CONSUME v. 4.2

FERA
Fire and Environmental Research Applications

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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 several 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 4.2 reflects our improved understanding of fuel consumption and emissions in wildland fire throughout 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). Additionally, thirty-five sites were inventoried and burned in sagebrush on BLM, National Park Service, and U.S. Fish and Wildlife Service lands in eastern Oregon, Nevada, Wyoming, Utah, and California. Data from all burns have been compiled and analyzed. Consumption models were built for fuel categories within the following fuelbed types: black and white spruce/hardwoods, longleaf and loblolly pine, ponderosa pine, grasslands, and sagebrush. Model development is currently underway to 1) validate fuel consumption predictions, 2) refine forest floor reduction models to provide more reasonable predictions and 3) create consumption models for new vegetation types including a new shrub consumption model for southern pine forests and consumption models for eastern mixed hardwood forests types.

Consume 4.2

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