



RMRS Science

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USDA Forest Service, Rocky Mountain Research Station, Fort Collins, CO

Science Provides Help for Fire Managers

According to the National Interagency Fire Center in Boise, ID, over 60,000 wildland fires had burned more than 3.5 million acres across the United States as of August 1, 2000. Officials are calling it the worst wildfire season in recent history. The National Weather Service reports that the “La Nina” weather event has been the biggest influencing factor, with most of the Nation experiencing a warming trend, with below normal rainfall over much of the West.

This has created complex and unprecedented challenges for fire managers. In addition to stretching federal, state and local governments thin as they work to fill orders for firefighters and equipment, other challenges include the integration of fire concerns into land management plans, controversies surrounding the use of prescribed fire, and new policies on fire control and suppression.

To help address these issues, fire managers and other resource specialists are finding help from scientists at the Rocky Mountain Research Station’s Fire Sciences Laboratory in Missoula, Montana. Work at this facility, the largest in the world devoted to wildland fire science, is based on laboratory and field experiments, in both simulated and actual fire conditions. Three research projects are based at the laboratory:

1) Scientists with the **Fire Behavior** unit conduct research on wildland fire behavior to help land managers in prefire planning and management, fire suppression, and prescribed burning to better manage and protect the environment, life and property. (Project Leader: Don Latham, 406-329-4848, e-mail: dlatham@fs.fed.us).



Research is based on lab and field experiments of regional, national and global scope.

2) Work in the **Fire Effects** unit centers on the effects of fire on forest, range, and wilderness ecosystems. Researchers provide practical guides and information systems so that land managers can better apply fire effects knowledge in land management decisions. Their findings provide a scientific basis for when and how to use prescribed fire to treat fuels and restore fire-dependent ecosystems. (Project Leader: Kevin Ryan, 406-329-4807, e-mail: kryan@fs.fed.us).

3) Scientists with the **Fire Chemistry** unit characterize fuel chemistry, combustion processes, and smoke emissions from prescribed and wild fires in tropical, temperate, and boreal ecosystems. Research results provide emission factors and spatial and temporal distribution on biomass burning that can be applied to improve smoke management and assess the impact of fires on air quality, stratospheric and tropospheric chemistry, and global climate. (Project Leader: Wei Min Hao, 406-329-4838, e-mail: whao@fs.fed.us).

<http://www.fs.fed.us/rm>



Results of their work are incorporated into a set of computer models, or “Fire Management Tools,” that provide information about fire management related applications and access to documentation, visuals, graphics, and executable software. These tools, being used by resource specialists both nationally and internationally, are featured at <http://www.fire.org>. This website contains 28 computer models and fire management applications that can be downloaded for use.

One tool gathering a lot of attention this fire season is the Structure Ignition Assessment Model (SIAM), developed by Research Physical Scientist Jack Cohen. “As more and more people are moving from urban to rural or wildland settings, their residences and vacation homes are being built in high risk areas and are difficult to protect from fire,” says Cohen. His recent paper, *Reducing the Wildland Fire Threat to Homes: Where and How Much?*, is based on the SIAM model, and addresses the need for homeowners and communities to focus on protecting homes and other structures through using low-ignitability construction materials and controlling surrounding flammable materials and brush. “Given that a fire occurs, proper mitigation of these two factors will help minimize the risk of a structure igniting from radiant heat or flying embers,” says Cohen. His paper is available electronically through the Rocky Mountain Research Station’s website at <http://www.fs.fed.us/rm/main/pubs/electronic.html>.

Fire managers will also be interested in other computer models developed at the Fire Sciences Laboratory:

BEHAVE: the Fire Behavior Prediction and Fuel Modeling System is a set of five programs that gather available fire models into a system for projecting an ongoing fire, prescribed fire planning, fuel hazard assessment, initial attack dispatch, fire prevention planning, and training.

FARSITE: Fire Area Simulator is a two-dimensional fire growth simulation model that uses spatial information on topography and fuels along with weather and wind data. Fire managers use FARSITE

to analyze how fire growth patterns may change depending on weather, and to examine how effective fuel treatments may be, or what could happen if a fire started in a given location under given weather scenarios.

FEIS: The Fire Effects Information System is a computerized encyclopedia of information describing the effects of fire on more than 1,000 plant and animal species and plant communities throughout North America.

FOFEM: The First Order Fire Effects Model is an easy-to-use computer program that predicts the effects of prescribed fire and wildfire, such as fuel consumption, smoke production and tree mortality. It is used to assess wildfire impacts, develop salvage specifications following fire, design fire prescriptions, and in environmental assessments and fire management planning.

WFAS: The Wildland Fire Assessment System is a web-based system that provides national maps of fire weather and fire potential. It is on the Forest Service web site at: <http://www.fs.fed.us/land/wfas>. Fire coordinators and fire managers use it for pre-fire planning and seasonal tracking of fire danger.

If you would like additional information on the Station’s Fire Sciences Laboratory, visit it’s website at <http://www.firelab.org>.

In addition to research at Missoula, Station scientists in Flagstaff, Arizona are helping the Forest Service’s Southwestern Region plan for fuels reduction work in the wildland/urban interface. Studies focus on inventory methods for determining volume of available fuels, evaluation of management options for removing fuels mechanically and/or via prescribed fire, the economic utilization of materials removed for fuel reduction, and the effects of potential insect and disease problems due to fuels reduction.



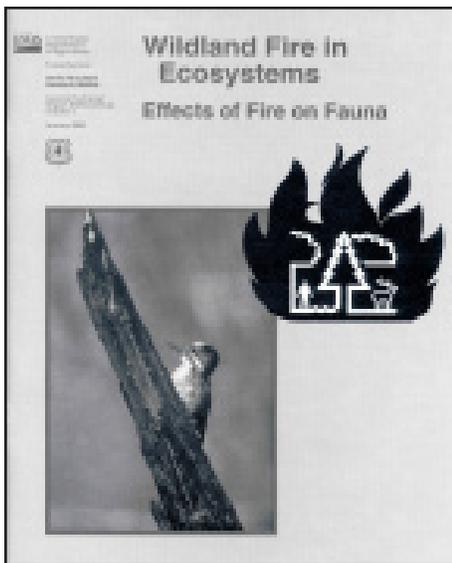
WELCOME to RMRScience...

This is the first issue of *RMRScience*, a quarterly report from the USDA Forest Service's Rocky Mountain Research Station. Each issue highlights on-going or recently completed research, and features findings useful to land managers and other natural resource specialists...a tool for getting research results into the hands of users.

If you received this first issue, you are on our mailing list. Others may receive *RMRScience* free-of-charge by writing to RMRScience, Rocky Mountain Research Station, 2150 Centre Ave., Bldg. A, Fort Collins, CO 80526, sending an e-mail to: cfletcher@fs.fed.us, or faxing us at (970) 295-5927. Comments and suggestions are always welcome.

Hot Off the Press!

The Rocky Mountain Research Station has just published the first in a five-volume series on wildland fire in ecosystems. Called the "Rainbow Series," so named because of the different colored covers for each publication, it is actually the second round of fire effects publications issued -- the first series was published in the late 1970's. That series, which covered fire effects on soil, water, air, flora, fauna, and fuels, proved very popular. So popular, in fact, that supplies quickly ran out, but knowledge of fire effects continued to grow.



To meet the continuing demand for summaries of fire effects knowledge, the interagency National Wildfire Coordinating Group asked Forest Service Research and Development to update and revise the series. The new Rainbow Series covers fire effects on air, soil and water, fauna, flora and fuels, and cultural resources. These publications emphasize principles and processes rather than serving as a summary of all that is known. The five volumes, taken together, provide a wealth of information and examples to advance understanding of basic concepts regarding fire effects in the United States and Canada. They offer technical support to fire and resource managers for carrying out interdisciplinary planning. Planners and managers will find the series helpful in many aspects of ecosystem-based management.

This first in the series, titled *Wildland Fire in Ecosystems: Effects of Fire on Fauna*, General Technical Report RMRS-42, Vol. 1, is now available from the Rocky Mountain Research Station. It includes chapters on: regional variation in fire regimes; direct effects of fire

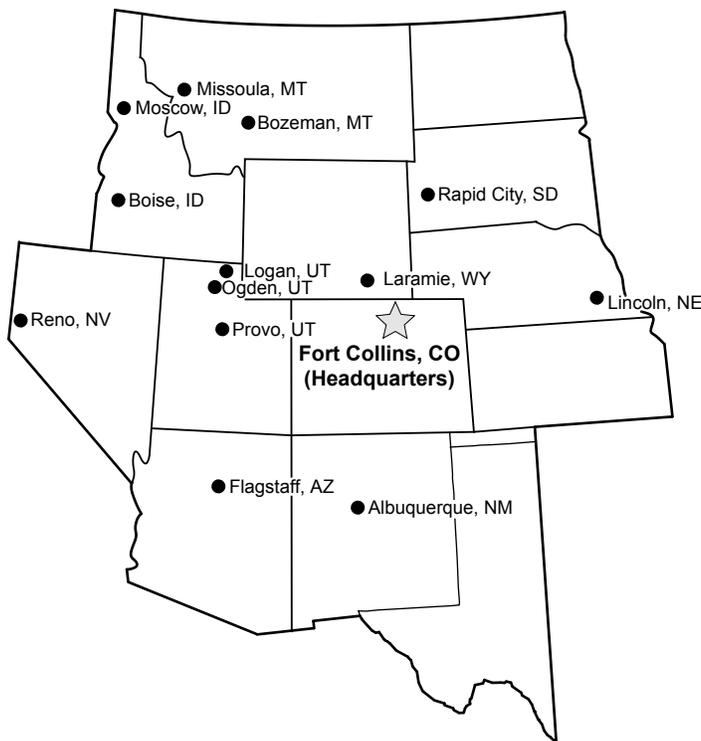
and animal responses; fire effects on animal populations, fauna at landscape scales, and on wildlife foods; and concludes with a section on management and research implications. To order, write Publications Distribution, Rocky Mountain Research Station, 240 West Prospect Road, Fort Collins, CO 80526-2098, or call (970) 498-1392; e-mail rschneider@fs.fed.us. It is also available in electronic format on the Station's website at <http://www.fs.fed.us/rm/main/pubs/electronic.html>. The remainder of the Rainbow Series will be published by the end of 2000.

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The USDA Forest Service’s Rocky Mountain Research Station is one of seven units nationwide that make up the most extensive natural resource research organization in the world. Headquartered at the foot of the Rockies in Fort Collins, CO, the Station maintains 14 field laboratories within a 14 state territory (see map). Scientists conduct studies nationwide, with emphasis on the Rocky Mountains, Great Basin, Great Plains, and Southwest. Research serves the Forest Service, as well as other federal agencies, international organizations, private groups, and individuals. For more information, visit our website at <http://www.fs.fed.us/rm>.

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