treatment Prescriptions for Large Fire Module

Fire Program Analysis (FPA) needs each Fire Planning Unit (FPU) to provide tabular information describing their three or four most commonly used fuels treatment prescriptions. FPA uses this information to build a fuels treatment landscape file that is part of the Large Fire module simulation.

FPUs should develop fuels treatment prescriptions based on the fuel types found in the corporate fuels layer that FPA is using to represent their FPU. Most FPUs have a LANDFIRE fuels layer available for their FPU, but some FPUs lack LANDFIRE data and need to use a layer developed by the Southern Wildfire Risk Assessment (SWRA) or the FPA team in Boise. All FPUs will use LANDFIRE fuels layers when they become available to their FPU. Fuels treatment prescriptions describe how the existing fuels landscape will change to a post-treatment landscape by use of their most commonly used treatments.

Fuels treatment prescription development and reporting does not require an in-depth analysis. FPUs can accomplish this task within three to four hours.

FPUs should describe their most common fuels treatments by using one or more of the following five fuels landscape attributes found in FARSITE and LANDFIRE layers.

- Surface fuel model (13 or 40, not both),
- Stand height,
- Canopy cover,
- Canopy base height, and/or
- Canopy bulk density.

FPUs should relate the use of these five attributes to the treatment types they perform in a typical year. For example:

- When the objective is to change the surface fuel model, then describe your prescription in terms of changes to surface fuel models, or
- When treatment success depends on making physical changes to the canopy, use the necessary canopy attributes that best describe the treatment prescription. Use only the canopy attributes that best describe each treatment.

FPA accepts surface fuel models from either the 13 FBPS fuel model set or the 40 Standard Fire Behavior Fuel Models for each FPU. The following rules will better define the particulars regarding the use of fuel model sets in FPA:

- FPUs may use the 13 or 40 fuel model sets, but cannot mix and match both.
- FPUs with available LANDFIRE data layers may use either the 13 or 40 models.

- FPUs without LANDFIRE layers available must use the 13-fuel model set.
- FPUs that have LANDFIRE layers for part of their FPU and one of the other corporate fuels layers for the remainder of their FPU must use the 13-fuel model set.

FPA recommends using the 40 surface fuel model set whenever possible to provide greater flexibility in showing changes in fire behavior as a result of each FPU's treatment prescriptions.

Examples of fuels treatment prescription are:

Change surface fuel model 10 to 8; make canopy cover 60%; make canopy height 70 feet; make canopy base height 30 feet; or make canopy bulk density 20.

-or-

Surface fuel model 8 remains 8; make canopy cover 50%; make canopy height 65 feet; make canopy base height 20 feet.-or-

Change surface fuel model 4 to 5.

-or-

Change surface fuel model GR7 to surface fuel model GR2.

FPUs must submit their fuels treatment prescriptions to jim_hutton@nps.gov with a copy to Kevin_Knauth@blm.gov using the format in Table 1. Copy tables into an Excel Spreadsheet and enter your correct FPU Values.

The following is an example of a fuels treatment using the 13-fuels model.

Treatment	Pre-treatment Fuel Model	Post-treatment Fuel Attributes				
		Fuel Model	Canopy Cover (%)	Canopy Height (ft)	Canopy Base Height (ft)	Canopy Bulk Density (kg/m³ ×100)
1	10	8	60	70	30	20
2	8	8	50	65	20	
3	4	5				
4	6	2				

Table 1: FPU Fuels Treatment Prescriptions Examples using the 13-Fuel Model

The 40 fuel modes are an effective way to demonstrate fire behavior changes and maintain or restore a target plant community. The following example displays a fuel treatment prescription that shows fire behavior changes while maintaining the plant community.

- Treatment 1 maintains a conifer forest while reducing surface fuel loading and reducing canopy covers. This also raises the canopy base height.
- Treatment 2 maintains the grassland while reducing fuel loading, continuous fuels, and the fuel bed depth.
- Treatment 3 maintains the overstory community, reduces surface and ladder fuels, and raises the canopy base height.
- Treatment 4 maintains the shrub community while reducing surface and ladder fuels. This model also raises the canopy base height, and reduces fuel loading and fuel-bed depth.

Treatment	Pre-treatment Fuel Model	Post-treatment Fuel Attributes				
		Fuel Model	Canopy Cover (%)	Canopy Height (m)	Canopy Base Height (m)	Canopy Bulk Density (kg/m³ ×100)
1	183	181	65		3.2	11
2	102	101	75		2.5	9
3	165	161	50		2.8	12
4	147	142				

Figure 2: FPU Fuels Treatment Prescriptions Examples using the 40-Fuel Model

In addition to describing each fuels prescription, each FPU must also identify how often they use each of their prescriptions. This involves determining what percentage of an FPU's total annual treatment acres is represented by each prescription. FPUs should derive this percentage as a quick estimate based on treatments performed in a typical year. This information is not tied to a specific year or to any specific budget level; it reflects the most common fuels treatments used in an FPU.

The example in Table 3 below shows that an FPU prescribes:

- Treatment 1 on approximately 50% of a typical year's treatment acres,
- Treatment 2 on approximately 30% of a typical year's treatment acres,

- Treatment 3 is used on approximately 15% of a typical year's treatment acres, and
- Treatment 4 on approximately 5% of a typical year's treatment acres within the FPU.

FPUs must submit their fuels treatment percentages to jim_hutton@nps.gov with a copy to Kevin_Knauth@blm.gov using the format in Table 2. Copy tables into an Excel Spreadsheet and enter your correct FPU Values.

Treatment	Percent
1	50
2	30
3	15
4	5

Table 3: Treatment Prescriptions Example by Percentage

Reminder: Email Table 1 and Table 2 spreadsheets for your FPU to Jim Hutton (jim_hutton@nps.gov) with a copy to Kevin Knauth (Kevin_Knauth@blm.gov). Direct questions to Jim Hutton (jim_hutton@nps.gov).

See Also

- Understanding How the Fire Program Analysis (FPA) Large Fire Module Processes Fuels Data FLS_011_WP
- Understanding the Fire Program Analysis (FPA) Large Fire Module LF_012_WP

Appendices

The following tables are examples of fuel treatment prescriptions for the Large Fire module. These examples are loosely based on FPU Prototype inputs. The fuel model fields are copied directly from the Prototypes, but the canopy attributes are interpreted due to a slight difference in the initial direction given to them earlier in the winter. FPA now enters fuels attributes based on the end-state fuels condition, but the Prototype areas were asked to provide fuels condition based on how it has changed from the existing fuels condition.

Treatment	Pre-treatment Fuel Model	Post-treatment Fuel Attributes				
		Fuel Model	Canopy Cover (%)	Canopy Height (ft)	Canopy Base Height (ft)	Canopy Bulk Density (kg/m³ ×100)
1	6	2	20			
2	2	1	0			
3	9	9			15	
4	6	1	30			

Table 2 Fuel Treatment Prescriptions Example from Color Country Prototype

Treatment	Pre-treatment Fuel Model	Post-treatment Fuel Attributes				
		Fuel Model	Canopy Cover (%)	Canopy Height (ft)	Canopy Base Height (ft)	Canopy Bulk Density (kg/m³ ×100)
1	10	8	50		20	
2	10	9	55		10	
3	4	5				

Table 3: Fuel Treatment Prescriptions Example from Southern Sierra Prototype

Treatment	Pre-treatment Fuel Model	Post-treatment Fuel Attributes				
		Fuel Model	Canopy Cover (%)	Canopy Height (ft)	Canopy Base Height (ft)	Canopy Bulk Density (kg/m³ ×100)
1	10	8	60		20	
2	8	2	70		35	
3	10	5	60		30	

Table 4: Fuel Treatment Prescriptions Example from Northwest Montana Prototype

Review History:

Date	Initials	Change Summary
August 15, 2008	DKS	Approved with minor edits
August 15, 2008	KSH	Incorporated final edits.
August 15, 2008	JH	Added table for 40-fuel model.
August 14, 2008	DKS	Minor edits with suggestion to add S&B examples.
August 13, 2008	JLF	Minor Edits
February 20, 2008	KSH	Incorporated edits.
February 20, 2008	KK	Added Donna's clarifications.
February 20, 2008	DKS	Clarifications requested.
February 14, 2008	KSH	Incorporate edits.
February 13, 2008	TK/KK	Modified existing material and added Prototype FPU fuels treatment prescriptions.
January 18, 2008	ED	Add direction for emailing spreadsheet in.
January 16, 2008	KSH	Incorporate edits.
January 16, 2008	JF	Suggestions for additional information.
January 16, 2008	BW	Edits in track changes
January 10, 2008	TK	Minor edits.
December 21, 2007	KSH	Formatted for Tech News article. Includes minor edits.
December 20, 2007	TK, JH	Initial version.