Comparison Chart for FlamMap 3.0 (Desktop) vs. WFDSS *Automated* Basic (FlamMap) and Short-term (MTT) Fire Behavior (Web-based)

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Variable	FlamMap 3.0 (Desktop)	WFDSS Basic Fire Behavior (BFB) and Short-term Fire Behavior (STFB)
Landscape File (LCP)	The user is required to load an LCP to do any analyses. The advantage of this is *any* LCP can be imported into FlamMap.	LCPs available via WFDSS are derived from LANDFIRE National, LANDFIRE Rapid Refresh, California, and a limited Alaska dataset. Users must define an analysis area. Advantages to having a system generated LCP is that the data are seamless and easily accessible. However, a disadvantage is that the user is limited to choosing one of the four datasets.
Live Fuel Moisture Values	Users must supply an initial fuel moisture file (.fms) which contains values for live herbaceous and live woody fuels as well as dead fuel moistures *for each fuel model* in the LCP. Dead fuel moisture values should be representative of the *start time* of the simulation. Live fuel values are *constant* throughout the simulation. When a fuel moisture conditioning file is used, the dead fuel moistures are adjusted based on aspect, elevation, and previous weather (from the weather file). Fuel moisture has a significant influence on fire behavior modeling, particularly when using the 40 fuel models. It is important that users create an accurate .fms file.	WFDSS BFB and STFB obtain live fuel moisture values from daily WFDSS ERC-G calculations via a RAWS. There are several disadvantages of this method: 1. The inability to see what fuel moisture values are being used to calculate fire behavior; 2. The inability to alter fuel moisture values by fuel model; 3. The inability to select a different RAWS.
Wind Speed & Direction	The user has three options for input wind speed and direction: 1. choosing a single speed and wind blowing uphill; 2. choosing a single speed and direction; 3. choosing a grid of wind vectors and loading the appropriate wind speed and direction ASCII files. Option 3 (using gridded winds) often produces more realistic results when modeling fire behavior in complex terrain. However, these wind vector grids cannot be created within FlamMap 3.0; they must be generated using WindWizard or WindNinja. An advantage of the user generating gridded winds is that a finer resolution (< 200 meters) wind field can be generated.	In WFDSS BFB and STFB, wind speed and direction are obtained from the National Digital Forecast Data (NDFD). These observations are used by WindNinja to create gridded winds at 200-meter resolution. Wind speed and direction information can be modified by the user. Having system-generated gridded winds is very convenient.

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Foliar Moisture Content	The user has the option of changing foliar moisture content (FMC), although the default value of 100% is often adequate. Foliar moisture affects crown fire initiation and occurrence. FMC generally ranges from 75 to 150. Lowering the FMC – a landscape-wide adjustment – will increase torching and crowning.	WFDSS uses 100% foliar moisture for both BFB and STFB. The user cannot change this value.
Crown Fire Calculation Method	The user has the option of choosing the Finney (1998) crown fire calculation method or the Scott and Reinhardt (2001) method. Model selection should be based on the canopy characteristics of the LCP and modeled results vs. reality.	WFDSS uses Finney (1998) crown fire calculation method for *all* fire behavior modeling.
Weather Observations for Fuel Moisture Conditioning	To condition fuels in FlamMap (optional, but recommended), the user must supply wind (.wnd) and weather (.wtr) files so dead fuel moistures can be calculated for *every cell* on the landscape. These files can be created manually or be obtained from a RAWS and exported as .wtr and .wnd files in FireFamily Plus. A couple advantages to this approach are a user can decide which RAWS to use and can select which weather data will be used for conditioning.	WFDSS BFB and STFB *automatically* conditions fuels by using weather observations from nearby RAWS. Dead fuel moistures are calculated for every cell in the analysis area. This is very convenient and a time saver. The disadvantages of this automation are the user cannot choose the RAWS, nor does the user know what weather is being used to calculate the dead fuel moisture values. WFDSS selects the RAWS by (1) identifying the center of the analysis extent, (2) calculating the distance from the center to the nearest RAWS(s) using a horizontal/vertical (elevation) algorithm, (3) ranking the stations, and (4) selecting the station who is "closest" and has weather data requisite for conditioning.
Start & End Time (FlamMap 3.0) / Analysis Burn Date & Time (BFB & STFB) for Fuel Moisture Conditioning	FlamMap 3.0 requires that the user input a start date and time for the fuel moisture conditioning period to begin as well as the end date and time. Normally the user will choose at least 4 to 7 days for the conditioning period. The dead fuel moistures that are calculated at the end of the conditioning period are what are used to calculate fire behavior at every cell (basic FlamMap) and are the values used by MTT for the *entire* simulation.	The user chooses a burn date and burn time for which they want the analysis to start. WFDSS looks back the last 7 + days (up to 14 days) to obtain the necessary observations to automatically condition the dead fuels.
Ignition Location	MTT allows the user several options for the ignition location: 1. The user can click on a point(s) to be used as the ignition; 2. The user can draw one or more lines or polygons to be used as the ignition; 3. The user can import a shapefile (points, lines, or polygons) into MTT. Importing a shapefile can provide for a more accurate ignition location.	In the automated version of WFDSS STFB, the user can input a latitude/longitude for the ignition or zoom to a location and create an ignition point based on several different map views (i.e., WFDSS and Terra topos, Google Maps).

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Simulation Duration	MTT allows the user to input the *total number of minutes* the simulation will run. For example, if a user wanted to simulate 10 hours of spread for one day, the maximum simulation time would be 600 minutes (equivalent to one, 10-hour burn period). If the user wanted to simulate two days, each with 5 hours of burning, 600 minutes would still be the correct input for the simulation time (equivalent to two, 5-hour burn periods).	STFB requires the user to define the length of the burn period (hours per day) and the number of burn periods (days). For instance, to simulate 10 hours of spread for one day, the user would input 10 (hours) for the burn period and one (day) for the number of burn periods. To simulate two days, each five hours long, the user would input a burn period of 5 hours and 2 days for the number of burn periods.
Spotting	FlamMap 3.0 MTT does not include spotting. This is a serious limitation when using MTT to model fire spread in areas where spotting plays a significant role.	STFB includes spotting. This is a major improvement and likely increases the modeling accuracy in areas where spotting contributes significantly to fire spread.
Outputs (Basic)	Outputs available for display and download include: Fireline intensity Rate of spread Flame length Heat/unit area Crown fire activity 1 hour fuel moisture 10 hour fuel moisture Solar radiation Spread vectors Horizontal movement rate Midflame wind speed Any grid can be saved as an ASCII Raster file to be imported into a GIS.	Outputs available for *display* in WFDSS BFB include: Fireline intensity Flame length Heat/unit area Crown fire activity 1 hour fuel moisture 10 hour fuel moisture Solar radiation Rate of spread Maximum spread direction None of the outputs are available to save or download, although users can do screen captures if necessary.
Outputs (MTT & STFB)	Outputs available from MTT include: Rate of spread grid Influence grid Arrival time grid Major paths Fire intensity map Flow paths Major paths Arrival time contours Burn probabilities (random ignitions only) Legend properties (color and units) can be changed in the desktop version. Any grid can be saved as an ASCII Raster and imported into a GIS.	Outputs available for *display* in WFDSS STFB include: Arrival time grid Major paths All of the outputs available in BFB are also created when a STFB analysis is run. Legend properties (colors and units) cannot be modified in the automated version of BFB. None of the outputs are available to save or download, although users can do screen captures if needed.

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Saving an Analysis	It is easy to save and archive FlamMap 3.0 projects which include all of the inputs used in the analysis as well as the outputs. This is very useful to save to a hard drive but these files take up a lot of space and require good file management to be able to retrieve them to use at a later date.	Automated WFDSS BFB and STFB projects are available within WFDSS and are easily retrieved. However, *they are only saved for 14 days*, after which they are automatically deleted unless they are included in a decision document. Currently, there is no way to save or download a WFDSS BFB or STFB analysis.