

The Fuel Characteristic Classification System (FCCS 2.0)

<http://www.fs.fed.us/pnw/fera>

Introduction

Fuelbeds vary widely in their physical attributes, potential fire behavior, and fire effects. As models that predict fire behavior, fire effects, and carbon cycling become more sophisticated and widely used, there is an increasing need to accurately quantify and classify the structural and geographical diversity of wildland fuels. The Fuel Characteristic Classification System (FCCS) was designed to represent the diversity of fuels found throughout North America and predict their relative fire hazard. FCCS version 2.0 builds on this system by predicting surface fire behavior and quantifying carbon stores for each calculated fuelbed.

About FCCS

FCCS is a user-friendly software program that allows users to access fuelbeds from a fuelbed library or create their own custom fuelbeds. FCCS fuelbeds represent fuels throughout much of North America and were compiled from published literature, fuels photo series, fuels data sets and expert opinion. Users can modify the FCCS fuelbeds to create a set of customized fuelbeds representing any scale of interest.

When a user has completed editing fuelbed data, FCCS reports input and calculated fuel characteristics for each existing fuelbed component, from canopy fuels to ground fuels (Figure 1). FCCS also calculates the relative fire hazard of each fuelbed, including surface fire behavior, crown fire, and available fuel potentials, scaled on an index from 0 to 9. These FCCS fire potentials facilitate communication of fire hazard among users and provide an index of the intrinsic capacity of each fuelbed for surface fire behavior, crown fire and available consumption of fuels under dry benchmark environmental conditions (no slope, 4 mph midflame wind speed, and dry fuel moistures).

FCCS version 2.0 predicts surface fire behavior, including reaction intensity ($\text{BTU ft}^{-2} \text{min}^{-1}$), flame length (ft), and rate of spread (ft min^{-1}) based benchmark and user-specified environmental conditions. By comparing predicted flame length and rate of spread, FCCS 2.0 provides a crosswalk to one of the original 13 Fire Behavior Prediction System fuel models and one of the 40 standard fuel models (Scott and Burgan 2005). FCCS 2.0 also reports carbon storage by fuelbed category and subcategory and predicts the amount of combustible







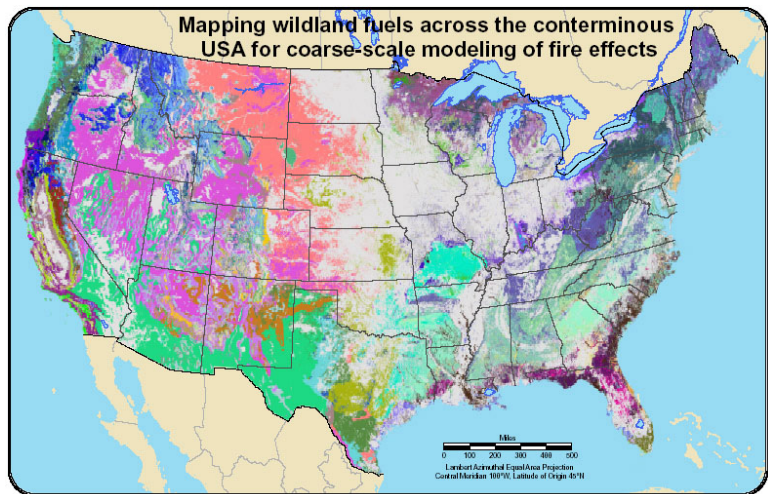
Stratum		Category
CANOPY		Trees, snags, ladder fuels
SHRUBS		Primary and secondary layers
NONWOODY VEGETATION		Primary and secondary layers
WOODY FUELS		All wood, sound wood, rotten wood, stumps, and woody fuel accumulations
LITTER-LICHEN-MOSS		Litter, lichen, and moss layers
GROUND FUELS		Duff, basal accumulations, and squirrel middens

Figure 1: Fuel strata and categories in the FCCS.

carbon in each category and subcategory based on selected fuel moisture scenarios. Additional changes in version 2.0 include: reports in English and metric units, photo uploads to represent each fuelbed, and a batch mode to provide output on a set of multiple fuelbeds.

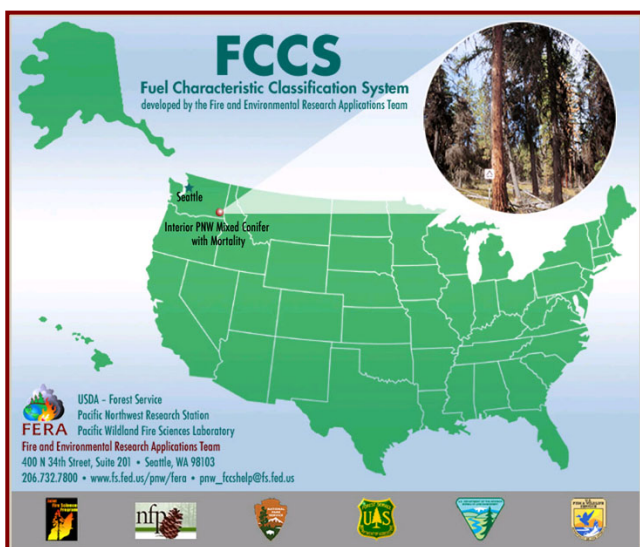
Applications

FCCS facilitates the mapping of fuelbed characteristics and fire hazard assessment (Figure 2; <http://www.fs.fed.us/pnw/fera/fccs/>), by providing fuelbeds, fuelbed characteristics, and associated predicted surface fire behavior, crown fire, and available fuel potentials. FCCS also provides the necessary inputs to run fuel consumption and emission production models, such as Consume 3.0 and the Fire Emissions Production Simulator (FEPS).



The system is currently being showcased as a tool to map fuelbeds and fire hazard, which allows managers to maximize fuel treatment effectiveness on the Okanogan and Wenatchee National Forests, Deschutes National Forest, and Lake Tahoe basin. FERA has also demonstrated the use of FCCS as the basis for a national air pollutant and carbon emission inventory, in cooperation with the U.S. Environmental Protection Agency. LANDFIRE is currently developing a map layer of the FCCS fuelbeds throughout the United States.

FCCS software, tutorial, and user's guide are available for download from the FERA website (<http://www.fs.fed.us/pnw/fera/fccs/>). The FCCS has been transferred to managers and scientists during 15 national workshops and through eight published papers in a special section of the Canadian Journal of Forest Research (CJFR). In future versions, we expect References will be available, new fuelbeds, linkages with other FERA tools, FireMON, links to FOFEM, Fuelbed building tool



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<http://www.fs.fed.us/pnw/fera/fccs/>

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