

# **A Suite of Fuel Management Tools: Fuel Characteristic Classification System, Natural Fuels Photo Series, Digital Photo Series, and Consume 3\_0**

by

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The Fire and Environmental Research Applications team (FERA) of the Pacific Wildland Fire Sciences Laboratory has developed a suite of four fuel management products that will be demonstrated at this workshop. This suite includes the Fuel Characteristics Classification System (FCCS 2\_0), Natural Fuels Photo Series, Digital Photo Series, and Consume 3\_0. These four tools work together and allow users to characterize fuelbeds, assess potential fire hazard and surface fire behavior, and estimate the amount of fuel consumed and emissions produced if burned during a wildland fire. These tools have been applied throughout multiple ecosystems of in the United States, including Hawaii and Alaska. They have also been applied to Savannas of Central Brazil and Natural Protected Areas in Mexico.

## **Fuel Characteristic Classification System (Version 2\_0)**

FCCS version 2\_0 is a user-friendly software program that allows users to access fuelbeds from a nation-wide library or create their own custom fuelbeds. FCCS fuelbeds were compiled from published literature, fuels photo series, fuels data sets and expert opinion. Users can modify 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. 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 by providing an index of the intrinsic capacity of each fuelbed for surface fire behavior, crown fire and available consumption of fuels. All potentials assume dry benchmark environmental conditions (no slope, 4 mph midflame wind speed, and dry fuel moistures).

FCCS predicts surface fire behavior, including reaction intensity ( $\text{Btu ft}^{-2} \text{min}^{-1}$ ), flame length (ft), and rate of spread ( $\text{ft min}^{-1}$ ), based either on dry benchmark environmental conditions or on those specified by the user. By comparing predicted flame length and rate of spread, FCCS provides a crosswalk between its fuelbeds, the original 13 Fire Behavior Prediction System fuel models, and the 40 standard fuel models. FCCS 2\_0 also reports carbon storage by fuelbed category and subcategory and predicts the amount of combustible carbon in each category and subcategory based on selected fuel moisture scenarios. The website for the FCCS 2\_0 is <http://www.fs.fed.us/pnw/fera/fccs/index.shtml>.

## **Natural Fuels Photo Series**

The Natural Fuels Photo Series are useful tools to quickly and inexpensively evaluate vegetation and fuel conditions in the field. This collection of data and photographs collectively display a range of natural conditions and fuel loadings in a wide variety of ecosystem types throughout the Americas from central Alaska to central Brazil. Fire managers are the primary target audience of the Natural Fuels Photo series, although the data presented will also prove useful for managers, scientists, and researchers in other natural resource and science fields. The website for the photo series is: [http://www.fs.fed.us/pnw/fera/research/fuels/photo\\_series/index.shtml](http://www.fs.fed.us/pnw/fera/research/fuels/photo_series/index.shtml).

## **Digital Photo Series**

The Digital Photo Series contains searchable data and images for the nearly 400 sites contained in the Natural Fuels Photo Series, representing fuels in a wide range of ecosystems throughout the United States. Each entry includes a site description, species composition, fuel loading and arrangement, and overstory composition and structure. This information can be used for planning fuels treatments or other management actions and as inputs to fire behavior and fire effects models and applications. The Digital Photo Series is available online at <http://depts.washington.edu/nwfire/dps/>.

## **Consume 3\_0**

Consume 3\_0 is a user-friendly software application for estimating fuel consumption and emissions produced. Land managers and researchers input fuel characteristics, length of ignition, fuel conditions, and meteorological attributes; Consume then calculates fuel consumption and emissions by combustion phase. Consume is designed to import data directly from the Fuel Characteristic Classification System (FCCS), and its output is formatted to feed other models and provide usable reports for burn plan preparation and smoke management requirements. Consume can be used for all forest, shrub and grasslands in North America. The Consume 3\_0 website is <http://www.fs.fed.us/pnw/fera/research/smoke/consume/index.shtml>.

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**Draft Agenda: A Suite of Fuel Management Tools:  
 Fuel Characteristic Classification System (FCCS),  
 Natural Fuels Photo Series, Digital Photo Series, Pile  
 Calculator, and Consume 3.0**

**Short Course—0800-1200  
 Portugal  
 November 2010**



<b>Introduction</b>	0800-0805
<i>--Roger Ottmar</i>	
 <b>Fuel Characteristic Classification System</b>	
Overview	0805 – 0825
<i>-- Roger Ottmar</i>	
FCCS Fire Potentials	0825 – 0855
<i>-- Susan Prichard</i>	
Global Applications of the FCCS:	0855 - 0905
<i>--Ernesto Alvarado</i>	
How To Use the FCCS	0905 – 0915
<i>-- Roger Ottmar</i>	
Demonstration	0930 – 1000
<i>-- Roger Ottmar and Susan Prichard</i>	
 <b>Break</b>	<b>1000 – 1015</b>
<b>Natural Fuels Photo Series in the USA, Mexico and Brazil</b>	1015– 1030
<i>-- Bob Vihnanek</i>	
<b>Digital Photo Series</b>	1030– 1045
<i>-- Bob Vihnanek</i>	
<b>Pile Calculator</b>	1045-1100
<i>-- Bob Vihnanek</i>	
 <b>Consume 3.0</b>	
Overview/how to Use Consume	1100 – 1130
<i>-- Susan Prichard</i>	
Demonstration	1130 – 1200
<i>-- Susan Prichard and Roger Ottmar</i>	