Supporting Documentation for the Burn Probability Model (IFT-FlamMap-RANDIG)

Name of Software Tool: Burn probability (IFT-FLAMMAP-RANDIG)

Current Version Description/Date: Version randig3d; date compiled: unknown.

Software Code and History: RANDIG is a mechanistic fire spread program (developed by M. Finney). RANDIG simulates fire spread using the minimum travel time (fire spread algorithm) method (Finney, 2002) and inputs for wind, fuel moisture, topography, and flame length classifications. RANDIG is run as a command-line version of FlamMap (Finney, 2006). The software code for the RANDIG burn probability model (.exe file format) was acquired from the Missoula Fire Sciences Laboratory via Mark Finney in March 2011.

Software Developer(s) Names, Organization, and Contact Information: U.S. Forest Service, Rocky Mountain Research Station, Fire, Fuel, and Smoke Science Program.

> **Note to Users: For questions specifically relating to the internal functional operations of this model, contact the developer(s) or help desk resources for this software tool. For questions regarding how this tool is used within IFTDSS, please contact the IFTDSS Team using the Feedback function available on every page of IFTDSS.**

Science Model Contact, Names, Organization, and Contact Information: U.S. Forest Service, Rocky Mountain Research Station, Fire, Fuel, and Smoke Science Program; Mark Finney.

Help desk contact information:

- Phone: 866-224-7677 or 360-326-6002
- Email: fire_help@fs.fed.us
- Website: http://www.fs.fed.us/fire/planning/nist

Availability of the version of record: The latest version of the software code for this module resides with the U.S. Forest Service, Rocky Mountain Research Station, Fire, Fuel, and Smoke Science Program.

Primary Funding Sources: Unknown.

Application Purpose (General): In IFTDSS, the burn probability module (IFT-FLAMMAP-RANDIG) is a spatial fire behavior tool in which an entire landscape is analyzed using a single set of wind and moisture conditions and user-defined flame length classes. The module creates raster maps of the burn probabilities at defined flame length classes and overall burn probabilities across a landscape. There is no temporal component in this module. The module uses spatial information on topography and fuels to calculate burn probabilities for the selected wind and moisture conditions. For more information, see http://www.firemodels.org/index.php/flammap-introduction/flammap-publications#Guides for spatial fire behavior analysis.

Application Purpose (Fuel Treatment): Burn probability is used in IFTDSS to help identify areas of the landscape where fire is likely to occur given a random ignition within that landscape. When categorized by flame length, burn probability can serve as an aid in determining the likelihood that expected fire behavior is potentially within or outside of acceptable levels. Moreover, the information provided by the burn probability module can be used to support decisions regarding the placement of fuels treatments within landscapes. The burn probability module simulates burn probability across a target area using a landscape (.lcp) file. For more information, see http://www.firemodels.org/index.php/flammap-introduction/flammap-publications#Fuel Treatment Location Simulations.

User/Application Documentation:

- http://www.firemodels.org/index.php/national-systems/flammap
- http://www.firemodels.org/index.php/flammap-introduction/flammap-publications

User Application Guidance: Available by request from Mark Finney, Missoula Fire Lab.

Finney, Mark A. (2006) An overview of FlamMap fire modeling capabilities. In Fuels management—how to measure success: conference proceedings. March 28-30, 2006; Portland, OR. Patricia L.Andrews and Bret W. Butler, comps. Proceedings RMRS-P-41. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station, pp. 213-220 (809 p).

Scientific Foundations of the Software Tool:

- Degree of validation/evaluation and availability of written results:
  - No information available at this time.
- Publication history:
  - Ager, A. A.; Finney, M. A.; Kems, B. K.; Maffei, H. 2007. Modeling wildfire risk to northern spotted owl (Strix occidentalis caurina) habitat in Central Oregon, USA. Forest Ecology and Management 246: 45-56.
  - Ager, A.A., N.M. Vaillant, and M.A. Finney. 2010. A comparison of landscape fuel treatment strategies to mitigate Wildland fire risk in the urban interface and preserve old forest structure. *For. Ecol. Manag*. 259(8):1556 –1570.
  - Finney, M. A. 2007. A computational method for optimizing fuel treatment locations. *International Journal of Wildland Fire* 16: 702-711.
  - Finney, M. A.; Seli, R. C.; McHugh, C. W.; Ager, A. A.; Bahro, B.; Agee, J. K. 2007. Simulation of long-term landscape-level fuel treatment effects on large wildfires. International Journal of Wildland Fire 16: 712-727.

- Parks, S. A., M.-A. Parisien, and C. Miller. 2012. Spatial bottom-up controls on fire likelihood vary across western North America. Ecosphere 3(1):12. http://dx.doi.org/10.1890/ES11-00298.1
- Stratton, R. D. 2004. Assessing the effectiveness of landscape fuel treatments on fire growth and behavior. *Journal of Forestry* 102(7): 32-40.
- Stratton, R. D. 2006. Guidance on spatial wildland fire analysis: models, tools, and techniques. General Technical Report RMRS-GTR-183. Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Training: Can be found at http://www.firemodels.org/index.php/flammap-support/flammap-training.