

Supporting Documentation for Crown Fire Behavior, IFT-crown (based on the CROWN module in BehavePlus)

Name of Software Tool: IFT-crown

Current Version Description/Date: IFT-crown version 01-31-12

Software Code and History: The mathematical model code for IFT-crown is from the Fire Behavior Software Developer Kit (FBSDK) and the BehavePlus5 xfbllib.cpp and xfbllib.h. IFT-crown (01-31-12) implements the critical model functionality found in the BehavePlus-CROWN module. Details comparing the functionality of BehavePlus5 and equivalent tools in IFTDSS can be found in Drury et al. (2012, BehavePlus Functionality available in IFTDSS Version 1.0). Rigorous testing has been performed to verify that the mathematical output from the IFT-crown module is consistent with the output from the BehavePlus5-CROWN module. Details concerning the output evaluation between the BehavePlus-CROWN and IFT-crown modules can be found in PDF files included in the IFTDSS online help (under **IFTDSS Compared with Other Systems > Module Test Cases**). Future versions of IFTDSS are scheduled to expand the BehavePlus functionality.

Software Developer(s) Names, Organization, and Contact Information:

- BehavePlus was developed by U.S. Forest Service, Rocky Mountain Research Station, Fire, Fuel, and Smoke Science Program. Contact information is available on:
<http://www.firemodels.org/index.php/behaveplus-support/behaveplus-contact-us>
- IFT-crown was developed by the IFTDSS Development Team based on software libraries provided by the BehavePlus developers. The IFTDSS Development Team may be contacted using the Feedback function available on every page of IFTDSS.

Science Model Contact, Names, Organization, and Contact Information:

- Contact information for implementation of the CROWN module in BehavePlus or the underlying scientific algorithms is available on:
<http://www.firemodels.org/index.php/behaveplus-support/behaveplus-contact-us>
- For questions regarding IFT-crown, please contact the IFTDSS Team using the Feedback Function available on every page of IFTDSS.

Availability of the Version of Record: The latest version of the software code for IFT-crown resides with Sonoma Technology, Inc. (STI) and is being used in IFTDSS version 1.0. However, STI did not develop the scientific algorithms within the software code. The IFT-crown software module code is public domain and available from STI upon written request.

Primary Funding Sources:

- BehavePlus development and support has been funded by U.S. Forest Service, Rocky Mountain Research Station, Fire, Fuel, and Smoke Science Program; U.S. Forest Service, Fire and Aviation Management; the Joint Fire Science Program (JFSP).
- IFT-crown development was funded by JFSP.

Application Purpose (General): The IFT-crown module is used to estimate the critical surface intensity needed for transition from surface to crown fire. In order to run this module, flame length or fireline intensity is needed. Both spread and intensity are output by the module. Some of the spread output variables include critical surface intensity and flame length, crown rate of spread, fire type, crown spread distance, crown fire area, and crown fire perimeter. Some of the intensity output variables include crown fireline intensity and flame length, power of the fire, power of the wind, crown load, canopy heat per unit area, and crown fire heat per unit area. The IFT-crown module can be used to facilitate decision making for a variety of elements in a burn plan, including Element 5, 7, 16, and 17 (Objectives, Fire Behavior Prescription, Holding plans, and Contingency plans).

Application Purpose (Fuel Treatment): The IFT-crown module can be used to model crown fire behavior under different fuel and moisture conditions. The IFT-crown module can be used for prescribed burn planning and to fill in specified elements of a burn plan.

User/Application Documentation:

- Documentation of BehavePlus operation and application:
<http://www.firemodels.org/index.php/national-systems/behaveplus>

User Application Guidance:

- The IFTDSS online help includes a PDF tutorial that illustrates how to use IFTDSS to prepare a burn plan (*Preparing a Prescribed Burn Plan*).

Scientific Foundations of the Software Tool:

- Degree of validation/evaluation and availability of written results:
No information available at this time.
- Publications describing BehavePlus and the fire models on which it is based:
<http://www.firemodels.org/index.php/behaveplus-introduction/behaveplus-publications>

Training Availability:

- Training on BehavePlus can be found at:
<http://www.firemodels.org/index.php/behaveplus-support/behaveplus-training>