



# CONSUME v. 3\_0

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

## Introduction

Land managers use fire to maintain and restore ecosystems, reduce fuel loading, expose mineral soil, improve wildlife habitat, and reduce the hazard of wildfire. As understanding of forest ecosystems has increased, forest managers have become more discriminating in their use of prescribed fire and managing wildland fire. Fires are now applied to satisfy land management objectives and benefit forest ecosystems as a whole.



Fuel consumption is a key variable in fire effects modeling and understanding when and how fire should be applied to meet site and landscape objectives while at the same time reducing air quality impacts. Until recently, much of the considerable research on fuel consumption focused on prescribed burning following logging in forested ecosystems.

FERA recently completed fuel consumption studies with support from the Joint Fire Science Program in natural fuel environments to improve our understanding of fuel consumption in wildland fuels for shrublands (including chaparral, sageland and palmetto/galberry types), hardwood forests (including southern and eastern regions of the U.S.), and boreal forests (including white spruce, black spruce and hardwood forests of Alaska). Improved models of fuel consumption were incorporated into Consume v 3\_0. We also resolved differences in fuel consumption between the relatively short flaming phase of combustion and the longer smoldering phase of combustion that generally contributes the majority of wildland fire emissions.

Consume v 3\_0 reflects an improved understanding of fuel consumption and emissions in wildland fire across major fuel types in the United States. Consume is a decision-making tool designed to assist resource managers in planning for prescribed fire, wildland fire for use, and wildfire. Consume predicts fuel consumption, pollutant emissions, and heat release based on a number of factors including fuel loadings, fuel moisture, and other environmental factors. Using these predictions, resource managers can determine when and where to conduct a prescribed burn or plan for a wildland fire to achieve desired objectives, while reducing the impact on other resources.

## Fuel Consumption Research

Seventy-one sites were inventoried and burned in black and white spruce/hardwood forests (Alaska), chaparral (California), ponderosa pine/mixed-conifer forests (Oregon), and pine/hardwood forests (South Carolina, Tennessee, and Florida). Thirty-five sites were inventoried and burned in sagebrush on Bureau of Land Management, National Park Service, and U.S. Fish and Wildlife Service lands in eastern Oregon, Nevada, Wyoming, Utah, and California. Additionally, over 150 sites were burned in clearcut and partial cut logging slash fuelbeds in Washington and Oregon. Data from all burns have been compiled and analyzed. Consumption models were built for fuel categories within the following fuelbed types: Douglas-fir/western hemlock, lodgepole pine, grand fir/Douglas-fir, black and white spruce/hardwoods, longleaf and loblolly pine, ponderosa pine, grasslands, and sagebrush.

## Consume 3\_0 Software

Consume 3\_0 is a user-friendly software application designed for resource managers with some working knowledge of Microsoft Windows® applications. Land managers and researchers input fuel characteristics, lighting patterns, fuel conditions, and meteorological attributes, and Consume outputs fuel consumption and emissions by combustion phase and by fuelbed category. Consume imports data from the Fuel Characteristic Classification System (FCCS), and outputs are formatted to feed other models and provide usable reports for burn plan preparation and smoke management requirements. Additionally, a tutorial and user's manual are available. Consume is applicable to most wildland fires in forests, shrubs, woodlands, and grasslands in North America.

### For More Information Contact:



Roger Ottmar  
Fire and Environmental Research Applications Team  
U.S. Forest Service Pacific Wildland Fire Sciences Lab  
400 North 34th Street, Suite 201  
Seattle, Washington 98103  
Office phone: (206) 732-7826  
Cell phone: (206) 849-3172  
E-mail: [rottmar@fs.fed.us](mailto:rottmar@fs.fed.us)

Susan Prichard  
Fire and Environmental Research Applications Team  
U.S. Forest Service Pacific Wildland Fire Sciences Lab  
400 North 34th Street, Suite 201  
Seattle, Washington 98103  
Office phone: (509) 996-2408  
E-mail: [sprich@u.washington.edu](mailto:sprich@u.washington.edu)

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