



Fuel and Fire Tools (FFT)

Introduction

FFT is a software application that integrates the Fuel Characteristics Classification System, Consume, FEPS, Pile Calculator, and Digital Photo Series into a single user interface. Fuelbeds are the common currency in FFT. FCCS requires a list of one to many fuelbeds to run calculations. Because Consume and FEPS can predict consumption by burn unit, they require fuelbeds to be assigned to a unit with a percentage area entered for each fuelbed.

- The Fuel Characteristic Classification System (FCCS version 3.0) stores and classifies fuels data as fuelbeds and calculates fuel loadings, carbon and other summary fuel characteristics. It predicts surface fire behavior and a 0-9 index of surface, crown fire and available fuel potentials. The FCCS is also available as a batch version and as a module in IFT-DSS.
- Consume (version 4.2) predicts total fuel consumption, pollutant emissions, and heat release for fuelbeds and burn units based on input fuel loadings, fuel moisture, and other environmental factors. It is also available as a batch version and as a module within BlueSky, IFT-DSS and WFEIS.
- The Fire Emission Production Simulator (FEPS) predicts hourly fuel consumption, pollutant emissions, and heat release characteristics of prescribed burns and wildland fires. The FEPS calculator module can be run in command line and has been integrated into BlueSky, IFT-DSS, and V-Smoke. *Note – this module is still under construction and does not function in FFT version 1.0.*
- The web-based Digital Photo Series (DPS) can be launched within the FFT fuelbed editor for reference purposes. It is also available as a separate web-based tool on the FERA website.
- The Pile Calculator is integrated within the FFT's Fuelbed Editor to allow the creation and editing of pile information within fuelbeds. It is also available as a web-based tool or stand-alone tool on the FERA website.

Applications

The FFT is designed to support the primary users of the FERA applications, who include the following groups:

- 1) **Land managers.** Fire and fuels managers will use the FFT to characterize fuels and assess their fire hazard, fire effects, and smoke impacts. With its large fuels dataset and ability to represent a wide variety of fuel conditions, the FFT has numerous applications, from small-scale fuel reduction projects to large-scale emissions and carbon assessments. Specific applications may include:
 - Fuel reduction projects and prescribed fire planning. The FFT can be used as a planning tool to target which fuels should be removed to effectively reduce fire hazard and smoke emissions. It can be used as a reporting tool to

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summarize pre and post-burn fuel characteristics, potential fire behavior, and fuel consumption and emissions. FFT can also be used to assist in planning prescribed fires so that they will meet specific land management objectives and evaluating fuel treatment effectiveness.

- Emission calculation. FFT can be used to estimate emissions and smoke production for prescribed fire planning and assessing emission reduction techniques. Outputs may be integrated into smoke dispersion models such as BlueSky or V-smoke.
 - Regional assessments. Fuelbeds generated in the FFT can be used to map fuel loading, carbon stores, or fire hazard. Because fuelbeds have no inherent scale, outputs can be easily mapped in GIS by assigning polygons or raster cells with a unique fuelbed identification number.
 - Carbon accounting. FFT can be used to compile carbon stores before and after disturbance and to predict carbon flux from fires.
- 2) **Researchers**. Researchers can use the FFT software for land management, fire projections, and research-related analyses. Large batches of fuelbeds can be run through the FFT calculator modules for a variety of applications, including landscape fire hazard assessments, emissions inventories, and carbon assessments.
- 3) **Regulatory agencies**. Regulatory agencies will use the FFT to calculate fuel consumption and/or emissions to manage smoke, estimate fees, and produce regional and national wildland fire emissions inventories

Software requirements

FFT runs on Windows operating systems (version 7.0 or later). All integrated tools (FCCS, Consume, FEPS, the Pile Calculator and Digital Photo Series) were developed by the Fire and Environmental Research Applications Team as freely sharable software and are supported as modules that are either platform independent or web tools.

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