

Dimensional analysis on forest fuel bed fire spread

www.nrfirescience.org/resource/16440

A dimensional analysis was performed to correlate the fuel bed fire rate of spread data previously reported in the literature. Under wind condition, six pertinent dimensionless groups were identified, namely dimensionless fire spread rate, dimensionless fuel particle size, fuel moisture content, dimensionless fuel bed depth or...

Author(s): Jiann C. Yang

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Analysis of the physical processes associated with junction fires at laboratory and field scales

www.nrfirescience.org/resource/16747

Junction fires, which involve the merging of two linear fire fronts intersecting at a small angle, are associated with very intense fire behaviour. The dynamic displacement of the intersection point of the two lines and the flow along the symmetry plane of the fire are analysed for symmetric boundary conditions. It is observed that...

Author(s): J. R. Raposo, Domingos Xavier Viegas, X. Xie, Miguel Almeida, A. R. Figueiredo, L. Porto, J. Sharples

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

An improved non-equilibrium model for the ignition

www.nrfirescience.org/resource/16743

This paper deals with the modelling of living fuel ignition, suggesting that an accurate description using a multiphase formulation requires consideration of a thermal disequilibrium within the vegetation particle, between the solid (wood) and the liquid (sap). A simple model at particle scale is studied to evaluate the flux...

Author(s): A. Lamorlette, M. El Houssami, D. Morvan

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Climate adaption and post-fire restoration of a foundational perennial in cold desert: Insights from intraspecific variation in response to weather

www.nrfirescience.org/resource/16523

1) The loss of foundational but fire-intolerant perennials such as sagebrush due to increases in fire size and frequency in semi-arid regions has motivated efforts to restore them, often with mixed or even no success. Seeds of sagebrush *Artemisia tridentata* and related species must be moved considerable distances from seed source to...

Author(s): Martha M. Brabec, Matthew J. Germino, Bryce A. Richardson

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Towards improving wildland firefighter situational awareness through daily fire behaviour risk assessments in the US Northern Rockies and Northern Great Basin

www.nrfirescience.org/resource/15489

Wildland firefighters must assess potential fire behaviour in order to develop appropriate strategies and tactics that will safely meet objectives. Fire danger indices integrate surface weather conditions to

quantify potential variations in fire spread rates and intensities and therefore should closely relate to observed fire...

Author(s): William Matt Jolly, Patrick H. Freeborn

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Effects of climate oscillations on wildland fire potential in the continental United States

www.nrfirescience.org/resource/16506

The effects of climate oscillations on spatial and temporal variations in wildland fire potential in the continental U.S. are examined from 1979 to 2015 using cyclostationary empirical orthogonal functions (CSEOFs). The CSEOF analysis isolates effects associated with the modulated annual cycle and the El Niño–Southern Oscillation...

Author(s): Shelby A. Mason, Peter E. Hamlington, Benjamin D. Hamlington, William Matt Jolly, Chad M. Hoffman

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Fuel-related fire-behaviour relationships for mixed live and dead fuels burned in the laboratory

www.nrfirescience.org/resource/16452

A laboratory experimental program addressing fire spread in fuel beds composed of dead foliage litter and vertically placed quasi-live branches, representative of many natural fuel complexes, was carried out for either still-air or wind conditions. Fuel-bed characteristics, fire spread rate, flame geometry, and fuel consumption were...

Author(s): Carlos G. Rossa, Paulo M. Fernandes

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Surface fuel characteristics, temporal dynamics, and fire behavior of masticated mixed-conifer fuelbeds of the U.S. Southeast and Rocky Mountains

www.nrfirescience.org/resource/15582

Mastication is a wildland fuel treatment technique that is rapidly becoming popular with fire managers for fire hazard reduction projects, especially in areas where reducing fuels with prescribed fire is particularly challenging. Mastication is the process of mechanically modifying the live and dead surface and canopy biomass by...

Author(s): Robert E. Keane, Pamela G. Sikkink, Theresa B. Jain, James J. Reardon

Year Published: 2017

Type: Document

Technical Report or White Paper

Interacting effects of fire severity, time since fire and topography on vegetation structure after wildfire

www.nrfirescience.org/resource/16674

Fire is an important disturbance in forest ecosystems globally. Many of the effects of fire on forest processes are mediated through effects on vegetation structure. Understanding how fire properties, fire regimes and environmental variation interact to affect structure is required in the face of predictions of increasing size and...

Author(s): Michelle Bassett, Steven W.J. Leonard, Evelyn K. Chia, Michael F. Clarke, Andrew F. Bennett

Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Tamm Review: Shifting global fire regimes: Lessons from reburns and research needs

www.nrfirescience.org/resource/15305

Across the globe, rising temperatures and altered precipitation patterns have caused persistent regional droughts, lengthened fire seasons, and increased the number of weather-driven extreme fire events. Because wildfires currently impact an increasing proportion of the total area burned, land managers need to better understand...

Author(s): Susan J. Prichard, Camille Stevens-Rumann, Paul F. Hessburg

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Effects of season on ignition of live wildland fuels using the forced ignition and flame spread test apparatus

www.nrfirescience.org/resource/16525

An understanding of what variables affect the ignition of live wildland fuels is crucial to predicting crown fire spread, the most poorly understood type of wildland fire. Ignition tests were performed over the course of an entire year for ten species (three species in year one, seven in year two) to evaluate seasonal changes in...

Author(s): Sara S. McAllister, David R. Weise

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Alternative characterization of forest fire regimes: incorporating spatial patterns

www.nrfirescience.org/resource/15536

Context The proportion of fire area that experienced stand-replacing fire effects is an important attribute of individual fires and fire regimes in forests, and this metric has been used to group forest types into characteristic fire regimes. However, relying on proportion alone ignores important spatial characteristics of stand-...

Author(s): Brandon M. Collins, Jens T. Stevens, Jay D. Miller, Scott L. Stephens, Peter M. Brown, Malcolm P. North

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Network analysis of wildfire transmission and implications for risk governance

www.nrfirescience.org/resource/16507

We characterized wildfire transmission and exposure within a matrix of large land tenures (federal, state, and private) surrounding 56 communities within a 3.3 million ha fire prone region of central Oregon US. Wildfire simulation and network analysis were used to quantify the exchange of fire among land tenures and communities and...

Author(s): Alan A. Ager, Cody Evers, Michelle A. Day, Haiganoush K. Preisler, Ana M. G. Barros, Max W. Nielsen-Pincus

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Predicting post-fire tree mortality for 12 western US conifers using the First-Order Fire Effects Model (FOFEM)

www.nrfirescience.org/resource/16493

Accurate prediction of fire-caused tree mortality is critical for making sound land management decisions such as developing burning prescriptions and post-fire management guidelines. To improve efforts to predict post-fire tree mortality, we developed 3-year post-fire mortality models for 12 Western conifer species—white fir (...)

Author(s): Sharon M. Hood, Duncan C. Lutes

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

An improved canopy wind model for predicting wind adjustment factors and wildland fire behavior

www.nrfirescience.org/resource/16445

The ability to rapidly estimate wind speed beneath a forest canopy or near the ground surface in any vegetation is critical to practical wildland fire behavior models. The common metric of this wind speed is the “mid-flame” wind speed, UMF. However, the existing approach for estimating UMF has some significant shortcomings....

Author(s): William J. Massman, Jason M. Forthofer, Mark A. Finney

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

How to generate and interpret fire characteristics charts for the U.S. fire danger rating system

www.nrfirescience.org/resource/15371

The fire characteristics chart is a graphical method of presenting U.S. National Fire Danger Rating System (NFDRS) indexes and components as well as primary surface or crown fire behavior characteristics. Computer software has been developed to produce fire characteristics charts for both fire danger and fire behavior in a format...

Author(s): Faith A. Heinsch, Patricia L. Andrews, D. A. Tirmenstein

Year Published: 2017

Type: Document

Technical Report or White Paper

Spatiotemporal dynamics of simulated wildfire, forest management, and forest succession in central Oregon, USA

www.nrfirescience.org/resource/15134

We use the simulation model Envision to analyze long-term wildfire dynamics and the effects of different fuel management scenarios in central Oregon, USA. We simulated a 50-year future where fuel management activities were increased by doubling and tripling the current area treated while retaining existing treatment strategies in...

Author(s): Ana M. G. Barros, Alan A. Ager, Michelle A. Day, Haiganoush K. Preisler, Thomas A. Spies, Eric M. White, Robert J. Pabst, Keith A. Olsen, Emily K. Platt, John D. Bailey, John P. Bolte

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Trend analysis of fire season length and extreme fire weather in North America between 1979 and 2015

www.nrfirescience.org/resource/16407

We have constructed a fire weather climatology over North America from 1979 to 2015 using the North American Regional Reanalysis dataset and the Canadian Fire Weather Index (FWI) System. We tested for the presence of trends in potential fire season length, based on a meteorological definition, and extreme fire weather using the non-...

Author(s): Piyush Jain, Xianli Wang, Michael D. Flannigan

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Phase dynamics of wildland fire smoke emissions and their secondary organic aerosols

www.nrfirescience.org/resource/15581

Biomass burning is an important source to the atmosphere of carbonaceous particulate matter that impacts air quality, climate, and human health. The semivolatile nature of directly emitted organic particulate matter can result in particle evaporation as smoke plumes dilute. Further, oxidation of emitted and volatilized precursors can...

Author(s): Sonia M. Kreidenweis, Jeffrey R. Pierce

Year Published: 2017

Type: Document

Technical Report or White Paper

An empirically based approach to defining wildland firefighter safety and survival zone separation distances

www.nrfirescience.org/resource/16748

Wildland firefighters in the US are mandated to identify areas that provide adequate separation between themselves and the flames (i.e. safety zones) to reduce the risk of burn injury. This study presents empirical models that estimate the distance from flames that would result in a low probability (1 or 5%) of either fatal or non-...

Author(s): Wesley G. Page, Bret W. Butler

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Spatially explicit measurements of forest structure and fire behavior following restoration treatments in dry forests

www.nrfirescience.org/resource/15044

Restoration treatments in dry forests of the western US often attempt silvicultural practices to restore the historical characteristics of forest structure and fire behavior. However, it is suggested that a reliance on non-spatial metrics of forest stand structure, along with the use of wildland fire behavior models that lack the...

Author(s): J. Ziegler, Chad M. Hoffman, Michael A. Battaglia, William E. Mell

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Simulated fire behaviour in young, postfire lodgepole pine forests

www.nrfirescience.org/resource/16291

Early-seral forests are expanding throughout western North America as fire frequency and annual area burned increase, yet fire behaviour in young postfire forests is poorly understood. We simulated fire behaviour in 24-year-old lodgepole pine (*Pinus contorta* var. *latifolia*) stands in Yellowstone National Park, Wyoming, United States...

Author(s): Kellen N. Nelson, Monica G. Turner, William H. Romme, Daniel B. Tinker
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

An uncertainty analysis of wildfire modeling [Chapter 13]

www.nrfirescience.org/resource/14997

Before fire models can be understood, evaluated, and effectively applied to support decision making, model-based uncertainties must be analyzed. In this chapter, we identify and classify sources of uncertainty using an established analytical framework, and summarize results graphically in an uncertainty matrix. Our analysis...

Author(s): Karen L. Riley, Matthew P. Thompson
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Indicators of burn severity at extended temporal scales: A decade of ecosystem response in mixed conifer forests of western Montana

www.nrfirescience.org/resource/15315

We collected field and remotely sensed data spanning 10 years after three 2003 Montana wildfires to monitor ecological change across multiple temporal and spatial scales. Multiple endmember spectral mixture analysis was used to create post-fire maps of: char, soil, green (GV) and non-photosynthetic (NPV) vegetation from high-...

Author(s): Sarah A. Lewis, Andrew T. Hudak, Peter R. Robichaud, Penelope Morgan, K.L. Satterberg, Eva K. Strand, Alistair M. S. Smith, J Zamudio, Leigh B. Lentile
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

The normal fire environment—Modeling environmental suitability for large forest wildfires using past, present, and future climate normals

www.nrfirescience.org/resource/16643

We modeled the normal fire environment for occurrence of large forest wildfires (>40 ha) for the Pacific Northwest Region of the United States. Large forest wildfire occurrence data from the recent climate normal period (1971–2000) was used as the response variable and fire season precipitation, maximum temperature, slope, and...

Author(s): Raymond J. Davis, Zhiqiang Yang, Andrew Yost, Cole Belongie, Warren B. Cohen
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Climate change and the eco-hydrology of fire: will area burned increase in a warming western USA?

www.nrfirescience.org/resource/14916

Wildfire area is predicted to increase with global warming. Empirical statistical models and process-based simulations agree almost universally. The key relationship for this unanimity, observed at multiple spatial and temporal scales, is between drought and fire. Predictive models often focus on ecosystems in which this...

Author(s): Donald McKenzie, Jeremy S. Littell
Year Published: 2017
Type: Document

Book or Chapter or Journal Article

Qualitative flow visualization of flame attachment on slopes

www.nrfirescience.org/resource/16566

Heating of unburned fuel by attached flames and plume of a wildfire can produce high spread rates that have resulted in firefighter fatalities worldwide. Qualitative flow fields of the plume of a gas burner embedded in a table tilted to 0°, 10°, 20°, and 30° above horizontal were imaged using the retroreflective shadowgraph...

Author(s): Torben Grumstrup, Sara S. McAllister, Mark A. Finney

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Closure to development of soil moisture drought index to characterize droughts

www.nrfirescience.org/resource/15608

This is a discussion article qualifying four issues related to soil moisture drought index (SODI) moisture departure.

Author(s): Mohammad Sohrabi, Jae H. Ryu, John T. Abatzoglou, John Tracy

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Wildland fire limits subsequent fire occurrence

www.nrfirescience.org/resource/15303

Several aspects of wildland fire are moderated by site- and landscape-level vegetation changes caused by previous fire, thereby creating a dynamic where one fire exerts a regulatory control on subsequent fire. For example, wildland fire has been shown to regulate the size and severity of subsequent fire. However, wildland fire has...

Author(s): Sean A. Parks, Carol Miller, Lisa M. Holsinger, Scott L. Baggett, Benjamin J. Bird

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Weather, fuels, and topography impede wildland fire spread in western US landscapes

www.nrfirescience.org/resource/14716

As wildland fire activity continues to surge across the western US, it is increasingly important that we understand and quantify the environmental drivers of fire and how they vary across ecosystems. At daily to annual timescales, weather, fuels, and topography are known to influence characteristics such as area burned and fire...

Author(s): Lisa M. Holsinger, Sean A. Parks, Carol Miller

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

A comparison of level set and marker methods for the simulation of wildland fire front propagation

www.nrfirescience.org/resource/13803

Simulating an advancing fire front may be achieved within a Lagrangian or Eulerian framework. In the former, independently moving markers are connected to form a fire front, whereas in the latter, values representing the moving front are calculated at points within a fixed grid. Despite a mathematical

equivalence between the two...

Author(s): Anthony S. Bova, William E. Mell, Chad M. Hoffman

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Recent advances and remaining uncertainties in resolving past and future climate effects on global fire activity

www.nrfirescience.org/resource/15603

Fire is an integral component of the Earth system that will critically affect how terrestrial carbon budgets and living systems respond to climate change. Paleo and observational records document robust positive relationships between fire activity and aridity in many parts of the world on interannual to millennial timescales....

Author(s): A. Park Williams, John T. Abatzoglou

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

The effect of wind on burning rate of wood cribs

www.nrfirescience.org/resource/14685

Wood cribs are often used as ignition sources for room fire tests. A wood crib may also apply to studies of burning rate in wildland fires, because wildland fuel beds are porous and three dimensional. A unique aspect of wildland fires is the ubiquitous presence of wind. However, very little is known about what effect the increased...

Author(s): Sara S. McAllister, Mark A. Finney

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Predicting large wildfires across western North America by modeling seasonal variation in soil water balance

www.nrfirescience.org/resource/14021

A lengthening of the fire season, coupled with higher temperatures, increases the probability of fires throughout much of western North America. Although regional variation in the frequency of fires is well established, attempts to predict the occurrence of fire at a spatial resolution <10 km² have generally been unsuccessful. We...

Author(s): Richard H. Waring, Nicholas C. Coops

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Controls on interannual variability in lightning-caused fire activity in the western US

www.nrfirescience.org/resource/15601

Lightning-caused wildfires account for a majority of burned area across the western United States (US), yet lightning remains among the more unpredictable spatiotemporal aspects of the fire environment and a challenge for both modeling and managing fire activity. A data synthesis of cloud-to-ground lightning strikes, climate and...

Author(s): John T. Abatzoglou, Crystal A. Kolden, Jennifer Balch, Bethany A. Bradley

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Soil heating during the complete combustion of mega-logs and broadcast burning in central Oregon USA pumice soils

www.nrfirescience.org/resource/14604

The environmental effect of extreme soil heating, such as occurs with the complete combustion of large downed wood during wildfires, is a post-fire management concern to forest managers. To address this knowledge gap, we stacked logs to create 'mega-log' burning conditions and compared the temperature, duration and penetration...

Author(s): Jane E. Smith, Ariel D. Cowan, Stephen A. Fitzgerald

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Quantifying the influence of previously burned areas on suppression effectiveness and avoided exposure: a case study of the Las Conchas Fire

www.nrfirescience.org/resource/13919

We present a case study of the Las Conchas Fire (2011) to explore the role of previously burned areas (wildfires and prescribed fires) on suppression effectiveness and avoided exposure. Methodological innovations include characterisation of the joint dynamics of fire growth and suppression activities, development of a fire line...

Author(s): Matthew P. Thompson, Patrick H. Freeborn, Jon D. Rieck, David E. Calkin, Julie W.

Gilbertson-Day, Mark A. Cochrane, Michael S. Hand

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

The net benefits of human-ignited wildfire forecasting: the case of tribal land units in the United States

www.nrfirescience.org/resource/14196

Research shows that some categories of human-ignited wildfires may be forecastable, owing to their temporal clustering, with the possibility that resources could be predeployed to help reduce the incidence of such wildfires. We estimated several kinds of incendiary and other human-ignited wildfire forecast models at the weekly time...

Author(s): Jeffrey P. Prestemon, David T. Butry, Douglas S. Thomas

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

High-resolution infrared thermography for capturing wildland fire behaviour: RxCADRE 2012

www.nrfirescience.org/resource/13856

Wildland fire radiant energy emission is one of the only measurements of combustion that can be made at wide spatial extents and high temporal and spatial resolutions. Furthermore, spatially and temporally explicit measurements are critical for making inferences about fire effects and useful for examining patterns of fire spread. In...

Author(s): Joseph J. O'Brien, E. Louise Loudermilk, Benjamin Hornsby, Andrew T. Hudak, Benjamin C. Bright, Matthew B. Dickinson, J. Kevin Hiers, Casey Teske, Roger D. Ottmar

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Determination of the effects of heating mechanisms and moisture content on ignition of live fuels

www.nrfirescience.org/resource/15576

Effect of moisture content and heat flux type on ignition of foliage from 10 live fuels was examined over the course of a year using two apparatuses: a flat-flame burner coupled with a radiant panel and a Forced Ignition and flame Spread Test (FIST) apparatus. Results of the experiments were compared to predictions made with the...

Author(s): David R. Weise, Thomas H. Fletcher, Shankar M. Mahalingam, Sara S. McAllister, Babak Shotorban, William Matt Jolly

Year Published: 2016

Type: Document

Technical Report or White Paper

Effectiveness and longevity of wildland fire as a fuel treatment

www.nrfirescience.org/resource/14440

Wildland fires, especially wildfires, are not commonly thought of as fuel treatments; however, because fires consume fuels and alter vegetation structure, they can serve as fuel treatments similar to more traditional means (e.g., mechanical or prescribed fire). To consider previously burned areas when managing subsequent fires,...

Author(s): Sean A. Parks, Corey L. Gucker

Year Published: 2016

Type: Document

Research Brief or Fact Sheet

Measurements relating fire radiative energy density and surface fuel consumption - RxCADRE 2011 and 2012

www.nrfirescience.org/resource/13845

Small-scale experiments have demonstrated that fire radiative energy is linearly related to fuel combusted but such a relationship has not been shown at the landscape level of prescribed fires. This paper presents field and remotely sensed measures of pre-fire fuel loads, consumption, fire radiative energy density (FRED) and fire...

Author(s): Andrew T. Hudak, Matthew B. Dickinson, Benjamin C. Bright, Robert L. Kremens, E. Louise Loudermilk, Joseph J. O'Brien, Benjamin Hornsby, Roger D. Ottmar

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

The Influence of Climate Model Biases on Projections of Aridity and Drought

www.nrfirescience.org/resource/15624

Global climate models (GCMs) have biases when simulating historical climate conditions, which in turn have implications for estimating the hydrological impacts of climate change. This study examines the differences in projected changes of aridity [defined as the ratio of precipitation (P) over potential evapotranspiration (PET), or...

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Wildland fire: nature's fuel treatment

www.nrfirescience.org/resource/14887

Every year wildland fires affect much more acreage in the United States compared to controlled burns. Like controlled burns, wildland fire can help promote biological diversity and healthy ecosystems. But

despite these facts, wildland fire is not often considered as a fuel treatment in the United States.

Scientists working with the...

Author(s): Brian Cooke

Year Published: 2016

Type: Document

Research Brief or Fact Sheet

Spatial coherence of extreme precipitation events in the Northwestern United States

www.nrfirescience.org/resource/15609

The complexity of impacts resulting from extreme precipitation events varies with the spatial extent of precipitation extremes. Characteristics of precipitation extremes, defined by the top 5% of 3-day accumulated precipitation, including their spatial coherence and relationships to two contrasting synoptic phenomena, were examined...

Author(s): Lauren E. Parker, John T. Abatzoglou

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Projected changes in cold hardiness zones and suitable overwinter ranges of perennial crops over the United States

www.nrfirescience.org/resource/15604

Average annual absolute minimum temperatures (TN_n) provide a means of delineating agriculturally relevant climate zones and are used to define cold hardiness zones (CHZ) by the United States Department of Agriculture. Projected changes in TN_n, mean winter minimum temperatures, and CHZs over the conterminous United States (CONUS...

Author(s): Lauren E. Parker, John T. Abatzoglou

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Synthesis of knowledge of extreme fire behavior: volume 2 for fire behavior specialists, researchers, and meteorologists

www.nrfirescience.org/resource/14330

The National Wildfire Coordinating Group's definition of extreme fire behavior indicates a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following is usually involved: high rate of spread, prolific crowning/spotting, presence of fire whirls, and strong...

Author(s): Paul A. Werth, Brian E. Potter, Martin E. Alexander, Miguel G. Cruz, Craig B. Clements, Mark A. Finney, Jason M. Forthofer, Scott L. Goodrick, Chad M. Hoffman, William Matt Jolly, Sara S. McAllister, Roger D. Ottmar, Russell A. Parsons

Year Published: 2016

Type: Document

Synthesis, Technical Report or White Paper

Near-term probabilistic forecast of significant wildfire events for the western United States

www.nrfirescience.org/resource/14704

Fire danger and potential for large fires in the United States (US) is currently indicated via several forecasted qualitative indices. However, landscape-level quantitative forecasts of the probability of a large fire are currently lacking. In this study, we present a framework for forecasting large fire occurrence – an extreme...

Author(s): Haiganoush K. Preisler, Karen L. Riley, Crystal S. Stonesifer, David E. Calkin, William Matt

Jolly
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Attribution of extreme weather events in the context of climate change - Report in brief

www.nrfirescience.org/resource/14069

As climate has warmed over recent years, a new pattern of more frequent and more intense weather events has unfolded across the globe. Climate models simulate such changes in extreme events, and some of the reasons for the changes are well understood. Warming increases the likelihood of extremely hot days and nights, favors...

Author(s): Committee on Extreme Weather Events and Climate Change Attribution

Year Published: 2016

Type: Document

Technical Report or White Paper

Contribution of cut-off lows to precipitation across the United States

www.nrfirescience.org/resource/15602

A chronology of cutoff lows (COL) from 1979 to 2014 alongside daily precipitation observations across the conterminous United States was used to examine the contribution of COL to seasonal precipitation, extreme-precipitation events, and interannual precipitation variability. COL accounted for between 2% and 32% of annual...

Author(s): John T. Abatzoglou

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Burning rates of wood cribs with implications for wildland fires

www.nrfirescience.org/resource/14684

Wood cribs are often used as ignition sources for room fire tests and the well characterized burning rates may also have applications to wildland fires. The burning rate of wildland fuel structures, whether the needle layer on the ground or trees and shrubs themselves, is not addressed in any operational fire model and no simple...

Author(s): Sara S. McAllister, Mark A. Finney

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Incorporating resource protection constraints in an analysis of landscape fuel-treatment effectiveness in the northern Sierra Nevada, CA, USA

www.nrfirescience.org/resource/14012

Finding novel ways to plan and implement landscape-level forest treatments that protect sensitive wildlife and other key ecosystem components, while also reducing the risk of large-scale, high-severity fires, can prove to be difficult. We examined alternative approaches to landscape-scale fuel-treatment design for the same landscape...

Author(s): Christopher B. Dow, Brandon M. Collins, Scott L. Stephens

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

A stochastic mixed integer program to model spatial wildfire behavior and suppression placement decisions with uncertain weather

www.nrfirescience.org/resource/13931

Wildfire behavior is a complex and stochastic phenomenon that can present unique tactical management challenges. This paper investigates a multistage stochastic mixed integer program with full recourse to model spatially explicit fire behavior and to select suppression locations for a wildland fire. Simplified suppression decisions...

Author(s): Erin J. Belval, Yu Wei, Michael Bevers

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

The impact of aging on laboratory fire behaviour in masticated shrub fuelbeds of California and Oregon, USA

www.nrfirescience.org/resource/14580

Mastication of shrubs and small trees to reduce fire hazard has become a widespread management practice, yet many aspects of the fire behaviour of these unique woody fuelbeds remain poorly understood. To examine the effects of fuelbed aging on fire behaviour, we conducted laboratory burns with masticated *Arctostaphylos* spp. and...

Author(s): Jesse K. Kreye, J. Morgan Varner, Jeffrey M. Kane, Eric E. Knapp, Warren P. Reed

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Measuring radiant emissions from entire prescribed fires with ground, airborne, and satellite sensors - RxCADRE 2012

www.nrfirescience.org/resource/13855

Characterising radiation from wildland fires is an important focus of fire science because radiation relates directly to the combustion process and can be measured across a wide range of spatial extents and resolutions. As part of a more comprehensive set of measurements collected during the 2012 Prescribed Fire Combustion and...

Author(s): Matthew B. Dickinson, Andrew T. Hudak, Thomas J. Zajkowski, E. Louise Loudermilk, Wilfrid Schroeder, Luke Ellison, Robert L. Kremens, William Holley, Otto Martinez, Alexander Paxton, Benjamin C. Bright, Joseph J. O'Brien, Benjamin Hornsby, Charles Ichoku, Jason Faulring, Aaron Gerace, David L. Peterson, Joseph Mauceri

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

The Influence of fuel moisture and flammable monoterpenes on the combustibility of conifer fuels

www.nrfirescience.org/resource/15574

Bark beetle-caused tree mortality and its effect on both the fuels complex and potential fire behavior in affected forests, particularly lodgepole pine forests, has been a topic of much debate in recent years (Hicke et al. 2012; Jenkins et al. 2012; Black et al. 2013). Early research on the subject seemed to suggest a...

Author(s): Michael J. Jenkins, Justin B. Runyon, Martin E. Alexander, Wesley G. Page, Andrew Guinta

Year Published: 2016

Type: Document

Technical Report or White Paper

Autoignition of wood under combined convective and radiative heating

www.nrfirescience.org/resource/15781

Many wildland fire models assume radiation heat transfer controls fuel particle ignition. However, evidence suggests that radiation is insufficient to ignite the predominantly small, thin fuel particles in wildlands and that convective heating by flame contact is a critical component. Here, convective ignition was studied using an...

Author(s): Sara S. McAllister, Mark A. Finney

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Forest fuels and potential fire behaviour 12 years after variable-retention harvest in lodgepole pine

www.nrfirescience.org/resource/14346

Variable-retention harvesting in lodgepole pine offers an alternative to conventional, even-aged management. This harvesting technique promotes structural complexity and age-class diversity in residual stands and promotes resilience to disturbance. We examined fuel loads and potential fire behaviour 12 years after two modes of...

Author(s): Justin S. Croteau, Christopher R. Keyes, Elaine Kennedy Sutherland, David K. Wright, Joel M. Egan

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Development of high-resolution (250 m) historical daily gridded air temperature data using reanalysis and distributed sensor networks for the US Northern Rocky Mountains

www.nrfirescience.org/resource/15620

Gridded temperature data sets are typically produced at spatial resolutions that cannot fully resolve fine-scale variation in surface air temperature in regions of complex topography. These data limitations have become increasingly important as scientists and managers attempt to understand and plan for potential climate change...

Author(s): Zachary A. Holden, Alan Swanson, Anna E. Klene, John T. Abatzoglou, Solomon Z. Dobrowski, Samuel A. Cushman, John Squires, Gretchen Moisen, Jared W. Oyler

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Prior wildfires influence burn severity of subsequent fires

www.nrfirescience.org/resource/15306

With longer and more severe fire seasons predicted, the incidence and extent of fires are expected to increase in western North America. As more area is burned, past wildfires may influence the spread and burn severity of subsequent fires, with implications for ecosystem resilience and fire management. We examined how previous burn...

Author(s): Camille Stevens-Rumann, Susan J. Prichard, Eva K. Strand, Penelope Morgan

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Warning signals for eruptive events in spreading fires

www.nrfirescience.org/resource/13265

Spreading fires are noisy (and potentially chaotic) systems in which transitions in dynamics are

notoriously difficult to predict. As flames move through spatially heterogeneous environments, sudden shifts in temperature, wind, or topography can generate combustion instabilities, or trigger self-stabilizing feedback loops, that...

Author(s): Jerome M. Fox, George M. Whitesides

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Evaluating crown fire rate of spread predictions from physics-based models

www.nrfirescience.org/resource/13614

Modeling the behavior of crown fires is challenging due to the complex set of coupled processes that drive the characteristics of a spreading wildfire and the large range of spatial and temporal scales over which these processes occur. Detailed physics-based modeling approaches such as FIRETEC and the Wildland Urban Interface Fire...

Author(s): Chad M. Hoffman, J. Ziegler, Rodman Linn, William E. Mell, Carolyn Hull Sieg, F. Pimont

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Development of soil moisture drought index (SODI) to characterize droughts

www.nrfirescience.org/resource/15645

A new drought index termed the "soil moisture drought index (SODI)" is developed to characterize droughts. The premise of the index is based on how much water is required to attain soil moisture at field capacity. SODI captures variations of precipitation, temperature, and soil moisture over time. Three widely used drought...

Author(s): Mohammad Sohrabi, Jae H. Ryu, John T. Abatzoglou, John Tracy

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Experimental analysis of fire spread across a two-dimensional ridge under wind conditions

www.nrfirescience.org/resource/13382

Results from a laboratory-scale investigation of a fire spreading on the windward face of a triangular-section hill of variable shape with wind perpendicular to the ridgeline are reported. They confirm previous observations that the fire enlarges its lateral spread after reaching the ridgeline, entering the leeward face with a much...

Author(s): J. R. Raposo, S. Cabiddu, Domingos Xavier Viegas, M. Salis, J. Sharples

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Climate-induced variations in global wildfire danger from 1979 to 2013

www.nrfirescience.org/resource/15322

Climate strongly influences global wildfire activity, and recent wildfire surges may signal fire weather-induced pyrogeographic shifts. Here we use three daily global climate data sets and three fire danger indices to develop a simple annual metric of fire weather season length, and map spatio-temporal trends from 1979 to 2013. We...

Author(s): William Matt Jolly, Mark A. Cochrane, Patrick H. Freeborn, Zachary A. Holden, Timothy J. Brown, G.J. Williamson, David M. J. S. Bowman

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Future mega-fires and smoke impacts

www.nrfirescience.org/resource/15579

“Megafire” events, in which large high-intensity fires propagate over extended periods, can cause both immense damage to the local environment and catastrophic air quality impacts on cities and towns downwind. Increases in extreme events associated with climate change (e.g., droughts, heat waves) are projected to result in more...

Author(s): Narasimhan K. Larkin, John T. Abatzoglou, Donald McKenzie, Brian E. Potter, E. Ashley Steel, Brian J. Stocks

Year Published: 2015

Type: Document

Technical Report or White Paper

Implications of climate change on wind erosion of agricultural lands in the Columbia plateau

www.nrfirescience.org/resource/15642

Climate change may impact soil health and productivity as a result of accelerated or decelerated rates of erosion. Previous studies suggest a greater risk of wind erosion on arid and semi-arid lands due to loss of biomass under a future warmer climate. There have been no studies conducted to assess the impact of climate change on...

Author(s): B.S. Sharratt, J. Tatarko, John T. Abatzoglou, F.A. Fox, D. Huggins

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Wildland fire as a self-regulating mechanism: the role of previous burns and weather in limiting fire progression

www.nrfirescience.org/resource/12770

Theory suggests that natural fire regimes can result in landscapes that are both self-regulating and resilient to fire. For example, because fires consume fuel, they may create barriers to the spread of future fires, thereby regulating fire size. Top-down controls such as weather, however, can weaken this effect. While empirical...

Author(s): Sean A. Parks, Lisa M. Holsinger, Carol Miller, Cara R. Nelson

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Daily weather and other factors influencing burn severity in central Idaho and western Montana

www.nrfirescience.org/resource/15316

Burn severity as inferred from satellite-derived differenced Normalized Burn Ratio (dNBR) is useful for evaluating fire impacts on ecosystems but the environmental controls on burn severity across large forest fires are both poorly understood and likely to be different than those influencing fire extent. We related dNBR to...

Author(s): Donovan Birch, Penelope Morgan, Crystal A. Kolden, John T. Abatzoglou, Gregory K. Dillon, Andrew T. Hudak, Alistair M. S. Smith

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Biomass and fire dynamics in a temperate forest-grassland mosaic: Integrating multi-species

herbivory, climate, and fire with the FireBGCv2/GrazeBGC system

www.nrfirescience.org/resource/13195

Landscape fire succession models (LFSMs) predict spatially-explicit interactions between vegetation succession and disturbance, but these models have yet to fully integrate ungulate herbivory as a driver of their processes. We modified a complex LFSM, FireBGCv2, to include a multi-species herbivory module, GrazeBGC. The system is...

Author(s): Robert A. Riggs, Robert E. Keane, Norm Cimon, Rachel Cook, Lisa M. Holsinger, John Cook, Timothy DelCurto, Scott L. Baggett, Donald Justice, David Powell, Martin Vavra, Bridgett J. Naylor

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

A study of wildfire ignition by rifle bullets

www.nrfirescience.org/resource/15780

Experiments were conducted to examine the potential for rifle bullets to ignite organic matter after impacting a hard surface. The tests were performed using a variety of common cartridges (7.62 × 51 [.308 Winchester (The use of tradenames is provided for informational purposes only and does not constitute an endorsement by the U.S...

Author(s): Mark A. Finney, Sara S. McAllister, Trevor B. Maynard, Ian J. Grob

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Relationships between fire danger and the daily number and daily growth of active incidents burning in the Northern Rocky Mountains, USA

www.nrfirescience.org/resource/13170

Daily National Fire Danger Rating System (NFDRS) indices are typically associated with the number and final size of newly discovered fires, or averaged over time and associated with the likelihood and total burned area of large fires. Herein we used a decade (2003–12) of NFDRS indices and US Forest Service (USFS) fire reports to...

Author(s): Patrick H. Freeborn, Mark A. Cochrane, William Matt Jolly

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Deriving fundamental statistical shrub fuel models by laser scanning and combustion experimentation

www.nrfirescience.org/resource/15558

We exploited the measurement capacity of a terrestrial laser scanner to precisely characterize shrub fuel matrices in a laboratory setting, to abstract fuel elements for fire behavior modeling, and to identify strengths and limitations of TLS for these purposes. Simultaneously, we produced statistical distributions of combustion...

Author(s): Carl A. Seielstad, Thomas H. Fletcher, David R. Weise

Year Published: 2015

Type: Document

Technical Report or White Paper

A wildfire-relevant climatology of the convective environment of the United States

www.nrfirescience.org/resource/13270

Convective instability can influence the behaviour of large wildfires. Because wildfires modify the

temperature and moisture of air in their plumes, instability calculations using ambient conditions may not accurately represent convective potential for some fire plumes. This study used the North American Regional Reanalysis to...

Author(s): Brian E. Potter, Matthew A. Anaya

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Projected changes in snowfall extremes and interannual variability of snowfall in the western U.S.

www.nrfirescience.org/resource/15647

Projected warming will have significant impacts on snowfall accumulation and melt, with implications for water availability and management in snow-dominated regions. Changes in snowfall extremes are confounded by projected increases in precipitation extremes. Downscaled climate projections from 20 global climate models were bias-...

Author(s): A.C. Lute, John T. Abatzoglou, Katherine C. Hegewisch

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Strategic operations planning-it's not just for wilderness! How the strategic operations planner can help

www.nrfirescience.org/resource/14609

The Strategic Operational Planner (SOPL) wildland fire management position was created in the United States in 2009 to reflect updated terminology. SOPL merges the former Fire Use Manager positions (FUM1 and FUM2) and is now an established position within the Incident Command System. Traditionally, the FUM positions and the SOPL...

Author(s): Charles W. McHugh, Stu Hoyt, Brett Fay

Year Published: 2015

Type: Document

Technical Report or White Paper

Seasonal reversal of the influence of El Niño–Southern Oscillation on very large wildfire occurrence in the interior northwestern United States

www.nrfirescience.org/resource/15643

Satellite-mapped fire perimeters and the multivariate El Niño–Southern Oscillation index were used to examine the impact of concurrent El Niño–Southern Oscillation (ENSO) phase on very large fire (VLF) occurrences over the intermountain northwestern United States (U.S.) from 1984 to 2012. While the warm phase of ENSO promotes...

Author(s): Renaud Barbero, John T. Abatzoglou, Timothy J. Brown

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Role of buoyant flame dynamics in wildfire spread

www.nrfirescience.org/resource/13377

Large wildfires of increasing frequency and severity threaten local populations and natural resources and contribute carbon emissions into the earth-climate system. Although wildfires have been researched and modeled for decades, no verifiable physical theory of spread is available to form the basis for the precise predictions...

Author(s): Mark A. Finney, Jack D. Cohen, Jason M. Forthofer, Sara S. McAllister, Michael J. Gollner,

Daniel J. Gorham, Kozo Saito, Nelson K. Akafuah, Brittany A. Adam, Justin D. English
Year Published: 2015
Type: Document
Book or Chapter or Journal Article

Modeling study of the contribution of fire emissions on BC concentrations and deposition rates

www.nrfirescience.org/resource/15578

Regional air quality simulations were performed to evaluate the contributions of wildland fires to inter-annual variability of black carbon (BC) concentrations and to assess the contributions of wildfires vs. prescribed fires to BC concentrations and deposition rates to glacier areas and snow-covered surfaces in the western US....

Author(s): Serena H. Chung, Brian K. Lamb, Farren Herron-Thorpe, Rodrigo Gonzalez-Abraham, Vikram Ravi, Tsengel Nergui, Joseph K. Vaughan, Narasimhan K. Larkin, Tara Strand

Year Published: 2015

Type: Document

Technical Report or White Paper

The changing strength and nature of fire-climate relationships in the northern Rocky Mountains, U.S.A., 1902-2008

www.nrfirescience.org/resource/15636

Time-varying fire-climate relationships may represent an important component of fire-regime variability, relevant for understanding the controls of fire and projecting fire activity under global-change scenarios. We used time-varying statistical models to evaluate if and how fire-climate relationships varied from 1902-2008, in one...

Author(s): Philip E. Higuera, John T. Abatzoglou, Jeremy S. Littell, Penelope Morgan

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Fuel loads and simulated fire behavior in 'old-stage' beetle-infested ponderosa pine of the Colorado Plateau

www.nrfirescience.org/resource/14527

Recent bark beetle outbreaks in western North America have led to concerns regarding changes in fuel profiles and associated changes in fire behavior. Data are lacking for a range of infestation severities and time since outbreak, especially for relatively arid cover types. We surveyed fuel loads and simulated fire behavior for...

Author(s): E. Matthew Hansen, Morris C. Johnson, Barbara J. Bentz, A. Steven Munson

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

The potential impact of regional climate change on fire weather in the United States

www.nrfirescience.org/resource/13208

Climate change is expected to alter the frequency and severity of atmospheric conditions conducive for wildfires. In this study, we assess potential changes in fire weather conditions for the contiguous United States using the Haines Index (HI), a fire weather index that has been employed operationally to detect atmospheric...

Author(s): Ying Tang, Shiyuan Zhong, Lifeng Luo, Xindi Bian, Warren Heilman, Julie Winkler

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Limitations and utilisation of monitoring trends in burn severity products for assessing wildfire severity in the USA

www.nrfirescience.org/resource/15631

The Monitoring Trends in Burn Severity project is a comprehensive fire atlas for the United States that includes perimeters and severity data for all fires greater than a particular size (,400 ha in the western US, and,200 ha in the eastern US). Although the database was derived for management purposes, the scientific community has...

Author(s): Crystal A. Kolden, Alistair M. S. Smith, John T. Abatzoglou

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

High-resolution infrared thermography for capturing wildland fire behaviour: RxCADRE 2012

www.nrfirescience.org/resource/13175

Wildland fire radiant energy emission is one of the only measurements of combustion that can be made at wide spatial extents and high temporal and spatial resolutions. Furthermore, spatially and temporally explicit measurements are critical for making inferences about fire effects and useful for examining patterns of fire spread. In...

Author(s): Joseph J. O'Brien, E. Louise Loudermilk, Benjamin Hornsby, Andrew T. Hudak, Benjamin C. Bright, Matthew B. Dickinson, J. Kevin Hiers, Casey Teske, Roger D. Ottmar

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Verification of Spot Fire Weather Forecasts

www.nrfirescience.org/resource/15563

Software was developed to evaluate National Weather Service (NWS) spot forecasts. Fire management officials request spot forecasts from the NWS to provide detailed guidance as to atmospheric conditions in the vicinity of planned prescribed burns as well as wildfires that do not have incident meteorologists on site. A multi-year set...

Author(s): John D. Horel, Timothy J. Brown

Year Published: 2015

Type: Document

Technical Report or White Paper

Modeling spatial and temporal dynamics of wind flow and potential fire behavior following a mountain pine beetle outbreak in a lodgepole pine forest

www.nrfirescience.org/resource/13298

Patches of live, dead, and dying trees resulting from bark beetle-caused mortality alter spatial and temporal variability in the canopy and surface fuel complex through changes in the foliar moisture content of attacked trees and through the redistribution of canopy fuels. The resulting heterogeneous fuels complexes alter within-...

Author(s): Chad M. Hoffman, Rodman Linn, Russell A. Parsons, Carolyn Hull Sieg, Judith Winterkamp

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Forecasting integrated lightning and fuels ignition potentials in a system with real-time analysis of fire weather prediction accuracy

www.nrfirescience.org/resource/15557

Weather forecasts can help identify environmental conditions conducive to prescribed burning or to increased fire danger. These conditions are important components of fire management tools such as fire ignition potential maps, fire danger rating systems, fire behavior predictions, and smoke dispersion modeling. Fire managers use...

Author(s): Miriam L. Rorig, Stacy Drury

Year Published: 2015

Type: Document

Technical Report or White Paper

Extent of the rain-snow transition zone in the western U.S. under historic and projected climate

www.nrfirescience.org/resource/15660

This study investigates the extent of the rain-snow transition zone across the complex terrain of the western United States for both late 20th century climate and projected changes in climate by the mid-21st century. Observed and projected temperature and precipitation data at 4 km resolution were used with an empirical...

Author(s): P. Zion Klos, Timothy E. Link, John T. Abatzoglou

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Observed and projected changes in absolute temperature extremes across the contiguous United States

www.nrfirescience.org/resource/15657

Changes in the extent of absolute, all-time, daily temperature records across the contiguous United States were examined using observations and climate model simulations. Observations from station data and reanalysis from 1980 to 2013 show increased extent of absolute highest temperature records and decreased extent of absolute...

Author(s): John T. Abatzoglou, Renaud Barbero

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Is proportion burned severely related to daily area burned?

www.nrfirescience.org/resource/13018

The ecological effects of forest fires burning with high severity are long-lived and have the greatest impact on vegetation successional trajectories, as compared to low-to-moderate severity fires. The primary drivers of high severity fire are unclear, but it has been hypothesized that wind-driven, large fire-growth days play a...

Author(s): Donovan Birch, Penelope Morgan, Crystal A. Kolden, Andrew T. Hudak, Alistair M. S. Smith

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Questionable evidence of natural warming of the northwestern United States

www.nrfirescience.org/resource/15655

Johnstone and Mantua (1) claim that changes in atmospheric circulation were the primary cause of the observed warming of sea surface temperature around the northeastern Pacific margins and surface air temperature (SAT) in Northern California, Oregon, and Washington from 1901 to 2012. The results of Johnstone and Mantua's report...

Author(s): John T. Abatzoglou, David E. Rupp, Philip W. Mote

Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Regional projections of the likelihood of very large wildland fires under a changing climate in the contiguous western United States

www.nrfirescience.org/resource/13006

Seasonal changes in the climatic potential for very large wildfires (VLWF > or = 50,000 ac ~20,234 ha) across the western contiguous United States are projected over the 21st century using generalized linear models and downscaled climate projections for two representative concentration pathways (RCPs). Significant ($p < 0.05$)...

Author(s): E. Natasha Stavros, John T. Abatzoglou, Donald McKenzie, Narasimhan K. Larkin

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Tables for estimating canopy fuel characteristics from stand variables in four interior west conifer forest types

www.nrfirescience.org/resource/12975

Tables have been constructed for use in making quick estimates of canopy base height, canopy fuel load, and canopy bulk density from visual observations or field measurements of stand height, basal area, and stand density for pure stands of ponderosa pine (*Pinus ponderosa* Dougl. ex Laws.), lodgepole pine (*Pinus contorta* Dougl. ex...)

Author(s): Martin E. Alexander, Miguel G. Cruz

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

De-coupling seasonal changes in water content and dry matter to predict live conifer foliar moisture content

www.nrfirescience.org/resource/12959

Live foliar moisture content (LFMC) significantly influences wildland fire behaviour. However, characterising variations in LFMC is difficult because both foliar mass and dry mass can change throughout the season. Here we quantify the seasonal changes in both plant water status and dry matter partitioning. We collected new and old...

Author(s): William Matt Jolly, Ann M. Hadlow, Kathleen Huguet

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Challenges of assessing fire and burn severity using field measures, remote sensing and modeling

www.nrfirescience.org/resource/15319

Comprehensive assessment of ecological change after fires have burned forests and rangelands is important if we are to understand, predict and measure fire effects. We highlight the challenges in effective assessment of fire and burn severity in the field and using both remote sensing and simulation models. We draw on diverse recent...

Author(s): Penelope Morgan, Robert E. Keane, Gregory K. Dillon, Theresa B. Jain, Andrew T. Hudak, Eva C. Karau, Pamela G. Sikkink, Zachary A. Holden, Eva K. Strand

Year Published: 2014

Type: Document

Impacts of mega-fires on large U.S. urban area air quality under changing climate and fuels

www.nrfirescience.org/resource/15569

Mega-fires can adversely impact air quality in the United States and the impacts are likely to become more serious in the future due to the possibility of more frequent and intense mega-fires in response to the projected climate change. This study investigated U.S. mega-fires and fuel conditions and their environmental impacts under...

Author(s): Yongqiang Liu, Scott L. Goodrick, John A. Stanturf, Hanqin Tian

Year Published: 2014

Type: Document

Technical Report or White Paper

Seasonal climate variability and change in the Pacific Northwest of the United States

www.nrfirescience.org/resource/15671

Observed changes in climate of the U.S. Pacific Northwest since the early twentieth century were examined using four different datasets. Annual mean temperature increased by approximately 0.6°–0.8°C from 1901 to 2012, with corroborating indicators including a lengthened freeze-free season, increased temperature of the coldest...

Author(s): John T. Abatzoglou, David E. Rupp, Philip W. Mote

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

The effects of previous wildfires on subsequent wildfire behavior and post-wildfire recovery

www.nrfirescience.org/resource/12650

Over the past several decades, size and extent of wildfires have been increasing in the western United States (Westerling et al. 2006; Littell et al. 2009). As the number and size of recent wildfires increases across landscapes, fire managers are questioning how past wildfires may influence the spread and effects of subsequent...

Author(s): Camille Stevens-Rumann, Susan J. Prichard, Penelope Morgan

Year Published: 2014

Type: Document

Synthesis

Role of extreme snowfall events in interannual variability of snowfall accumulation in the western United States

www.nrfirescience.org/resource/15661

Water resources in the western United States are contingent on interannual variations in snow-pack. Interannual snowpack variability has been attributed to large-scale climate patterns including the El Niño ~ no-Southern Oscillation (ENSO), however, the contribution of snowfall frequency and extreme snowfall events to this...

Author(s): A.C. Lute, John T. Abatzoglou

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Tracking interannual streamflow variability with drought indices in the U.S. Pacific Northwest

www.nrfirescience.org/resource/15659

Drought indices are often used for monitoring interannual variability in macroscale hydrology. However,

the diversity of drought indices raises several issues: 1) which indices perform best and where; 2) does the incorporation of potential evapotranspiration (PET) in indices strengthen relationships, and how sensitive is the choice...

Author(s): John T. Abatzoglou, Renaud Barbero, Jacob W. Wolf, Zachary A. Holden

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Interactions among the mountain pine beetle, fires, and fuels

www.nrfirescience.org/resource/12022

Bark beetle outbreaks and wildfires are principal drivers of change in western North American forests, and both have increased in severity and extent in recent years. These two agents of disturbance interact in complex ways to shape forest structure and composition. For example, mountain pine beetle, *Dendroctonus ponderosae* Hopkins...

Author(s): Michael J. Jenkins, Justin B. Runyon, Christopher J. Fettig, Wesley G. Page, Barbara J. Bentz

Year Published: 2014

Type: Document

Book or Chapter or Journal Article, Synthesis

Fire behavior in masticated fuels: a review

www.nrfirescience.org/resource/12387

Mastication is an increasingly common fuels treatment that redistributes 'ladder' fuels to the forest floor to reduce vertical fuel continuity, crown fire potential, and fireline intensity, but fuel models do not exist for predicting fire behavior in these fuel types. Recent fires burning in masticated fuels have behaved in...

Author(s): Jesse K. Kreye, Nolan W. Brewer, Penelope Morgan, J. Morgan Varner, Alistair M. S. Smith, Chad M. Hoffman, Roger D. Ottmar

Year Published: 2014

Type: Document

Book or Chapter or Journal Article, Synthesis

Modeling very large-fire occurrences over the continental United States from weather and climate forcing

www.nrfirescience.org/resource/15656

Very large-fires (VLFs) have widespread impacts on ecosystems, air quality, fire suppression resources, and in many regions account for a majority of total area burned. Empirical generalized linear models of the largest fires (>5000 ha) across the contiguous United States (US) were developed at 60 km spatial and weekly...

Author(s): Renaud Barbero, John T. Abatzoglou, E. Ashley Steel, Narasimhan K. Larkin

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Climate and very large wildland fires in the contiguous western USA

www.nrfirescience.org/resource/13009

Very large wildfires can cause significant economic and environmental damage, including destruction of homes, adverse air quality, firefighting costs and even loss of life. We examine how climate is associated with very large wildland fires (VLWFs > or =50,000 acres, or ~20,234 ha) in the western contiguous USA. We used composite...

Author(s): E. Natasha Stavros, John T. Abatzoglou, Narasimhan K. Larkin, Donald McKenzie, E. Ashley

Steel
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

Post-epidemic fire risk and behavior

www.nrfirescience.org/resource/13708

Citizens, government officials, and natural resource managers are greatly concerned about potential impacts of the mountain pine beetle (MPB) epidemic on fire hazards and risk. Some mountain towns are surrounded by dead and dying trees. In the Rocky Mountain Region of the Forest Service, the MPB epidemic threatens over 250,000 acres...

Author(s): Russell A. Parsons, William Matt Jolly, Paul G. Langowski, Megan Matonis, I. Sue Miller

Year Published: 2014

Type: Document

Conference Proceedings

Spectroscopic analysis of seasonal changes in live fuel moisture content and leaf dry mass

www.nrfirescience.org/resource/13001

Live fuel moisture content (LFMC), the ratio of water mass to dry mass contained in live plant material, is an important fuel property for determining fire danger and for modeling fire behavior. Remote sensing estimation of LFMC often relies on an assumption of changing water and stable dry mass over time.

Fundamental understanding...

Author(s): Yi Qi, Philip E. Dennison, William Matt Jolly, Rachel C. Kropp, Simon C. Brewer

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Future Forests Webinar Series, webinar proceedings and summary: ongoing research and management responses to the mountain pine beetle outbreak

www.nrfirescience.org/resource/12963

The Future Forest Webinar Series facilitated dialogue between scientists and managers about the challenges and opportunities created by the mountain pine beetle (MPB) epidemic. The series consisted of six webinars facilitated by the USFS Rocky Mountain Research Station, the Northern and Rocky Mountain Regions, and the Colorado Forest...

Year Published: 2014

Type: Document

Conference Proceedings

40 years of wilderness fire in the Selway-Bitterroot and Frank Church-River of No Return

www.nrfirescience.org/resource/12777

Wilderness fire, its history, challenges, teachings, and future management were the focus of discussions and presentations during the 40 Years of Wilderness Fire in the Selway-Bitterroot field trip at the May 2014 Large Wildland Fires Conference. The trip took participants to observe recent fire patterns in the region between the...

Author(s): Corey L. Gucker

Year Published: 2014

Type: Document

Research Brief or Fact Sheet

Crown fire potential in lodgepole pine forests during the red stage of mountain pine beetle

attack

www.nrfirescience.org/resource/12926

Mountain pine beetle (MPB) outbreaks within the previous 10-15 years have affected millions of hectares of lodgepole pine forests in western North America. Concerns about the influence of recent tree mortality on changes in fire behaviour amongst firefighters and fire managers have led researchers to attempt to quantify the effects...

Author(s): Wesley G. Page, Michael J. Jenkins, Martin E. Alexander

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Representation and evaluation of wildfire propagation simulations

www.nrfirescience.org/resource/12390

This paper provides a formal mathematical representation of a wildfire simulation, reviews the most common scoring methods using this formalism, and proposes new methods that are explicitly designed to evaluate a forest fire simulation from ignition to extinction. These scoring or agreement methods are tested with synthetic cases in...

Author(s): Jean-Baptiste Filippi, Vivien Mallet, Bahaa Nader

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Observed changes in false springs over the contiguous United States

www.nrfirescience.org/resource/15668

Climate warming fosters an earlier spring green-up that may bring potential benefits to agricultural systems. However, advances in green-up timing may leave early stage vegetation growth vulnerable to cold damage when hard freezes follow green-up resulting in a false spring. Spatiotemporal patterns of green-up dates, last spring...

Author(s): Alexander G. Peterson, John T. Abatzoglou

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Criteria and methodology for evaluating aerial wildfire suppression

www.nrfirescience.org/resource/12414

Aircraft are often used to drop suppressants and retardants to assist wildfire containment. Drop effectiveness has rarely been measured due to the difficulties in collecting data from wildfires and running field experiments and the absence of definitions and measures. This paper presents a set of criteria and methodologies for...

Author(s): Matt P. Plucinski, Elsa Pastor

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Fire behaviour case study of two early winter grass fires in southern Alberta, 27 November 2011

www.nrfirescience.org/resource/11995

On November 27, 2011, two wildfires - the Lethbridge Fire and the Milk River Ridge Fire - starting within approximately an hour of each other, advanced in a north-easterly direction some 12 km and 32 km, respectively, from their point of origin in a relatively short period of time. Fortunately, no lives were lost. However, a few...

Author(s): Martin E. Alexander, Mark J. Heathcott, Randall L. Schwanke

Year Published: 2013
Type: Document
Technical Report or White Paper

Flame descriptors

www.nrfirescience.org/resource/12396

The following three descriptors are used to characterize flaming combustion: 1) Flame height is the vertical distance from the base to the tip of the flames. 2) Flame length is the actual length of the flames from the tip to the midpoint of the flame footprint. Under no-wind conditions on flat ground, flame length equals flame...

Author(s): Dale D. Wade
Year Published: 2013
Type: Document
Research Brief or Fact Sheet

Crown fire behavior characteristics and prediction in conifer forests: a state-of-knowledge synthesis - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/12447

Joint Fire Science Program (JFSP) project 09-S-03-1 was undertaken in response to JFSP Project Announcement No. FA-RFA09-0002 with respect to a synthesis on extreme fire behavior or more specifically a review and analysis of the literature dealing with certain features of crown fire behavior in conifer forests in the United States...

Author(s): Martin E. Alexander, Miguel G. Cruz, Nicole M. Vaillant, David L. Peterson
Year Published: 2013
Type: Document
Synthesis, Technical Report or White Paper

Compartmentalization of pathogens in fire-injured trees

www.nrfirescience.org/resource/12007

Wildland fire is an episodic process that greatly influences the composition, structure, and developmental sequence of forests. Most news reports of wildland fire involves blazes fueled by slash, standing dead stems, and snags that reach into tree crowns and burn deeply into the forest floor, causing extensive tree mortality and the...

Author(s): Kevin T. Smith
Year Published: 2013
Type: Document
Conference Proceedings

A study of flame spread in engineered cardboard fuelbeds: part II: scaling law approach

www.nrfirescience.org/resource/12419

In this second part of a two part exploration of dynamic behavior observed in wildland fires, time scales differentiating convective and radiative heat transfer is further explored. Scaling laws for the two different types of heat transfer considered: Radiation-driven fire spread, and convection-driven fire spread, which can both...

Author(s): Brittany A. Adam, Nelson K. Akafuah, Mark A. Finney, Jason M. Forthofer, Kozo Saito
Year Published: 2013
Type: Document
Conference Proceedings

Surface fire intensity influences simulated crown fire behavior in lodgepole pine forests with

recent mountain pine beetle-caused tree mortality

www.nrfirescience.org/resource/12138

Recent bark beetle outbreaks have had a significant impact on forests throughout western North America and have generated concerns about interactions and feedbacks between beetle attacks and fire. However, research has been hindered by a lack of experimental studies and the use of fire behavior models incapable of accounting for the...

Author(s): Chad M. Hoffman, Penelope Morgan, William E. Mell, Russell A. Parsons, Eva K. Strand, Stephen Cook

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Are the applications of wildland fire behaviour models getting ahead of their evaluation again?

www.nrfirescience.org/resource/12417

Evaluation is a crucial component for model credibility and acceptance by researchers and resource managers. The nature and characteristics of free-burning wildland fires pose challenges to acquiring the kind of quality data necessary for adequate fire behavior model evaluation. As a result, in some circles it has led to a research...

Author(s): Martin E. Alexander, Miguel G. Cruz

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

The climate velocity of the contiguous United States during the 20th century

www.nrfirescience.org/resource/15681

Rapid climate change has the potential to affect economic, social, and biological systems. A concern for species conservation is whether or not the rate of on-going climate change will exceed the rate at which species can adapt or move to suitable environments. Here we assess the climate velocity (both climate displacement rate and...

Author(s): Solomon Z. Dobrowski, John T. Abatzoglou, Alan Swanson, Jonathan A. Greenberg, Alison R. Mynsberge, Zachary A. Holden, Michael K. Schwartz

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Optimising fuel treatments over time and space

www.nrfirescience.org/resource/12039

Fuel treatments have been widely used as a tool to reduce catastrophic wildland fire risks in many forests around the world. However, it is a challenging task for forest managers to prioritise where, when, and how to implement fuel treatments across a large forest landscape. In this study, an optimisation model was developed for...

Author(s): Woodam Chung, J. Greg Jones, Kurt Krueger, Jody Bramel, Marco A. Contreras

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Characterizing wildfire hazard and risk in mountain pine beetle-affected stands and how to identify those characteristics at the landscape-scale

www.nrfirescience.org/resource/11977

The transformation of fuels resulting from the mountain pine beetle epidemic is unprecedented in its large geographic extent and the rapid pace of the transformation. This paper describes a proposed fire

risk and hazard characterization system, as well as methodology for locating certain stand types on the landscape.

Author(s): Robert W. Gray

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Combustibility of a mixture of live and dead fuel components

www.nrfirescience.org/resource/12427

The problem of predicting the rate of spread of a linear fire front in a fuel bed composed of one live and one dead fuel component in no-slope and no-wind conditions is addressed. Two linear models based on the mass fraction of each fuel component are proposed to predict the rate of spread of a fire front as a function of the mass...

Author(s): Domingos Xavier Viegas, J. Soares, Miguel Almeida

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Evaluation of CMIP5 20th century climate simulations for the Pacific Northwest USA

www.nrfirescience.org/resource/15675

Monthly temperature and precipitation data from 41 global climate models (GCMs) of the Coupled Model Intercomparison Project Phase 5 (CMIP5) were compared to observations for the 20th century, with a focus on the United States Pacific Northwest (PNW) and surrounding region. A suite of statistics, or metrics, was calculated, that...

Author(s): David E. Rupp, John T. Abatzoglou, Katherine C. Hegewisch, Philip W. Mote

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Modelling conditional burn probability patterns for large wildland fires

www.nrfirescience.org/resource/12005

We present a technique for modelling conditional burn probability patterns in two dimensions for large wildland fires. The intended use for the model is strategic program planning when information about future fire weather and event durations is unavailable and estimates of the average probabilistic shape and extent of large fires...

Author(s): Pamela S. Ziesler, Douglas B. Rideout, Robin Reich

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Fire weather case study - Mann Gulch Fire, Montana

www.nrfirescience.org/resource/11976

The intent of this report is to analyze weather conditions to determine if a 'critical fire weather pattern' also contributed to the 'blowup.'

Author(s): Paul A. Werth

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Fuel Characteristic Classification System version 3.0: technical documentation

www.nrfirescience.org/resource/12407

The Fuel Characteristic Classification System (FCCS) is a software module that records wildland fuel characteristics and calculates potential fire behavior and hazard potentials based on input environmental variables. The FCCS 3.0 is housed within the Integrated Fuels Treatment Decision Support System (Joint Fire Science Program...

Author(s): Susan J. Prichard, David V. Sandberg, Roger D. Ottmar, Ellen Eberhardt, Anne Andreu, Paige C. Eagle, Kjell Swedin

Year Published: 2013

Type: Document

Technical Report or White Paper

Relationships between climate and macroscale area burned in the western United States

www.nrfirescience.org/resource/12027

Increased wildfire activity (e.g. number of starts, area burned, fire behaviour) across the western United States in recent decades has heightened interest in resolving climate-fire relationships. Macroscale climate-fire relationships were examined in forested and non-forested lands for eight Geographic Area Coordination Centers in...

Author(s): John T. Abatzoglou, Crystal A. Kolden

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Progress in understanding bark beetle effects on fire behavior using physics-based models

www.nrfirescience.org/resource/13297

Bark beetle outbreaks are a major disturbance of forests throughout western North America affecting ecological processes and social and economic values (Amman 1977, Bond and Keeley 2005). Since the 1990s, bark beetle outbreaks have affected between 1.1 and 13.5 million acres in the western United States and an additional 13.5...

Author(s): Chad M. Hoffman, Carolyn Hull Sieg, Penelope Morgan, William E. Mell, Rodman Linn, Camille Stevens-Rumann, Joel D. McMillin, Russell A. Parsons, Helen Maffei

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Uncertainty associated with model predictions of surface and crown fire rates of spread

www.nrfirescience.org/resource/12418

The degree of accuracy in model predictions of rate of spread in wildland fires is dependent on the model's applicability to a given situation, the validity of the model's relationships, and the reliability of the model input data. On the basis of a compilation of 49 fire spread model evaluation datasets involving 1278 observations...

Author(s): Miguel G. Cruz, Martin E. Alexander

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Developing a computerized approach for optimizing individual tree removal to efficiently reduce crown fire potential

www.nrfirescience.org/resource/11889

Thinning is a common silvicultural treatment being widely used to restore different types of overstocked forest stands in western U.S. because of its effect on changing fire behavior. Typically, thinning is applied at the stand level using prescriptions derived from sample plots that ignore variability in tree

sizes and location...

Author(s): Marco A. Contreras, Woodam Chung

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Backfire technique for prescribed burning

www.nrfirescience.org/resource/12400

The term 'backfire' refers to a commonly used method for prescribed burning in which the igniter sets a line of fire that slowly backs into the wind. This technique should not be confused with the colloquial use of the term 'backfire' for 'suppression fire,' which refers to any fire set ahead of a wildfire in an attempt to stop it.

Author(s): Dale D. Wade

Year Published: 2013

Type: Document

Research Brief or Fact Sheet

Wildland fire emissions, carbon, and climate: modeling fuel consumption

www.nrfirescience.org/resource/12442

Fuel consumption specifies the amount of vegetative biomass consumed during wildland fire. It is a two-stage process of pyrolysis and combustion that occurs simultaneously and at different rates depending on the characteristics and condition of the fuel, weather, topography, and in the case of prescribed fire, ignition rate and...

Author(s): Roger D. Ottmar

Year Published: 2013

Type: Document

Book or Chapter or Journal Article, Synthesis

Fire behaviour case study of two early winter grass fires in southern Alberta, 27 November 2011

www.nrfirescience.org/resource/15591

On November 27, 2011, two wildfires - the Lethbridge Fire and the Milk River Ridge Fire - starting within approximately an hour of each other, advanced in a north-easterly direction some 12 km and 32 km, respectively, from their point of origin in a relatively short period of time. Fortunately, no lives were lost. However, a few...

Author(s): Martin E. Alexander, Mark J. Heathcott, Randall L. Schwanke

Year Published: 2013

Type: Document

Technical Report or White Paper

Modeled forest inventory data suggest climate benefits from fuels management

www.nrfirescience.org/resource/13480

As part of a recent synthesis addressing fuel management in dry, mixed-conifer forests, we analyzed more than 5,000 Forest Inventory and Analysis (FIA) plots, a probability sample that represents 33 million acres of these forests throughout Washington, Oregon, Idaho, Montana, Utah, and extreme northern California. We relied on the...

Author(s): Jeremy S. Fried, Theresa B. Jain, Jonathan Sandquist

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Models for predicting fuel consumption in sagebrush-dominated ecosystems

www.nrfirescience.org/resource/11978

Fuel consumption predictions are necessary to accurately estimate or model fire effects, including pollutant emissions during wildland fires. Fuel and environmental measurements on a series of operational prescribed fires were used to develop empirical models for predicting fuel consumption in big sagebrush (*Artemisia tridentata*...

Author(s): Clinton S. Wright

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Angular variation of fire rate of spread

www.nrfirescience.org/resource/12428

Laboratory fire tests were performed in still air, for variable inclinations (10° , 15°) and fuel bed dimensions (1.28×2.50 - 3.0×4.6 m²), with homogeneous fuel beds of pine needles and pine wood excelsior. The fire ignition was made at a point, along a closed line with no fuel inside and along a straight edge of the fuel bed...

Author(s): Jorge C. S. Andre, Joao C. Goncalves, Gilberto C. Vaz, Domingos Xavier Viegas

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Development of gridded surface meteorological data for ecological applications and modeling

www.nrfirescience.org/resource/15682

Landscape-scale ecological modelling has been hindered by suitable high-resolution surface meteorological datasets. To overcome these limitations, desirable spatial attributes of gridded climate data are combined with desirable temporal attributes of regional-scale reanalysis and daily gauge-based precipitation to derive a spatially...

Author(s): John T. Abatzoglou

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Introduced annual grass increases regional fire activity across the arid western USA (1980-2009)

www.nrfirescience.org/resource/12110

Non-native, invasive grasses have been linked to altered grass-fire cycles worldwide. Although a few studies have quantified resulting changes in fire activity at local scales, and many have speculated about larger scales, regional alterations to fire regimes remain poorly documented. We assessed the influence of large-scale *Bromus*...

Author(s): Jennifer Balch, Bethany A. Bradley, Carla M. D'Antonio, Jose Gomez-Dans

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Capturing fire: RxCADRE takes fire measurements to whole new level

www.nrfirescience.org/resource/12425

Models of fire behavior and effects do not always make accurate predictions, and there is not enough systematically gathered data to validate them. To help advance fire behavior and fire effects model development, the Joint Fire Science Program is helping fund the RxCADRE, which is made up of scientists from the U.S. Forest Service...

Author(s): Gail Wells

Year Published: 2013
Type: Document
Research Brief or Fact Sheet

Drought seasonality explains patterns in widespread aspen forest mortality across the western United States

www.nrfirescience.org/resource/15679

Globally documented widespread drought-induced forest mortality has important ramifications for plant community structure, ecosystem function, and the ecosystem services provided by forests. Yet the characteristics of drought seasonality, severity, and duration that trigger mortality events have received little attention despite...

Author(s): Leander Anderegg, William R.L. Anderegg, John T. Abatzoglou, Alexandra M. Hausladen, Joseph A. Berry

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Current status and future needs of the BehavePlus Fire Modeling System

www.nrfirescience.org/resource/12392

The BehavePlus Fire Modeling System is among the most widely used systems for wildland fire prediction. It is designed for use in a range of tasks including wildfire behaviour prediction, prescribed fire planning, fire investigation, fuel hazard assessment, fire model understanding, communication and research. BehavePlus is based on...

Author(s): Patricia L. Andrews

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

The missing mountain water: slower westerlies decrease orographic enhancement in the Pacific Northwest USA

www.nrfirescience.org/resource/15674

Trends in streamflow timing and volume in the Pacific Northwest United States have been attributed to increased temperatures, because trends in precipitation at lower-elevation stations were negligible. We demonstrate that observed streamflow declines are probably associated with declines in mountain precipitation, revealing...

Author(s): Charles H. Luce, John T. Abatzoglou, Zachary A. Holden

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Evaluating the performance and mapping of three fuel classification systems using Forest Inventory and Analysis surface fuel measurements

www.nrfirescience.org/resource/12015

Fuel Loading Models (FLMs) and Fuel Characteristic Classification System (FCCSs) fuelbeds are used throughout wildland fire science and management to simplify fuel inputs into fire behavior and effects models, but they have yet to be thoroughly evaluated with field data. In this study, we used a large dataset of Forest Inventory and...

Author(s): Robert E. Keane, Jason M. Herynk, Chris Toney, Shawn P. Urbanski, Duncan C. Lutes, Roger D. Ottmar

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Wilderness shapes contemporary fire size distributions across landscapes of the western United States

www.nrfirescience.org/resource/12682

In many U.S. federally designated wilderness areas, wildfires are likely to burn of their own accord due to favorable management policies and remote location. Previous research suggested that limitations on fire size can result from the evolution of natural fire regimes, specifically in places where fuels were...

Author(s): Sandra L. Haire, Kevin McGarigal, Carol Miller

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

The relationship of large fire occurrence with drought and fire danger indices in the western USA, 1984-2008: the role of temporal scale

www.nrfirescience.org/resource/12025

The relationship between large fire occurrence and drought has important implications for fire prediction under current and future climates. This study's primary objective was to evaluate correlations between drought and fire-danger-rating indices representing short- and long-term drought, to determine which had the strongest...

Author(s): Karen L. Riley, John T. Abatzoglou, Isaac C. Grenfell, Anna E. Klene, Faith A. Heinsch

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Effects of bark beetle-caused tree mortality on wildfire

www.nrfirescience.org/resource/13294

Millions of trees killed by bark beetles in western North America have raised concerns about subsequent wildfire, but studies have reported a range of conclusions, often seemingly contradictory, about effects on fuels and wildfire. In this study, we reviewed and synthesized the published literature on modifications to fuels and fire...

Author(s): Jeffrey A. Hicke, Morris C. Johnson, Jane L. Hayes, Haiganoush K. Preisler

Year Published: 2012

Type: Document

Book or Chapter or Journal Article, Synthesis

Evaluating regression model estimates of canopy fuel stratum characteristics in four crown fire-prone fuel types in western North America

www.nrfirescience.org/resource/8312

Two evaluations were undertaken of the regression equations developed by M. Cruz, M. Alexander and R. Wakimoto (2003, International Journal of Wildland Fire 12, 39-50) for estimating canopy fuel stratum characteristics from stand structure variables for four broad coniferous forest fuel types found in western North America. The...

Author(s): Miguel G. Cruz, Martin E. Alexander

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Spatial bottom-up controls on fire likelihood vary across western North America

www.nrfirescience.org/resource/8311

The unique nature of landscapes has challenged our ability to make generalizations about the effects of bottom-up controls on fire regimes. For four geographically distinct fire-prone landscapes in western North America, we used a consistent simulation approach to quantify the influence of three key bottom-up factors, ignitions,...

Author(s): Sean A. Parks, Marc-Andre Parisien, Carol Miller

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Modeling tree-level fuel connectivity to evaluate the effectiveness of thinning treatments for reducing crown fire potential

www.nrfirescience.org/resource/8295

Land managers have been using fire behavior and simulation models to assist in several fire management tasks. These widely-used models use average attributes to make stand-level predictions without considering spatial variability of fuels within a stand. Consequently, as the existing models have limitations in adequately modeling...

Author(s): Marco A. Contreras, Russell A. Parsons, Woodam Chung

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Bark beetles and fire: two forces of nature transforming western forests

www.nrfirescience.org/resource/11984

Bark beetles are chewing a wide swath through forests across North America. Over the past few years, infestations have become epidemic in lodgepole and spruce-fir forests of the Intermountain West. The resulting extensive acreages of dead trees are alarming the public and raising concern about risk of severe fire. Researchers...

Author(s): Gail Wells

Year Published: 2012

Type: Document

Research Brief or Fact Sheet

Climate and vegetation influences on fire impacts in Alaskan boreal forest: implications for carbon and fire management

www.nrfirescience.org/resource/15688

Boreal forest fires are an important source of terrestrial carbon emissions, particularly during years of widespread wildfires. Most carbon emission models parameterize wildfire impacts and carbon flux to area burned by fires, therein making the assumption that fires consume a spatiotemporally homogeneous landscape composed of...

Author(s): Crystal A. Kolden, John T. Abatzoglou

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Numerical simulation of crown fire hazard immediately after bark beetle-caused mortality in lodgepole pine forests

www.nrfirescience.org/resource/8325

Quantifying the effects of mountain pine beetle (MPB)-caused tree mortality on potential crown fire hazard has been challenging partly because of limitations in current operational fire behavior models. Such models are not capable of accounting for fuel heterogeneity resulting from an outbreak. Further, the coupled interactions...

Author(s): Chad M. Hoffman, Penelope Morgan, William E. Mell, Russell A. Parsons, Eva K. Strand, Stephen Cook
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Climate extremes and their linkage to regional drought over Idaho, USA

www.nrfirescience.org/resource/15683

To investigate consequences of climate extreme and variability on agriculture and regional water resource, twenty-seven climatic indices of temperature and precipitation over Idaho, USA, were computed. Precipitation, mean temperature and maximum temperature, self-calibrated Palmer Drought Index and Standardized Precipitation Index...

Author(s): Mohammad Sohrabi, Jae H. Ryu, John T. Abatzoglou, John Tracy
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Do mountain pine beetle outbreaks change the probability of active crown fire in lodgepole pine forests? Comment 1 & 2, Reply 1

www.nrfirescience.org/resource/13342

Comment 1 - Simard et al. (2011) have produced a comprehensive data set and analysis concerning mountain pine beetle (MPB; *Dendroctonus ponderosae*)-caused mortality and associated crown fire feedbacks in lodgepole pine (*Pinus contorta*)-dominated forests. Misapplication of the NEXUS fire modeling system (Scott and...

Author(s): Christopher J. Moran, Mark A. Cochrane, William Matt Jolly, Russell A. Parsons, J. Morgan Varner, Bret W. Butler, Kevin C. Ryan, Corey L. Gucker, Martin Simard, William H. Romme, Monica G. Turner
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Properties affecting the consumption of sound and rotten coarse woody debris in northern Idaho: a preliminary investigation using laboratory fires

www.nrfirescience.org/resource/8333

This study evaluates the consumption of coarse woody debris in various states of decay. Samples from a northern Idaho mixed-conifer forest were classified using three different classification methods, ignited with two different ignition methods and consumption was recorded. Intrinsic properties that change with decay were measured...

Author(s): Joshua C. Hyde, Alistair M. S. Smith, Roger D. Ottmar
Year Published: 2012
Type: Document
Book or Chapter or Journal Article

Towards the understanding of extreme wildland fire behavior

www.nrfirescience.org/resource/11092

The author presents a brief discussion of the changing face of extreme fire behavior and an introduction to Synthesis of knowledge of extreme fire behavior: volume I for fire managers.

Author(s): Martin E. Alexander
Year Published: 2012
Type: Document
Research Brief or Fact Sheet

Wildland fire in ecosystems: effects of fire on cultural resources and archaeology

www.nrfirescience.org/resource/141

This state-of-knowledge review provides a synthesis of the effects of fire on cultural resources, which can be used by fire managers, cultural resource (CR) specialists, and archaeologists to more effectively manage wildland vegetation, fuels, and fire. The goal of the volume is twofold: (1) to provide cultural resource/...

Year Published: 2012

Type: Document

Synthesis

Fuels and fire behavior dynamics in bark beetle-attacked forests in Western North America and implications for fire management

www.nrfirescience.org/resource/8320

Declining forest health attributed to associations between extensive bark beetle-caused tree mortality, accumulations of hazardous fuels, wildfire, and climate change have catalyzed changes in forest health and wildfire protection policies of land management agencies. These changes subsequently prompted research to investigate the...

Author(s): Michael J. Jenkins, Wesley G. Page, Elizabeth G. Hebertson, Martin E. Alexander

Year Published: 2012

Type: Document

Book or Chapter or Journal Article, Synthesis

Chapter 2: Fire behavior and effects: principles for archaeologists

www.nrfirescience.org/resource/12590

Fire is a natural component of earth's ecosystems. Fire has impacted most landscapes of the Americas, having left evidence of its passing in trees, soils, fossils, and cultural artifacts (Andreae 1991; Benton and Reardon 2006; Biswell 1989; Bowman and others 2009; Boyd and others 2005; Cochrane and others 1999; DeBano and others...

Author(s): Kevin C. Ryan, Cassandra L. Koerner

Year Published: 2012

Type: Document

Synthesis, Technical Report or White Paper

The Waldo Canyon Fire: Fires on the Colorado Front Range and Home Destruction - A Report to the Pike and San Isabel National Forests

www.nrfirescience.org/resource/11266

The purpose of this white paper is to discuss fires on the Colorado Front Range and to share initial observations of fire behavior and home destruction during the Waldo Canyon Fire. It is my hope that these lessons and observations will be beneficial to agencies and especially the public. I want to share this information early when...

Author(s): Richard D. Stratton

Year Published: 2012

Type: Document

Technical Report or White Paper

An evaluation of multi-scalar drought indices in Nevada and eastern California

www.nrfirescience.org/resource/15687

Nevada and eastern California are home to some of the driest and warmest climates, most mountainous regions, and fastest growing metropolitan areas of the United States. Throughout Nevada

and eastern California, snow-dominated watersheds provide most of the water supply for both human and environmental demands. Increasing demands on...

Author(s): Daniel J. McEvoy, Justin L. Huntington, John T. Abatzoglou, Laura M. Edwards

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Characterizing fire-on-fire interactions in three large wilderness areas

www.nrfirescience.org/resource/8339

The interaction of fires, where one fire burns into another recently burned area, is receiving increased attention from scientists and land managers wishing to describe the role of fire scars in affecting landscape pattern and future fire spread. Here, we quantify fire-on-fire interactions in terms of frequency, size, and time-since...

Author(s): Casey Teske, Carl A. Seielstad, Lloyd P. Queen

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Spatial variability in wildfire probability across the western United States

www.nrfirescience.org/resource/8322

Despite growing knowledge of fire-environment linkages in the western USA, obtaining reliable estimates of relative wildfire likelihood remains a work in progress. The purpose of this study is to use updated fire observations during a 25-year period and a wide array of environmental variables in a statistical framework to produce...

Author(s): Marc-Andre Parisien, Susan Snetsinger, Jonathan A. Greenberg, Cara R. Nelson, Tania L. Schoennagel, Solomon Z. Dobrowski, Max A. Moritz

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Relationships between moisture, chemistry, and ignition of Pinus contorta needles during the early stages of mountain pine beetle attack

www.nrfirescience.org/resource/8317

Very little is known about how foliar moisture and chemistry change after a mountain pine beetle attack and even less is known about how these intrinsic foliar characteristics alter foliage ignitability. Here, we examine the fuel characteristics and ignition potential of Pinus contorta (lodgepole pine) foliage during the early...

Author(s): William Matt Jolly, Russell A. Parsons, Ann M. Hadlow, Greg M. Cohn, Sara S. McAllister, John B. Popp, Robert M. Hubbard, Jose F. Negron

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Synthesis of knowledge of extreme fire behavior: Volume 1 for managers

www.nrfirescience.org/resource/12566

The National Wildfire Coordinating Group definition of extreme fire behavior (EFB) indicates a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following is usually involved: high rate of spread, prolific crowning/spotting, presence of fire whirls, and strong...

Author(s): Paul A. Werth, Brian E. Potter, Craig B. Clements, Mark A. Finney, Scott L. Goodrick, Martin E. Alexander, Miguel G. Cruz, Jason M. Forthofer, Sara S. McAllister

Year Published: 2011
Type: Document
Synthesis, Technical Report or White Paper

Empirical downscaling of daily minimum air temperature at very fine resolutions in complex terrain

www.nrfirescience.org/resource/15692

Available air temperature models do not adequately account for the influence of terrain on nocturnal air temperatures. An empirical model for night time air temperatures was developed using a network of one hundred and forty inexpensive temperature sensors deployed across the Bitterroot National Forest, Montana. A principle...

Author(s): Zachary A. Holden, John T. Abatzoglou, Scott L. Baggett, Charles H. Luce

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

A tool to estimate the impact of bark beetle activity on fuels and fire behavior

www.nrfirescience.org/resource/12129

Recent bark beetle outbreaks have resulted in the loss of hundreds of thousands of conifers on approximately 74 million acres (30 million hectares) of forest in western North America during the last decade. Stand conditions, drought, and warming temperatures have contributed to the severity of these outbreaks, particularly in high-...

Author(s): Michael J. Jenkins, Elizabeth G. Hebertson, Wesley G. Page, Wanda E. Lindquist

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

Detailed point weather forecasts: how to get them when you need them

www.nrfirescience.org/resource/12441

Detailed point weather forecasts are a critical component of fire management planning. Accurate hour-by-hour forecasts for your exact location are valuable when you are preparing to ignite a prescribed burn and want to compare your prescription with actual conditions. They also provide important weather documentation for your files...

Author(s): Alan J. Long, Annie Oxarart

Year Published: 2011

Type: Document

Research Brief or Fact Sheet

Simulating fuel treatment effects in dry forests of the western United States: testing the principles of a fire-safe forest

www.nrfirescience.org/resource/8275

We used the Fire and Fuels Extension to the Forest Vegetation Simulator (FFE-FVS) to simulate fuel treatment effects on 45,162 stands in low- to midelevation dry forests (e.g., ponderosa pine (*Pinus ponderosa* Dougl. ex. P...

Author(s): Morris C. Johnson, Maureen C. Kennedy, David L. Peterson

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

Linking 3D spatial models of fuels and fire: effects of spatial heterogeneity on fire behavior

www.nrfirescience.org/resource/14161

Crownfire endangers fire fighters and can have severe ecological consequences. Prediction of fire behavior in tree crowns is essential to informed decisions in fire management. Current methods used in fire management do not address variability in crown fuels. New mechanistic physics-based fire models address convective heat transfer...

Author(s): Russell A. Parsons, William E. Mell, Peter McCauley

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

A method for ensemble wildland fire simulation

www.nrfirescience.org/resource/12732

An ensemble simulation system that accounts for uncertainty in long-range weather conditions and two-dimensional wildland fire spread is described. Fuel moisture is expressed based on the energy release component, a US fire danger rating index, and its variation throughout the fire season is modeled using time series analysis of...

Author(s): Mark A. Finney, Isaac C. Grenfell, Charles W. McHugh, Robert C. Seli, D. Trethewey, Richard D. Stratton, Stuart Brittain

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

The combustion of sound and rotten coarse woody debris: a review

www.nrfirescience.org/resource/13132

Coarse woody debris serves many functions in forest ecosystem processes and has important implications for fire management as it affects air quality, soil heating and carbon budgets when it combusts. There is relatively little research evaluating the physical properties relating to the combustion of this coarse woody debris with...

Author(s): Joshua C. Hyde, Alistair M. S. Smith, Roger D. Ottmar, Ernesto Alvarado, Penelope Morgan

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

Influence of the PNA on declining mountain snowpack in the western United States

www.nrfirescience.org/resource/15695

The widespread decrease in mountain snowpack across the Western United States is a hallmark indicator of regional climate change. Observed decreases in snowpack across lower-elevation watersheds are broadly consistent with model predictions of anthropogenic climate change; however, the magnitude of the decreases across much of the...

Author(s): John T. Abatzoglou

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

Changes in climatic water balance drive downhill shifts in plant species optimum elevations

www.nrfirescience.org/resource/15690

Uphill shifts of species' distributions in response to historical warming are well documented, which leads to widespread expectations of continued uphill shifts under future warming. Conversely, downhill shifts are often considered anomalous and unrelated to climate change. By comparing the altitudinal distributions of 64 plant...

Author(s): Shawn M. Crimmins, Solomon Z. Dobrowski, Jonathan A. Greenberg, John T. Abatzoglou,

Alison R. Mynsberge
Year Published: 2011
Type: Document
Book or Chapter or Journal Article

Fuel and fire behavior in high-elevation five-needle pines affected by mountain pine beetle

www.nrfirescience.org/resource/12112

Bark beetle-caused tree mortality in conifer forests affects the quantity and quality of forest fuels and has long been assumed to increase fire hazard and potential fire behavior. In reality, bark beetles and their effects on fuel accumulation and subsequent fire hazard have only recently been described. We have extensively sampled...

Author(s): Michael J. Jenkins

Year Published: 2011

Type: Document

Conference Proceedings

Mapping the potential for high severity wildfire in the western United States

www.nrfirescience.org/resource/15320

Each year, large areas are burned in wildfires across the Western United States. Assessing the ecological effects of these fires is crucial to effective postfire management. This requires accurate, efficient, and economical methods to assess the severity of fires at broad landscape scales (Brennan and Hardwick 1999; Parsons and...

Author(s): Gregory K. Dillon, Penelope Morgan, Zachary A. Holden

Year Published: 2011

Type: Document

Synthesis

A comparison of statistical downscaling methods suited for wildfire applications

www.nrfirescience.org/resource/11973

Place-based data is required in wildfire analyses, particularly in regions of diverse terrain that foster not only strong gradients in meteorological variables, but also complex fire behaviour. However, a majority of downscaling methods are inappropriate for wildfire application due to the lack of daily timescales and variables such...

Author(s): John T. Abatzoglou, Timothy J. Brown

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

Both topography and climate affected forest and woodland burn severity in two regions of the western US

www.nrfirescience.org/resource/15318

Fire is a keystone process in many ecosystems of western North America. Severe fires kill and consume large amounts of above- and belowground biomass and affect soils, resulting in long-lasting consequences for vegetation, aquatic ecosystem productivity and diversity, and other ecosystem properties. We analyzed the occurrence of,...

Author(s): Gregory K. Dillon, Zachary A. Holden, Penelope Morgan, Michael A. Crimmins, Emily K. Heyerdahl, Charles H. Luce

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

Review of fuel treatment effectiveness in forests and rangelands and a case study from the 2007 megafires in central, Idaho, USA

www.nrfirescience.org/resource/11449

This report provides managers with the current state of knowledge regarding the effectiveness of fuel treatments for mitigating severe wildfire effects. A literature review examines the effectiveness of fuel treatments that had been previously applied and were subsequently burned through by wildfire in forests and rangelands. A case...

Author(s): Andrew T. Hudak, Ian Rickert, Penelope Morgan, Eva K. Strand, Sarah A. Lewis, Peter R. Robichaud, Chad M. Hoffman, Zachary A. Holden

Year Published: 2011

Type: Document

Synthesis, Technical Report or White Paper

Analyzing wildfire exposure and source-sink relationships on a fire prone forest landscape

www.nrfirescience.org/resource/12736

We used simulation modeling to analyze wildfire exposure to social and ecological values on a 0.6 million ha national forest in central Oregon, USA. We simulated 50,000 wildfires that replicated recent fire events in the area and generated detailed maps of burn probability (BP) and fire intensity distributions. We also recorded the...

Author(s): Alan A. Ager, Nicole M. Vaillant, Mark A. Finney, Haiganoush K. Preisler

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

Do mountain pine beetle outbreaks change the probability of active crown fire in lodgepole pine forests?

www.nrfirescience.org/resource/13340

Disturbance interactions have received growing interest in ecological research in the last decade. Fire and bark beetle outbreaks have recently increased in severity and extent across western North America, raising concerns about their possible interactions. Although it is often presumed that bark beetle outbreaks increase...

Author(s): Martin Simard, William H. Romme, Jacob M. Griffin, Monica G. Turner

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

How big was Dodge's escape fire?

www.nrfirescience.org/resource/8289

Several published accounts exist of how smokejumper foreman Wag Dodge survived the 1949 Mann Gulch Fire in northwestern Montana by setting an 'escape fire' in cured grass fuels, the most notable among them being Norman Maclean's 1992 book *Young Men and Fire*. Two other smokejumpers survived by reaching a rockslide. Sadly, 12...

Author(s): Martin E. Alexander

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Field guide for mapping post-fire soil burn severity

www.nrfirescience.org/resource/15310

Following wildfires in the United States, the U.S. Department of Agriculture and U.S. Department of the

Interior mobilize Burned Area Emergency Response (BAER) teams to assess immediate post-fire watershed conditions. BAER teams must determine threats from flooding, soil erosion, and instability. Developing a postfire soil burn...

Author(s): Annette Parson, Peter R. Robichaud, Sarah A. Lewis, Carolyn Napper, Jess T. Clark

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Assessing crown fire potential in coniferous forests of western North America: a critique of current approaches and recent simulation studies

www.nrfirescience.org/resource/8187

To control and use wildland fires safely and effectively depends on credible assessments of fire potential, including the propensity for crowning in conifer forests. Simulation studies that use certain fire modelling systems (i.e. NEXUS, FlamMap, FARSITE, FFE-FVS (Fire and Fuels Extension to the Forest Vegetation Simulator), Fuel...

Author(s): Miguel G. Cruz, Martin E. Alexander

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Evaluation of forest management systems under risk of wildfire

www.nrfirescience.org/resource/8336

We evaluate the economic efficiency of even- and uneven-aged management systems under risk of wildfire. The management problems are formulated for a mixed-conifer stand and approximations of the optimal solutions are obtained using simulation optimization. The Northern Idaho variant of the Forest Vegetation Simulator and its Fire...

Author(s): Kari Hyytiainen, Robert G. Haight

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Fire-climate interactions in the American west since 1400 CE

www.nrfirescience.org/resource/11992

Despite a strong anthropogenic fingerprint on 20th Century wildland fire activity in the American West, climate remains a main driver. A better understanding of the spatiotemporal variability in fire-climate interactions is therefore crucial for fire management. Here, we present annually resolved, tree-ring based fire records for...

Author(s): Valerie Trouet, Alan H. Taylor, Eugene R. Wahl, Carl N. Skinner

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Effects of biomass removal treatments on stand-level fire characteristics in major forest types of the Northern Rocky Mountains

www.nrfirescience.org/resource/8189

Removal of dead and live biomass from forested stands affects subsequent fuel dynamics and fire potential. The amount of material left onsite after biomass removal operations can influence the intensity and severity of subsequent unplanned wildfires or prescribed burns. We developed a set of biomass removal treatment scenarios and...

Author(s): Elizabeth D. Reinhardt, Lisa M. Holsinger, Robert E. Keane

Year Published: 2010

Type: Document
Book or Chapter or Journal Article

Experimental measurements during combustion of moist individual foliage samples

www.nrfirescience.org/resource/11434

Individual samples of high moisture fuels from the western and southern United States and humidified aspen excelsior were burned over a flat-flame burner at $987^{\circ} \pm 12^{\circ}\text{C}$ and 10 ± 0.5 mol% O₂. Time-dependent mass and temperature profiles of these samples were obtained and analysed. It was observed that significant amounts of...

Author(s): Brent M. Pickett, Carl Isackson, Rebecca Wunder, Thomas H. Fletcher, Bret W. Butler, David R. Weise

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Learning the rhythm of the seasons in the face of global change: phenological research in the 21st century

www.nrfirescience.org/resource/15709

Phenology is the study of recurring life-cycle events, classic examples being the flowering of plants and animal migration. Phenological responses are increasingly relevant for addressing applied environmental issues. Yet, challenges remain with respect to spanning scales of observation, integrating observations across taxa, and...

Author(s): Jeffrey T. Morrisette, Andrew D. Richardson, Alan K. Knapp, Jeremy I. Fisher, Eric A.

Graham, John T. Abatzoglou, Bruce E. Wilson, David D. Breshears, Geoffrey M. Henebry, Jonathan M. Hanes, Liang Liang

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Influence of the Madden Julian Oscillation on summertime cloud-to-ground lightning activity over the continental US

www.nrfirescience.org/resource/15696

Summertime cloud-to-ground lightning strikes are responsible for the majority of wildfire ignitions across vast sections of the seasonally dry western United States. In this study, a strong connection between active phases of the Madden–Julian oscillation (MJO) and regional summertime lightning activity was found across the...

Author(s): John T. Abatzoglou, Timothy J. Brown

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Fire ecology in Rocky Mountain landscapes

www.nrfirescience.org/resource/15378

Fire Ecology in Rocky Mountain Landscapes brings a century of scientific research to bear on improving the relationship between people and fire. In recent years, some scientists have argued that current patterns of fire are significantly different from historical patterns, and that landscapes should be managed with an eye toward...

Author(s): William L. Baker

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

An analysis of Dodge's escape fire on the 1949 Mann Gulch Fire in terms of a survival zone for wildland firefighters

www.nrfirescience.org/resource/11020

The Wildland Fire Operations Research Group of FPInnovations-Feric Division in collaboration with the University of Alberta initiated a project in late 2007 at the request of its stakeholders to examine and define the limits of wildland firefighter safety and survival zones. Part of this project involves examining past wildfire...

Author(s): Martin E. Alexander, Mark Y. Ackerman, Gregory J. Baxter

Year Published: 2009

Type: Document

Conference Proceedings

Reciprocal interactions between bark beetles and wildfire in subalpine forests: landscape patterns and the risk of high-severity fire - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11136

The interactions of wildfire and bark beetle outbreaks and their reciprocal influences on fire behavior, bark beetle dynamics, and ecosystem structure are critical research issues in many coniferous forests of the Intermountain West. We combined field studies with new remote sensing methods to address three main questions regarding...

Author(s): Daniel B. Tinker

Year Published: 2009

Type: Document

Technical Report or White Paper

The 1988 fires of Yellowstone and beyond as a wildland fire behavior case study

www.nrfirescience.org/resource/11217

A 'Learning Organization' is an organization that creates, acquires, interprets, transfers, and retains knowledge and purposefully modifies its behavior to reflect new knowledge and insights (Garvin 2000). Dr. Marty Alexander's report The 1988 Fires of Yellowstone and Beyond as a Wildland Fire Behavior Case Study now provides the...

Author(s): Martin E. Alexander

Year Published: 2009

Type: Document

Technical Report or White Paper

Fire treatment effects on vegetation structure, fuels, and potential fire severity in western U.S. forests

www.nrfirescience.org/resource/13352

Forest structure and species composition in many western U.S. coniferous forests have been altered through fire exclusion, past and ongoing harvesting practices, and livestock grazing over the 20th century. The effects of these activities have been most pronounced in seasonally dry, low and mid-elevation coniferous forests that once...

Author(s): Scott L. Stephens, Jason J. Moghaddas, Carleton B. Edminster, Carl E. Fiedler, Sally M. Haase, Michael G. Harrington, Jon E. Keeley, Eric E. Knapp, James D. McIver, Kerry L. Metlen, Carl N. Skinner, Andrew P. Youngblood

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Seasonal predictions for wildland fire severity

www.nrfirescience.org/resource/11064

The National Fire Danger Rating System (NFDRS) indices deduced from the monthly to seasonal predictions of a meteorological climate model at 50-km grid space from January 1998 through December 2003 were used in conjunction with a probability model to predict the expected number of fire occurrences and large fires over the U.S. West...

Author(s): Shyh-Chin Chen, Haiganoush K. Preisler, Francis M. Fujioka, John W. Benoit, John O. Roads

Year Published: 2009

Type: Document

Conference Proceedings, Technical Report or White Paper

Fuel treatments, fire suppression, and their interaction with wildfire and its impacts: the Warm Lake experience during the Cascade Complex of wildfires in central Idaho, 2007

www.nrfirescience.org/resource/11435

Wildfires during the summer of 2007 burned over 500,000 acres within central Idaho. These fires burned around and through over 8,000 acres of fuel treatments designed to offer protection from wildfire to over 70 summer homes and other buildings located near Warm Lake. This area east of Cascade, Idaho, exemplifies the difficulty of...

Author(s): Russell T. Graham, Theresa B. Jain, Mark Loseke

Year Published: 2009

Type: Document

Technical Report or White Paper

Wildland surface fire spread modelling, 1990-2007. 2: Empirical and quasi-empirical models

www.nrfirescience.org/resource/13824

In recent years, advances in computational power have led to an increase in attempts to model the behaviour of wildland fires and to simulate their spread across landscape. The present series of articles endeavours to comprehensively survey and précis all types of surface fire spread models developed during the period 1990-2007....

Author(s): Andrew L. Sullivan

Year Published: 2009

Type: Document

Book or Chapter or Journal Article, Synthesis

How much influence does landscape-scale physiography have on air temperature in a mountain environment?

www.nrfirescience.org/resource/15698

Spatio-temporal patterns of temperature in mountain environments are complex due to both regional synoptic-scale and landscape-scale physiographic controls in these systems. Understanding the nature and magnitude of these physiographic effects has practical and theoretical implications for the development of temperature datasets...

Author(s): Solomon Z. Dobrowski, John T. Abatzoglou, Jonathan A. Greenberg, S.G. Schladow

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Fuel treatment guidebook: illustrating treatment effects on fire hazard

www.nrfirescience.org/resource/8155

The Guide to Fuel Treatments (Johnson and others 2007) analyzes potential fuel treatments and the potential effects of those treatments for dry forest lands in the Western United States. The guide

examines low- to mid-elevation dry forest stands with high stem densities and heavy ladder fuels, which are currently common due to fire...

Author(s): Crystal L. Raymond

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Climate and wildfire area burned in western U.S. ecoprovinces, 1916-2003

www.nrfirescience.org/resource/8228

The purpose of this paper is to quantify climatic controls on the area burned by fire in different vegetation types in the western United States. We demonstrate that wildfire area burned (WFAB) in the American West was controlled by climate during the 20th century (1916-2003). Persistent ecosystem-specific correlations between...

Author(s): Jeremy S. Littell, Donald McKenzie, David L. Peterson, Anthony L. Westerling

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

January 31st 2009 off-season grassland wildfire

www.nrfirescience.org/resource/11145

Wildland fires can be high impact events no matter what the season or fuel type. While the first image that comes to mind of wildland fire suppression is timbered mountainous terrain on a late summer afternoon, this wildland fire occurred in relatively flat grasslands during the overnight and early morning hours, during the...

Author(s): Robert W. Hoenisch

Year Published: 2009

Type: Document

Technical Report or White Paper

Wildland surface fire spread modelling, 1990-2007. 3: Simulation and mathematical analogue models

www.nrfirescience.org/resource/13825

In recent years, advances in computational power have led to an increase in attempts to model the behaviour of wildland fires and to simulate their spread across landscape. The present series of articles endeavours to comprehensively survey and précis all types of surface fire spread models developed during the period 1990-2007....

Author(s): Andrew L. Sullivan

Year Published: 2009

Type: Document

Book or Chapter or Journal Article, Synthesis

Wildland surface fire spread modelling, 1990-2007. 1: Physical and quasi-physical models

www.nrfirescience.org/resource/13823

In recent years, advances in computational power have led to an increase in attempts to model the behaviour of wildland fires and to simulate their spread across the landscape. The present series of articles endeavours to comprehensively survey and précis all types of surface fire spread models developed during the period 1990-...

Author(s): Andrew L. Sullivan

Year Published: 2009

Type: Document

Book or Chapter or Journal Article, Synthesis

Temporal and spatial structure in a daily wildfire-start data set from the western United States (1986-96)

www.nrfirescience.org/resource/8201

The temporal and spatial structure of 332 404 daily fire-start records from the western United States for the period 1986 through 1996 is illustrated using several complimentary visualisation techniques. We supplement maps and time series plots with Hovmiller diagrams that reduce the spatial dimensionality of the daily data in order...

Author(s): Patrick J. Bartlein, Steven W. Hostetler, Sarah L. Shafer, J. O. Holman, Allen M. Solomon

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Bark beetles, fuels, fires, and implications for forest management in the Intermountain West

www.nrfirescience.org/resource/8239

Bark beetle-caused tree mortality in conifer forests affects the quantity and quality of forest fuels and has long been assumed to increase fire hazard and potential fire behavior. In reality, bark beetles, and their effects on fuel accumulation, and subsequent fire hazard, are poorly understood. We extensively sampled fuels in...

Author(s): Michael J. Jenkins, Elizabeth G. Hebertson, Wesley G. Page, C. Arik Jorgensen

Year Published: 2008

Type: Document

Book or Chapter or Journal Article, Synthesis

Guide to fuel treatments in dry forests of the Western United States: assessing forest structure and fire hazard

www.nrfirescience.org/resource/11166

Guide to Fuel Treatments analyzes a range of fuel treatments for representative dry forest stands in the Western United States with overstories dominated by ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), and pinyon pine (*Pinus edulis*). Six silvicultural options (no thinning; thinning from below to 50 trees...

Author(s): Morris C. Johnson, David L. Peterson, Crystal L. Raymond

Year Published: 2007

Type: Document

Technical Report or White Paper

Wildfires, weather, and productivity

www.nrfirescience.org/resource/11016

The object of this paper is to show the intercorrelations existing between statistics of wildfires (occurrences: N; areas burned: A), climatic parameters (precipitation: P; temperature: T) and net primary productivity: NPP. To this purpose, statistics of wildfires have been studied in several regions of the world, focusing on...

Author(s): Michel L. Bernard, Nouredine Nimour

Year Published: 2007

Type: Document

Conference Proceedings

Statistical model for forecasting monthly large wildfire events in the western United States

www.nrfirescience.org/resource/8123

The ability to forecast the number and location of large wildfire events (with specified confidence

bounds) is important to fire managers attempting to allocate and distribute suppression efforts during severe fire seasons. This paper describes the development of a statistical model for assessing the forecasting skills of fire-...

Author(s): Haiganoush K. Preisler, Anthony L. Westerling

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

Predicted fire behavior in selected mountain pine beetle-infested lodgepole pine

www.nrfirescience.org/resource/12113

Using custom fuel models developed for use with Rothermel's surface fire spread model, we predicted and compared fire behavior in lodgepole pine (*Pinus contorta* Dougl. var. *latifolia* Engelm.) stands with endemic, current epidemic, and postepidemic mountain pine beetle (*Dendroctonus ponderosae* Hopkins) populations using standardized...

Author(s): Wesley G. Page, Michael J. Jenkins

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

The asymmetry of trends in spring and autumn temperature and circulation regimes over western North America

www.nrfirescience.org/resource/15710

Observational evidence shows that spring temperatures over western North America have undergone significant warming over the past half century, while autumn temperatures have shown relatively little change. Low-frequency modes of atmospheric variability for spring and autumn are demonstrated to account for a great deal of the...

Author(s): John T. Abatzoglou, Kelly T. Redmond

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

A physics-based approach to modelling grassland fires

www.nrfirescience.org/resource/14842

Physics-based coupled fire-atmosphere models are based on approximations to the governing equations of fluid dynamics, combustion, and the thermal degradation of solid fuel. They require significantly more computational resources than the most commonly used fire spread models, which are semi-empirical or empirical. However, there...

Author(s): William E. Mell, Mary Ann Jenkins, Jim Gould, Phil Cheney

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

Contingent pacific-atlantic ocean influence on multicentury wildfire synchrony over western North America

www.nrfirescience.org/resource/8293

Widespread synchronous wildfires driven by climatic variation, such as those that swept western North America during 1996, 2000, and 2002, can result in major environmental and societal impacts.

Understanding relationships between continental-scale patterns of drought and modes of sea surface temperatures (SSTs) such as El Niño-...

Author(s): Thomas Kitzberger, Peter M. Brown, Emily K. Heyerdahl, Thomas W. Swetnam, Thomas T. Veblen

Year Published: 2007
Type: Document
Book or Chapter or Journal Article

Post-fire recovery of Wyoming big sagebrush shrub-steppe in central and southeast Montana

www.nrfirescience.org/resource/15386

Sagebrush is a widespread habitat throughout our study area and a number of species including Greater Sage-grouse, pronghorn, Brewers Sparrow, Sage Sparrow, Sage Thrasher and sagebrush vole are sagebrush dependent, at least at some stage of their life cycles. Fire constitutes an important driver in structuring sagebrush ecosystems;...

Author(s): Stephen V. Cooper, Peter Lesica, Greg Kudray

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

On the use of a firebrand generator to investigate the ignition of structures in wildland-urban interface (WUI) fires

www.nrfirescience.org/resource/12439

An experimental apparatus has been constructed to generate a controlled and repeatable size and mass distribution of glowing firebrands. The present study reports on a series of experiments conducted in order to characterize the performance of this firebrand generator. Firebrand generator characterization and subsequent structural...

Author(s): Anthony Manzello, John R. Shields, Jiann C. Yang, Yoshihiko Hayashi, Daisaku Nii

Year Published: 2007

Type: Document

Conference Proceedings

The fire-climate connection

www.nrfirescience.org/resource/11985

JFSP-funded research is exploring and quantifying relationships among the large-scale drivers of climate and the occurrence and extent of wildfire in the various regions of the western United States.

Author(s): Gail Wells

Year Published: 2007

Type: Document

Research Brief or Fact Sheet

Simulation of long-term landscape-level fuel treatment effects on large wildfires

www.nrfirescience.org/resource/8166

A simulation system was developed to explore how fuel treatments placed in topologically random and optimal spatial patterns affect the growth and behaviour of large fires when implemented at different rates over the course of five decades. The system consisted of a forest and fuel dynamics simulation module (Forest Vegetation...

Author(s): Mark A. Finney, Robert C. Seli, Charles W. McHugh, Alan A. Ager, Bernhard Bahro, James K. Agee

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

Fuel consumption and flammability thresholds in shrub-dominated ecosystems - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11164

Research to quantify fuel consumption and flammability in shrub-dominated ecosystems has received little attention despite the widespread occurrence of fire-influenced, shrub-dominated landscapes across the arid lands of the western United States. While some research has addressed issues relating to fire behavior in some shrub-...

Author(s): Clinton S. Wright, Roger D. Ottmar, Sue A. Ferguson, Robert E. Vihnanek

Year Published: 2007

Type: Document

Technical Report or White Paper

Testing the modeled effectiveness of an operational fuel reduction treatment in a small western Montana interface landscape using two spatial scales

www.nrfirescience.org/resource/8410

Much of the coniferous zones in the Western United States where fires were historically frequent have seen large increases in stand densities and associated forest fuels due to 20th century anthropogenic influences. This condition is partially responsible for contemporary large, uncharacteristically severe wildfires. Therefore,...

Author(s): Michael G. Harrington, Erin Noonan-Wright, Mitchell Doherty

Year Published: 2007

Type: Document

Conference Proceedings

Regional relationships between climate and wildfire-burned area in the Interior West, USA

www.nrfirescience.org/resource/11507

Recent studies have linked the Atlantic Multidecadal Oscillation (AMO) and the Pacific Decadal Oscillation (PDO) with drought occurrence in the interior United States. This study evaluates the influence of AMO and PDO phases on interannual relationships between climate and wildfire-burned area during the 20th century. Palmer's...

Author(s): Brandon M. Collins, Philip N. Omi, Phillip L. Chapman, Brandon M. Collins, Philip N. Omi, Phillip L. Chapman

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

Comparison of crown fire modeling systems used in three fire management applications

www.nrfirescience.org/resource/11200

The relative behavior of surface-crown fire spread rate modeling systems used in three fire management applications-CFIS (Crown Fire Initiation and Spread), FlamMap and NEXUS- is compared using fire environment characteristics derived from a dataset of destructively measured canopy fuel and associated stand characteristics. Although...

Author(s): Joe H. Scott

Year Published: 2006

Type: Document

Technical Report or White Paper

Evaluation of MM5 model resolution when applied to prediction of National Fire Danger Rating indexes

www.nrfirescience.org/resource/7943

Weather predictions from the MM5 mesoscale model were used to compute gridded predictions of National Fire Danger Rating System (NFDRS) indexes. The model output was applied to a case study of the 2000 fire season in Northern Idaho and Western Montana to simulate an extreme event. To

determine the preferred resolution for automating...

Author(s): Jeanne L. Hoadley, Miriam L. Rorig, Larry S. Bradshaw, Sue A. Ferguson, Kenneth Westrick, Scott L. Goodrick, Paul A. Werth

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

A national study of the consequences of fire and fire surrogate treatments

www.nrfirescience.org/resource/15633

We provide highlights of some of the results thus far for the National Fire and Fire Surrogate study (FFS). Highlights summarize work that has been published within the last four years (2003-2006), primarily in theses, proceedings, general technical reports, and peer-reviewed journals (<http://www.fs.fed.us/ffs/>). In the summary, we...

Author(s): James D. Mclver, Phil Weatherspoon

Year Published: 2006

Type: Document

Technical Report or White Paper

Evaluation of silvicultural treatments and biomass use for reducing fire hazard in western states

www.nrfirescience.org/resource/11189

Several analysis have shown that fire hazard is a concern for substantial areas of forestland, shrubland, grassland, and range in the western United States. In response, broadscale management strategies, such as the National Fire Plan, established actions to reduce the threat of undesirable fire. Available budgets are insufficient...

Author(s): Kenneth E. Skog, R. James Barbour, Karen L. Abt, Edward M. Bilek, Frank Burch, Roger D. Fight, Robert J. Huggett, Patrick D. Miles, Elizabeth D. Reinhardt, Wayne D. Shepperd

Year Published: 2006

Type: Document

Technical Report or White Paper

Biomass consumption during prescribed fires in big sagebrush ecosystems

www.nrfirescience.org/resource/11419

Big sagebrush (*Artemisia tridentata*) ecosystems typically experience stand replacing fires during which some or all of the ignited biomass is consumed. Biomass consumption is directly related to the energy released during a fire, and is an important factor that determines smoke production and the effects of fire on other resources....

Author(s): Clinton S. Wright, Susan J. Prichard

Year Published: 2006

Type: Document

Conference Proceedings

Fuel Treatment Evaluator 3.0

www.nrfirescience.org/resource/11078

The Fuel Treatment Evaluator (FTE) 3.0 is a web-based tool that simulates uneven-aged and even-aged silvicultural treatments on timberland in 12 western states. This tool simulates treatments to reduce forest fire hazard to specific target levels and identifies the volume of biomass removed, harvesting costs, and estimated biomass...

Author(s): U.S. Department of Agriculture, Forest Service

Year Published: 2006

Type: Document

Research Brief or Fact Sheet

Employing numerical weather models to enhance fire weather and fire behavior predictions

www.nrfirescience.org/resource/11428

This paper presents an assessment of fire weather and fire behavior predictions produced by a numerical weather prediction model similar to those used by operational weather forecasters when preparing their forecasts. The PSU/NCAR MM5 model is used to simulate the weather conditions associated with three fire episodes in June 2005....

Author(s): Joseph J. Charney, Lesley A. Fusina

Year Published: 2006

Type: Document

Conference Proceedings

Planetary wave breaking and nonlinear reflection: seasonal cycle and interannual variability

www.nrfirescience.org/resource/15713

Forty-six years of daily averaged NCEP–NCAR reanalysis data are used to identify the occurrence of planetary wave breaking (PWB) in the subtropical upper troposphere. As large-amplitude waves propagate into the subtropics where the zonal flow is weak, they may break. PWB is diagnosed by observing the large-scale meridional...

Author(s): John T. Abatzoglou, Gudrun Magnusdottir

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

Demonstration and integration of systems for fire remote sensing, ground-based fire measurement, and fire modeling - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11158

Proof-of-concept research is being conducted to: compare airborne and in situ, ground-based fire measurement systems; begin evaluation of two fire-behavior simulation models with these data; test approaches to incorporating improved wind-field and weather data in these models; test the utility of the airborne remote sensing for...

Author(s): Colin C. Hardy, Philip J. Riggan

Year Published: 2005

Type: Document

Technical Report or White Paper

Evaluation of the Experimental Climate Prediction Center's fire danger forecasts with remote automated weather station observations

www.nrfirescience.org/resource/8127

The Scripps Experimental Climate Prediction Center has been routinely making regional forecasts of atmospheric elements and fire danger indices since 27 September 1997. This study evaluates these forecasts using selected remote automated weather station observations over the western USA. Bias and anomaly correlations are computed...

Author(s): Hauss J. Reinbold, John O. Roads, Timothy J. Brown

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

Cumulative effects of fuel management on landscape-scale fire behavior and effects - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11157

The project is concerned with modeling the long-term effects of landscape fuel treatment patterns on wildfire sizes and severity. The work was initiated based on theoretical fuel treatment patterns that appeared effective at changing fire growth across large landscapes, thus reducing the acreage burned and the chances that large...

Author(s): Mark A. Finney

Year Published: 2005

Type: Document

Technical Report or White Paper

Optimizing landscape treatments for reducing wildfire risk and improving ecological sustainability of ponderosa pine forests with mixed severity fire regimes - Part 2 - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11169

A mixed severity fire regime historically created complex landscape structures in ponderosa pine forests of the Colorado Front Range. Mitigating present wildfire risks and restoring these forests to ecologically sustainable conditions requires new guidelines for landscape treatment. However, vast acreages need treatment while only...

Author(s): Merrill R. Kaufmann, Jimmie D. Chew, J. Greg Jones

Year Published: 2005

Type: Document

Technical Report or White Paper

FuelCalc: A tool for calculating wildland fuel quantities and qualities and supporting fuel management decision - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11165

A need exists for a simple computer program to determine surface and canopy fuel quantities (load, bulk density, depth) and qualities (fire behavior fuel model, fire-carrying fuel type) from a variety of fuel inventory data sources. In addition, fuel managers need help analyzing the potential effects of silvicultural treatments on...

Author(s): Elizabeth D. Reinhardt, Joe H. Scott, Duncan C. Lutes

Year Published: 2005

Type: Document

Technical Report or White Paper

Climate drivers of fire and fuel in the Northern Rockies: past, present & future - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11154

This 3-year research project is identifying the climate drivers of regional fire and fuel dynamics in the Northern Rockies in the past, present, and future. We are identifying regional fire years from two sources: multicentury tree-ring reconstructions and multidecadal fire atlases. To elucidate the climate forcing of past fires, we...

Author(s): Penelope Morgan, Emily K. Heyerdahl, Carol Miller, Matthew G. Rollins

Year Published: 2005

Type: Document

Technical Report or White Paper

Recent history of large-scale ecosystem disturbances in North America derived from the AVHRR satellite record

www.nrfirescience.org/resource/11506

Ecosystem structure and function are strongly affected by disturbance events, many of which in North America are associated with seasonal temperature extremes, wildfires, and tropical storms. This study

was conducted to evaluate patterns in a 19-year record of global satellite observations of vegetation phenology from the advanced...

Author(s): Christopher Potter, Tan Ping-Ning, Vipin Kumar, Chris J. Kucharik, Steven Klooster, Vanessa Genovese, Warren B. Cohen, Sean P. Healey

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

Climatic controls of fire in the western United States: from the atmosphere to ecosystems - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11155

The objective of this project is to conduct a diagnostic analysis of the variations in climate that govern the characteristics of the fire season in the western United States on intra-annual through decadal and longer time scales. We propose a retrospective, model-based analysis to understand better the role of climate as a control...

Author(s): Steven W. Hostetler, Patrick J. Bartlein, Allen M. Solomon, J. O. Holman, Richard T. Busing, Sarah L. Shafer

Year Published: 2005

Type: Document

Technical Report or White Paper

Characterization of firefighter safety zone effectiveness - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11153

Firefighters are required to play close attention to fire behavior and have safety zones readily available in case of unexpected fire behavior. However, safety zone location and size are often a matter of anecdotal evidence, personal experience, and untested models. This is particularly troublesome for younger firefighters that...

Author(s): Bret W. Butler

Year Published: 2005

Type: Document

Technical Report or White Paper

Forest fuel treatments in western North America: merging silviculture and fire management

www.nrfirescience.org/resource/7948

In order to accomplish complex and multiple management objectives related to forest structure, fuels, and fire disturbance, these two disciplines must be effectively integrated in science and practice. The authors have linked scientific and management tools to develop an analytical approach that allows resource managers to quantify...

Author(s): Morris C. Johnson, David L. Peterson

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

A web-based information system for estimating fuel characteristics, fire hazard, and treatment effectiveness - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11879

This project has three objectives: 1) Classify ponderosa pine, Douglas-fir, and dry mixed-conifer forests types in Montana and New Mexico into appropriate fuel characteristic classes (FCC's), and display the results by forest type, density, and structural classes, 2) Develop web-based applications by which users can evaluate the...

Author(s): Carl E. Fiedler, Roger D. Ottmar
Year Published: 2005
Type: Document
Technical Report or White Paper

Modeling surface winds in complex terrain for wildland fire incident support - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11167

One major source of uncertainty in fire behavior and fire behavior modeling is the spatial variation in wind fields. Mountainsides, valleys, ridges, and the fire itself, influence both the speed and direction of wind flows. Small scale surface wind variations cannot be predicted by synoptic forecasting methods or on-site...

Author(s): Mark A. Finney, Larry S. Bradshaw, Bret W. Butler
Year Published: 2005
Type: Document
Technical Report or White Paper

Evaluation of the Experimental Climate Prediction Center's fire danger forecasts with remote automated weather station observations

www.nrfirescience.org/resource/8208

The Scripps Experimental Climate Prediction Center has been routinely making regional forecasts of atmospheric elements and fire danger indices since 27 September 1997. This study evaluates these forecasts using selected remote automated weather station observations over the western USA. Bias and anomaly correlations are computed...

Author(s): Hauss J. Reinbold, John O. Roads, Timothy J. Brown
Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Visualizing a forest landscape today and tomorrow

www.nrfirescience.org/resource/11102

Description not entered

Author(s): J. Greg Jones
Year Published: 2005
Type: Document
Research Brief or Fact Sheet

The impact of twenty-first century climate change on wildland fire danger in the western United States: an applications perspective

www.nrfirescience.org/resource/8343

High-temporal resolution meteorological output from the Parallel Climate Model (PCM) is used to assess changes in wildland fire danger across the western United States due to climatic changes projected in the 21st century. A business-as-usual scenario incorporating changing greenhouse gas and aerosol concentrations until the year...

Author(s): Timothy J. Brown, Beth L. Hall, Anthony L. Westerling
Year Published: 2004
Type: Document
Book or Chapter or Journal Article

MODIS Applications in 2003 Fire Management - Slide presentation

www.nrfirescience.org/resource/11516

Powerpoint presentation MODIS Applications in 2003 Fire Management

Author(s): C. A. Ryan, Bryce L. Nordgren, James P. Menakis, Mark A. Finney, Wei Min Hao

Year Published: 2004

Type: Document

Conference Proceedings

Science basis for changing forest structure to modify wildfire behavior and severity

www.nrfirescience.org/resource/15018

Fire, other disturbances, physical setting, weather, and climate shape the structure and function of forests throughout the Western United States. More than 80 years of fire research have shown that physical setting, fuels, and weather combine to determine wildfire intensity (the rate at which it consumes fuel) and severity (the...

Author(s): Russell T. Graham, Sarah M. McCaffrey, Theresa B. Jain

Year Published: 2004

Type: Document

Synthesis, Technical Report or White Paper

Fuels planning: science synthesis and integration; forest structure and fire hazard fact sheet 2: fire hazard

www.nrfirescience.org/resource/14954

Fire hazard reflects the potential fire behavior and magnitude of effects as a function of fuel conditions. This fact sheet discusses crown fuels, surface fuels, and ground fuels and their contribution and involvement in wildland fire.

Author(s): Kelly O'Brian

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Landscape fire simulation and fuel treatment optimization

www.nrfirescience.org/resource/111

Fuel treatment effects on the growth and behavior of large wildland fires depend on the spatial arrangements of individual treatment units. Evidence of this is found in burn patterns of wildland fires. During planning stages, fire simulation is most often used to anticipate effects of fuel treatment units. Theoretical modeling shows...

Author(s): Mark A. Finney

Year Published: 2004

Type: Document

Technical Report or White Paper

A comment on models and modelling in fire/fuel management

www.nrfirescience.org/resource/12394

'Modeling is fine as long as you know what you are doing.' General remark made to the author by a retired University of Alberta forestry professor a few years ago. The April 1988 issue of the Journal of Forestry published an article by John J. Garland that I have often handed out at various training courses and workshops to impress...

Author(s): Martin E. Alexander

Year Published: 2004

Type: Document

Technical Report or White Paper

'Brewer fire mystery' discussion

www.nrfirescience.org/resource/8288

Occasionally, Fire Management Today publishes comments from readers on topics of concern, offering authors a chance to respond. Stephen A. Eckert contends that the 'Brewer fire mystery' is not so mysterious. He says that the conditions were ripe for extreme fire behavior, and that under those conditions, the fire quickly went from a...

Author(s): Stephen A. Eckert, Martin E. Alexander

Year Published: 2004

Type: Document

Book or Chapter or Journal Article

Reaction times and burning rates for wind tunnel headfires

www.nrfirescience.org/resource/8211

Catchpole et al. (1998) reported rates of spread for 357 heading and no-wind fires burned in the wind tunnel facility of the USDA Forest Service's Fire Sciences Laboratory in Missoula, Montana for the purpose of developing models of wildland fire behavior. The fires were burned in horizontal fuel beds with differing characteristics...

Author(s): Ralph M. Nelson

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

An initial analysis of relationships between 2- and 10-minute averaged winds at 10, 6, and 1.8 meters: implications for fire behavior and danger applications

www.nrfirescience.org/resource/8424

Recently there has been discussion in the National Wildland Fire Coordination Group (NWCG) fire danger and fire weather working teams about the impact of observations from different anemometer heights and more importantly, averaging times, on inputs to fire management systems such as National Fire Danger Rating System (Deeming and...

Author(s): Larry S. Bradshaw, Eugene Petrescu, Isaac C. Grenfell

Year Published: 2003

Type: Document

Conference Proceedings

Climate and wildfire in the western United States

www.nrfirescience.org/resource/8184

A 21-yr gridded monthly fire-starts and acres-burned dataset from U.S. Forest Service, Bureau of Land Management, National Park Service, and Bureau of Indian Affairs fire reports recreates the seasonality and interannual variability of wildfire in the western United States. Despite pervasive human influence in western fire regimes,...

Author(s): Anthony L. Westerling, Timothy J. Brown, Alexander Gershunov, Daniel R. Cayan, M. D.

Dettinger

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

Statistical forecasts of the 2003 western wildfire season using canonical correlation analysis

www.nrfirescience.org/resource/8193

Experimental forecasts for the 2003 fire season indicate low area burned in most western deserts and basins, high area burned in the southern Rocky Mountains and at higher elevations in Arizona and New

Mexico, and mid to high area burned in the Sierra Nevada. This pattern - largely a continuation of that seen in 2002 - is the result...

Author(s): Anthony L. Westerling, Alexander Gershunov, Daniel R. Cayan

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

Comparison of 2-D wind fields and simulated wildland fire growth

www.nrfirescience.org/resource/11019

The paper discusses wildfire growth simulated by the FARSITE model using high-resolution wind fields over complex terrain extracted from operational runs of the MM5 weather forecast model supported by the USDA FS Rocky Mountain Center (RMC: <http://www.fs.fed.us/rmc/>). The original 12-km resolution wind field (simulated by MM5) has...

Author(s): Karl F. Zeller, Ned Nikolov, John S. Snook, Mark A. Finney, Jason M. Forthofer

Year Published: 2003

Type: Document

Conference Proceedings

Fire whirls, fire tornados, and fire storms: physical and numerical modeling

www.nrfirescience.org/resource/11022

Fire whirls are a typically rare but potentially catastrophic form of fire. They are observed during urban and forest fires, where fire "tornados" are characterized by large-scale whirling flames which rise in 2 to 360 m diameter vortices from 10 to 1200 m high. These fire whirls accelerate combustion, produce significant suction...

Author(s): Robert N. Meroney

Year Published: 2003

Type: Document

Conference Proceedings

Performance of the Haines Index during August 2000 for Montana

www.nrfirescience.org/resource/10997

The Haines Index, introduced by Haines (1988) as the Lower Atmosphere Severity Index, is designed to gauge how readily the lower mid-troposphere (500 to 4500 m AGL) will spur an otherwise fairly predictable fire to become erratic and unmanageable. Based on stability and moisture, the Haines Index (hereafter, HI) takes on integer...

Author(s): Brian E. Potter, Scott L. Goodrick

Year Published: 2003

Type: Document

Conference Proceedings

Assessing canopy fuel stratum characteristics in crown fire prone fuel types of western North America

www.nrfirescience.org/resource/7917

Application of crown fire behavior models in fire management decision-making have been limited by the difficulty of quantitatively describing fuel complexes, specifically characteristics of the canopy fuel stratum. To estimate canopy fuel stratum characteristics of four broad fuel types found in the western United States and...

Author(s): Martin E. Alexander, Ronald H. Wakimoto

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

Assessing the value of increased model resolution in forecasting fire danger

www.nrfirescience.org/resource/10969

The fire season of 2000 was used as a case study to assess the value of increasing mesoscale model resolution for fire weather and fire danger forecasting. With a domain centered on Western Montana and Northern Idaho, MM5 simulations were run at 36, 12, and 4-km resolutions for a 30 day period at the height of the fire season....

Author(s): Jeanne L. Hoadley, Miriam L. Rorig, Kenneth Westrick, Larry S. Bradshaw, Sue A. Ferguson, Scott L. Goodrick, Paul A. Werth

Year Published: 2003

Type: Document

Conference Proceedings

Predicting surface winds in complex terrain for use in fire spread models

www.nrfirescience.org/resource/8438

Fire behavior predictions and forecasts are vital to tactical planning on wildland firefighting incidents. One major source of uncertainty in fire behavior predictions is spatial variation in the wind fields used in the fire models. In most cases wind data are limited to only a few specific locations, none of which may be actually...

Author(s): Jason M. Forthofer, Bret W. Butler, Kyle S. Shannon, Mark A. Finney, Larry S. Bradshaw, Richard D. Stratton

Year Published: 2003

Type: Document

Conference Proceedings

Wildland fire behavior case studies and analysis: part 2

www.nrfirescience.org/resource/15996

This resource is a special issue of Fire Management Today that includes articles on fire behavior and descriptions of specific large fires that have important lessons in fire fighter safety.

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

Long lead statistical forecasts of area burned in western U.S. wildfires by ecosystem province

www.nrfirescience.org/resource/8377

A statistical forecast methodology exploits large-scale patterns in monthly U.S. Climatological Division Palmer Drought Severity Index (PDSI) values over a wide region and several seasons to predict area burned in western U.S. wildfires by ecosystem province a season in advance. The forecast model, which is based on canonical...

Author(s): Anthony L. Westerling, Alexander Gershunov, Daniel R. Cayan, Tim P. Barnett

Year Published: 2002

Type: Document

Book or Chapter or Journal Article

Using FVS and its fire and fuels extension in the context of uncertain climate

www.nrfirescience.org/resource/11011

While the prospect of a static climate is no longer tenable, the direction of change for particular localities is not yet clear. Modelling vulnerability of silvicultural options to various scenarios of climate change requires a modelling system that can represent major processes affected by climatic variability. The Forest...

Author(s): Albert R. Stage
Year Published: 2002
Type: Document
Conference Proceedings

The 2000 fire season: lightning-caused fires

www.nrfirescience.org/resource/8141

A large number of lightning-caused fires burned across the western United States during the summer of 2000. In a previous study, the authors determined that a simple index of low-level moisture (85-kPa dewpoint depression) and instability (85-50-kPa temperature difference) from the Spokane, Washington, upper-air soundings was very...

Author(s): Miriam L. Rorig, Sue A. Ferguson

Year Published: 2002

Type: Document

Book or Chapter or Journal Article

Statistical forecast of the 2001 western wildfire season using principal components regression

www.nrfirescience.org/resource/8396

Description not entered

Author(s): Anthony L. Westerling, Daniel R. Cayan, Alexander Gershunov, M. D. Dettinger, Timothy J. Brown

Year Published: 2001

Type: Document

Book or Chapter or Journal Article

Ponderosa pine ecosystems restoration and conservation: steps toward stewardship; April 25-27, 2000; Flagstaff, AZ

www.nrfirescience.org/resource/11888

This volume is divided into three sections: (1) Ecological, Biological, and Physical Science; (2) Social and Cultural; and (3) Economics and Utilization. Effective ecological restoration requires a combination of science and management. The authors of the first section exemplified this integration in the course of addressing a broad...

Author(s): Regina K. Vance, Carleton B. Edminster, W. Wallace Covington, Julie A. Blake

Year Published: 2001

Type: Document

Conference Proceedings

Stevensville West Central Study

www.nrfirescience.org/resource/10981

This paper reports on an application of two modeling systems in the assessment and planning effort for a 58,038-acre area on the Bitterroot National Forest: SIMulating Vegetative Patterns and Processes at Landscape ScaLEs (SIMPPLLE), and Multi-resource Analysis and Geographic Information System (MAGIS). SIMPPLLE was a useful model...

Author(s): J. Greg Jones, Jimmie D. Chew, Nan K. Christianson, D. J. Silvius, Catherine A. Stewart

Year Published: 2000

Type: Document

Conference Proceedings

Fire-climate interactions in the Selway-Bitterroot Wilderness area

www.nrfirescience.org/resource/11887

Tree-ring reconstructed summer drought was examined in relation to the occurrence of 15 fires in the Selway-Bitterroot Wilderness Area (SBW). The ten largest fire years between 1880 and 1995 were selected from historical fire atlas data; five additional fire years were selected from a fire history completed in a subalpine forest...

Author(s): Kurt F. Kipfmüller, Thomas W. Swetnam

Year Published: 2000

Type: Document

Conference Proceedings

The Mann Gulch Fire and the Canadian Forest Fire Danger Rating System

www.nrfirescience.org/resource/8408

The year 1999 marks the 50th anniversary of the Mann Gulch Fire that occurred in western Montana on August 5, 1949 (Matthews 1999). There has been considerable interest amongst the Canadian wildland fire community in the 1949 Mann Gulch Fire ever since the publishing of MacLean's (1992) book 'Young Men and Fire' and Rothermel's (...)

Author(s): Martin E. Alexander

Year Published: 2000

Type: Document

Conference Proceedings

The use of shaded fuelbreaks in landscape fire management

www.nrfirescience.org/resource/8372

Shaded fuelbreaks and larger landscape fuel treatments, such as prescribed fire, are receiving renewed interest as forest protection strategies in the western United States. The effectiveness of fuelbreaks remains a subject of debate because of differing fuelbreak objectives, prescriptions for creation and maintenance, and their...

Author(s): James K. Agee, Bernhard Bahro, Mark A. Finney, Philip N. Omi, David B. Sapsis, Carl N. Skinner, Jan W. van Wagtenonk, Charles P. Weatherspoon

Year Published: 2000

Type: Document

Book or Chapter or Journal Article, Synthesis

Chapter 1: Introduction to wildland fire in ecosystems: effects of fire on fauna

www.nrfirescience.org/resource/12603

Fires affect animals mainly through effects on their habitat. Fires often cause short-term increases in wildlife foods that contribute to increases in populations of some animals. These increases are moderated by the animals' ability to thrive in the altered, often simplified, structure of the postfire environment. The extent of...

Author(s): Jack L. Lyon, James K. Brown, Mark H. Huff, Jane Kapler Smith

Year Published: 2000

Type: Document

Technical Report or White Paper

The effects of thinning and similar stand treatments on fire behavior in western forests

www.nrfirescience.org/resource/11183

In the West, thinning and partial cuttings are being considered for treating millions of forested acres that are overstocked and prone to wildfire. The objectives of these treatments include tree growth redistribution, tree species regulation, timber harvest, wildlife habitat improvement, and wildfire-hazard reduction. Depending on...

Author(s): Russell T. Graham, Alan E. Harvey, Theresa B. Jain, Jonalea R. Tonn

Year Published: 1999

Type: Document
Technical Report or White Paper

Critical fire weather patterns of the United States

www.nrfirescience.org/resource/12780

Descriptions of critical fire weather patterns from across the United States. Watch out conditions discussed.

Year Published: 1999

Type: Document

Research Brief or Fact Sheet

Development of input data layers for the FARSITE fire growth model for the Selway-Bitterroot Wilderness Complex, USA

www.nrfirescience.org/resource/11240

Fuel and vegetation spatial data layers required by the spatially explicit fire growth model FARSITE were developed for all lands in and around the Selway-Bitterroot Wilderness Area in Idaho and Montana. Satellite imagery and terrain modeling were used to create the three base vegetation spatial data layers of potential vegetation,...

Author(s): Robert E. Keane, Janice L. Garner, Kirsten M. Schmidt, Donald G. Long, James P. Menakis, Mark A. Finney

Year Published: 1998

Type: Document

Technical Report or White Paper

Making sense of fire weather

www.nrfirescience.org/resource/8122

This paper analyzes data from 339 large wildland fires that occurred in the Continental United States from 1971 through 1984. Each fire burned 1,000 acres (400 ha) or more. Each fire was associated with the nearest upper-air weather station and classified according to its season (spring, summer, autumn, or winter). Results of this...

Author(s): Brian E. Potter

Year Published: 1997

Type: Document

Book or Chapter or Journal Article

Wildfire case study: Butte City Fire, southeastern Idaho, July 1, 1994

www.nrfirescience.org/resource/11146

The Butte City Fire occurred on July 1, 1994, west of Idaho Falls, ID. Ignited from a burning flat tire, the blaze was driven by high winds that caused it to cover over 20,500 acres in just over 6.5 hours. Sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) is the principal shrub species of this high desert rangeland. With the...

Author(s): Bret W. Butler, Timothy D. Reynolds

Year Published: 1997

Type: Document

Technical Report or White Paper

The ecological implications of fire in Greater Yellowstone, proceedings of the second biennial conference on the Greater Yellowstone Ecosystem

www.nrfirescience.org/resource/11989

Proceedings of the second biennial conference on the Greater Yellowstone Ecosystem.

Author(s): Jason Greenlee
Year Published: 1996
Type: Document
Conference Proceedings

Intermountain West lightning-caused fires: climatic predictors of area burned

www.nrfirescience.org/resource/11460

An increase in continuous fine fuels promoted by the expansion of aggressive annual exotic grasses in the Intermountain West has altered the region's fire regimes, with both ecologic and economic ramifications. I examine the predictive nature of seasonal climatic variables, seasonal precipitation and temperature data up to 2 years...

Author(s): Paul A. Knapp
Year Published: 1995
Type: Document
Book or Chapter or Journal Article

A statistical-topographic model for mapping climatological precipitation over mountainous terrain

www.nrfirescience.org/resource/8361

The demand for climatological precipitation fields on a regular grid is growing dramatically as ecological and hydrological models become increasingly linked to geographic information systems that spatially represent and manipulate model output. This paper presents an analytical model that distributes point measurements of monthly...

Author(s): Christopher Daly, Ronald P. Neilson, Donald L. Phillips
Year Published: 1994
Type: Document
Book or Chapter or Journal Article

Fire growth maps for the 1988 Greater Yellowstone Area fires

www.nrfirescience.org/resource/11212

Daily fire growth maps display the growth of the 1988 fires in the Greater Yellowstone Area. Information and data sources included daily infrared photography flights, satellite imagery, ground and aerial reconnaissance, command center intelligence, and the personal recollections of fire behavior observers. Fire position was...

Author(s): Richard C. Rothermel, Roberta A. Hartford, Carolyn H. Chase
Year Published: 1994
Type: Document
Technical Report or White Paper

Probability of fire-stopping precipitation events

www.nrfirescience.org/resource/11933

Fire managers in the Northwestern United States are often confronted by the problem of determining when precipitation might stop an ongoing fire. The possibility that a useful probability for fire-stopping precipitation could be developed from historical weather records was investigated. Persons familiar with weather and fire...

Author(s): Donald J. Latham, Richard C. Rothermel
Year Published: 1993
Type: Document
Research Brief or Fact Sheet

Mann Gulch fire: a race that couldn't be won

www.nrfirescience.org/resource/11196

The Mann Gulch fire, which over ran 16 firefighters in 1949, is analyzed to show its probable movement with respect to the crew. The firefighters were smokejumpers who had parachuted near the fire on August 5, 1949. While they were moving to a safer location, the fire blocked their route. Three survived, the foreman who ignited...

Author(s): Richard C. Rothermel

Year Published: 1993

Type: Document

Technical Report or White Paper

The evaluation of Idaho wildfire growth using the Haines Index

www.nrfirescience.org/resource/8307

An atmospheric index specifically designed to be related to the growth of wildland fires is evaluated for two recent Idaho fires. The index includes terms related to high midlevel lapse rates and low-level dry air. In the cases examined, the index performs well at pinpointing the time of the most explosive fire growth. Long-term...

Author(s): Paul A. Werth, Richard Ochoa

Year Published: 1993

Type: Document

Book or Chapter or Journal Article

Lookouts, communication, escape routes, safety zones

www.nrfirescience.org/resource/15460

In a presentation to the USDA Forest Service's national Fire and Aviation Staff, Gleason provides a clear overview of his proposed Lookouts, Communication, Escape Routes, Safety Zones (LCES) method of training firefighters for greater safety. After defining LCES, he discusses how it should be implemented on the ground. He emphasizes...

Author(s): Paul Gleason

Year Published: 1991

Type: Document

Management or Planning Document

The 1985 Butte fire in central Idaho: a Canadian perspective on the associated burning conditions

www.nrfirescience.org/resource/11055

During the afternoon of August 29, 1985, the Butte Fire made a high-intensity crown fire run, covering a distance of 2.22 km in one hour and 40 minutes, and forcing 73 fire fighters to deploy their protective fire shelters. This paper presents a retrospective analysis of the fire behavior in terms of the two major subsystems of the...

Author(s): Martin E. Alexander

Year Published: 1991

Type: Document

Conference Proceedings, Technical Report or White Paper

Fuel moisture as measured and predicted during the 1988 fires in Yellowstone National Park

www.nrfirescience.org/resource/11109

Fine fuel moisture content, relative humidity, air temperature, and fire behavior were observed hourly for 48 hours on the North Fork Fire in Yellowstone National Park from August 25 to August 27, 1988. Fine fuel reached minimum moisture content of 3 to 5 percent late in the afternoon, remained below 8 percent until after midnight,...

Author(s): Roberta A. Hartford, Richard C. Rothermel
Year Published: 1991
Type: Document
Research Brief or Fact Sheet

Predicting behavior of the 1988 Yellowstone fires: projections versus reality

www.nrfirescience.org/resource/8252

An account is presented of the initial long range, 30-day, projections of fire growth of the wildfires in the Greater Yellowstone Area in 1988. The request for information, the method of prediction, and the actual fire growth are discussed and documented with maps. The difficulties and uncertainties of long-range fire prediction...

Author(s): Richard C. Rothermel
Year Published: 1991
Type: Document
Book or Chapter or Journal Article

Predicting behavior and size of crown fires in the northern Rocky Mountains

www.nrfirescience.org/resource/11195

Assessment of crown fire conditions calls for two important judgments: (1) identifying conditions for the onset of severe fires, and (2) predicting the spread rate, intensity, and size of expected crown fires. This paper addresses the second problem and provides methods for making a first approximation of the behavior of a running...

Author(s): Richard C. Rothermel
Year Published: 1991
Type: Document
Technical Report or White Paper

The Haines Index and Idaho fire growth

www.nrfirescience.org/resource/8306

[Excerpted from text] The growth of wildfires is related to three broad factors: fuel type, topography and weather. The National Fire Danger Rating System and the Fire Behavior Prediction System combine these factors to predict the probability and severity of wildland fires. However, these systems have mixed results in predicting...

Author(s): Paul A. Werth, Richard Ochoa
Year Published: 1990
Type: Document
Book or Chapter or Journal Article

FIRESUM-an ecological process model for fire succession in western conifer forests

www.nrfirescience.org/resource/11917

Describes an ecological process model of succession that simulates long-term stand dynamics in forests of the Northern Rocky Mountains. This model is used to evaluate the effects of various fire regimes, including prescribed burning and fire suppression, on the vegetation and fuel complex of a simulation stand. This report documents...

Author(s): Robert E. Keane, Stephen F. Arno, James K. Brown
Year Published: 1989
Type: Document
Technical Report or White Paper

The relationship between mean monthly fire potential indices and monthly fire severity

www.nrfirescience.org/resource/10970

Thirty-day forecasts of fire potential are needed, and can be computed using a variety of monthly fire weather indices. But which indices are most related to monthly fire severity? Correlation analysis was used to determine the relationships between mean monthly fire potential indices and monthly measures of fire severity at 16...

Author(s): M. H. McCutchan, William A. Main

Year Published: 1989

Type: Document

Conference Proceedings

Help with making crown fire hazard assessments

www.nrfirescience.org/resource/11046

This paper offers some suggestions and field guides with respect to the operational application of C.E. Van Wagner's (1997, Can. J. For. Res. 7:23-34) theory to calculate the threshold conditions for the start and spread of crown fires in conifer forests. Three categories of crowning are recognized (passive, active, and independent...

Author(s): Martin E. Alexander

Year Published: 1988

Type: Document

Conference Proceedings, Technical Report or White Paper

Appraising fuels and flammability in western aspen: a prescribed fire guide

www.nrfirescience.org/resource/11132

Describes a method for appraising fuels and fire behavior potential in aspen forests to guide the use of prescribed fire and the preparation of fire prescriptions. Includes an illustrated classification of aspen fuels; appraisals of fireline intensity, rate of spread, adjective ratings for fire behavior and probability of burn...

Author(s): James K. Brown, Dennis Simmerman

Year Published: 1986

Type: Document

Technical Report or White Paper

Surface fuel loadings and predicted fire behavior for vegetation types in the northern Rocky Mountains

www.nrfirescience.org/resource/11930

Means, standard deviations, and quartiles of fuel loadings were determined for litter, for downed woody material of 0 to one-fourth inch, one-fourth to 1 inch, 0 to 1 inch, and 1 to 3 inches, for herbaceous vegetation, and for shrubs by cover types and fire groups. The studies were conducted at four locations in northwestern Wyoming...

Author(s): James K. Brown, Collin D. Bevins

Year Published: 1986

Type: Document

Research Brief or Fact Sheet

Predicting duff and woody fuel consumed by prescribed fire in the Northern Rocky Mountains

www.nrfirescience.org/resource/11265

Relationships for predicting duff reduction, mineral soil exposure, and consumption of downed woody fuel were determined to assist in planning prescribed fires. Independent variables included lower and entire duff moisture contents, loadings of downed woody fuels, duff depth, National Fire-Danger Rating System 1,000-hour moisture...

Author(s): James K. Brown, Michael A. Marsden, Kevin C. Ryan, Elizabeth D. Reinhardt

Year Published: 1985
Type: Document
Technical Report or White Paper

Fire Review of the 1985 Log Tom Fire Complex (Butte Fire)

www.nrfirescience.org/resource/15987

This report reviews the Long Tom Fire Complex. The review team identified 11 issues and provided alternatives for them to reduce suppression costs, improve suppression efficiency, and minimize resource impacts on future large fires in the Salmon River area.

Author(s): Jerry Monesmith, Dick Flannelly, Bert Strom, Jim Lawrence

Year Published: 1985

Type: Document

Management or Planning Document

Behavior of the life-threatening Butte Fire: August 27-29, 1985

www.nrfirescience.org/resource/8314

On August 29, 1985, 73 firefighters were forced into safety zones, where they took refuge in their fire shelters for 1 to 2 hours while a very severe crown fire burned over them. The incident took place on the Butte Fire on the Salmon National Forest in Idaho. Five firefighters were hospitalized overnight for heat exhaustion, smoke...

Author(s): Richard C. Rothermel, Robert W. Mutch

Year Published: 1985

Type: Document

Book or Chapter or Journal Article

Modeling behavior of prescribed fires in Yosemite National Park

www.nrfirescience.org/resource/8313

The National Fire Danger Rating System and the Fire Behavior Prediction System were tested on prescribed fires burning underneath canopies in six fuel types in Yosemite National Park, California. The mean error for rate of spread was +0.03 foot per minute for the NFDRS and -0.15foot for the FBPS. For flame length factors for...

Author(s): Jan W. van Wagtendonk, Stephen J. Botti

Year Published: 1984

Type: Document

Book or Chapter or Journal Article

Changes in fire weather distributions: effects on predicted fire behavior

www.nrfirescience.org/resource/11221

Data that represent average worst fire weather for a particular area are used to index daily fire danger; however, they do not account for different locations or diurnal weather changes that significantly affect fire behavior potential. To study the effects that selected changes in weather databases have on computed fire behavior...

Author(s): Lucy A. Salazar, Larry S. Bradshaw

Year Published: 1984

Type: Document

Technical Report or White Paper

Wildland fires: predicting the behavior of wildland fires-among nature's most potent forces-can save lives, money, and natural resources

www.nrfirescience.org/resource/8315

During a period of three days in mid-February 1983, bushfires swept over 400,000 ha in southern Australia, killing 74 people, destroying more than 2,000 homes, and burning out 7 towns. This tragic repetition of the fires of January 1939, in which 71 people perished, was foretold by Noble (1977), whose monograph on the 1939 fires...

Author(s): Frank A. Albini

Year Published: 1984

Type: Document

Book or Chapter or Journal Article

Monoammonium phosphate: effect on flammability of excelsior and pine needles

www.nrfirescience.org/resource/11959

The study quantified differences between fire-retarding abilities of monoammonium phosphate samples from five different sources. Ponderosa pine needles and aspen excelsior fuel beds were spray-treated with different levels of chemical solutions, dried, and burned under controlled laboratory conditions.

Flame spread and energy...

Author(s): Aylmer D. Blakely

Year Published: 1983

Type: Document

Technical Report or White Paper

Fuel and fire behavior prediction in big sagebrush

www.nrfirescience.org/resource/11957

Relationships between height of big sagebrush and crown area, fuel loading, bulk density, size distribution of foliage and stemwood, and fraction dead stemwood are presented. Based upon these relationships, modeled rate-of-fire spread and fireline intensity are shown for sagebrush ranging in height from 20 to 120 cm and in coverage...

Author(s): James K. Brown

Year Published: 1982

Type: Document

Technical Report or White Paper

Lightning direction-finding systems for forest fire detection throughout the western United States and Alaska

www.nrfirescience.org/resource/7958

Extensive networks of magnetic direction-finding (DF) stations have been installed throughout the western United States and Alaska to facilitate early detection of lightning-caused fires. Each station contains a new wideband direction-finder that responds primarily to cloud-to-ground lightning and discriminates against cloud...

Author(s): E. Philip Krider, R. C. Noggle, A. E. Pifer, Dale L. Vance

Year Published: 1980

Type: Document

Book or Chapter or Journal Article

Influence of harvesting and residues on fuels and fire management

www.nrfirescience.org/resource/13134

Fuel and fire behavior potential in clearcut lodgepole pine and in Douglas-fir/larch under clearcutting, group selection, and shelterwood silvicultural systems were compared after logging to near-complete and conventional utilization standards. Fuels and fire behavior potentials were unaffected by silvicultural...

Author(s): James K. Brown

Year Published: 1980

Type: Document
Technical Report or White Paper

Progress toward locating lightning fires

www.nrfirescience.org/resource/12120

Systems to enable land managers to locate, evaluate, and counter the fire threat of lightning storms are in the early stages of development. In the western U.S. and Alaska, the Bureau of Land Management has established networks of instruments that locate lightning strikes by means of recorded azimuths. Further research could add...

Author(s): Donald J. Latham
Year Published: 1979
Type: Document
Research Brief or Fact Sheet

Predicting slash depth for fire modeling

www.nrfirescience.org/resource/11954

Development of equations for predicting fuel bed depth (called "bulk depth" herein) appropriate for modeling fire behavior in slash is described. Bulk depth (y) was correlated with the expected number of 1/4-to 1-inch-diameter particle intercepts per foot of vertical plane transect (x) by regressions of the form $y = a \cdot x$. Values of "...

Author(s): Frank A. Albini, James K. Brown
Year Published: 1978
Type: Document
Technical Report or White Paper

Fire danger rating network density

www.nrfirescience.org/resource/11969

Conventional statistical techniques are used to answer the question, "What is the necessary station density for a fire danger network?" The Burning Index of the National Fire-Danger Rating System is used as an indicator of fire danger. Results are presented as station spacing in tabular form for each of six regions in the western...

Author(s): Rudy M. King, R. William Furman
Year Published: 1976
Type: Document
Technical Report or White Paper

Broadcast burning in larch-fir clearcuts: the Miller Creek-Newman Ridge study

www.nrfirescience.org/resource/11950

Seventy-three clearcuts in western larch/Douglas-fir forests of western Montana were broadcast burned over a wide range of environmental conditions for the purpose of quantifying fire characteristics and burn accomplishment. The moisture content of the upper duff, and the National Fire-Danger Rating System Buildup Index (1964) were...

Author(s): William R. Beaufait, Charles E. Hardy, William C. Fischer
Year Published: 1975
Type: Document
Technical Report or White Paper

Smoke column height related to fire intensity

www.nrfirescience.org/resource/11946

Height of slash fire smoke columns, commonly thought to be a function of atmospheric conditions

alone, through a series of 10-acre experimental fires is shown to be strongly related to fire intensity. By conducting intense fires, land managers can possibly burn forest debris and still maintain air quality when atmospheric conditions...

Author(s): Rodney A. Norum

Year Published: 1974

Type: Document

Technical Report or White Paper

30 years of vegetation change following burning of sagebrush-grass range

www.nrfirescience.org/resource/15395

A sagebrush-grass range was burned according to plan in 1936. Long-term results show that sagebrush yields have increased while most other important shrub, grass, and forb yields have decreased. Evaluation by subspecies of sage-brush was helpful in interpreting sagebrush behavior. The return of sagebrush shows the need for planning...

Author(s): Roy O. Harniss, Robert B. Murray

Year Published: 1973

Type: Document

Book or Chapter or Journal Article

Meteorological factors in the Sundance Fire run

www.nrfirescience.org/resource/11905

Strong, sustained, southwesterly winds were a major factor in the Sundance Fire run in northern Idaho during which the fire front raced 16 miles northeastward within a 9-hr. period on September 1, 1967. These winds were found to be dependent upon an unusually strong summertime pressure gradient ahead of an approaching trough,...

Author(s): Arnold I. Finklin

Year Published: 1973

Type: Document

Technical Report or White Paper

Field test of a rate-of-fire-spread model in slash fuels

www.nrfirescience.org/resource/11945

Predicted rates of fire spread using a mathematical model were consistently greater but in reasonably close agreement with rates observed on test fires in ponderosa pine and Douglas-fir slash. Fuel loading, bulk density, particle density, particle surface-to-volume ratio, heat content, total plant salt content, silica-free salt,...

Author(s): James K. Brown

Year Published: 1972

Type: Document

Technical Report or White Paper

The pyrolysis products and thermal characteristics of cottonwood and its components

www.nrfirescience.org/resource/11944

This study was undertaken to determine the thermal properties of, and the pyrolysis products from, western cottonwood (*Populus trichocavva*) and two of its major components: cellulose and xylan. The modifications due to treatment of the wood and its components with an acid and alkali were also documented. Differential thermal...

Author(s): Charles W. Philpot

Year Published: 1971

Type: Document

Technical Report or White Paper

Airborne infrared forest fire detection system: final report

www.nrfirescience.org/resource/11942

This work was undertaken because of a mutual interest of the Department of Defense, Advanced Research Projects Agency (ARPA), and the USDA Forest Service in the problems of detecting hot targets against natural terrain backgrounds using airborne infrared (IR) line scanning instrumentation. The study objectives were broadly defined...

Author(s): Ralph A. Wilson, Stanley N. Hirsch, Forrest H. Madden, John B. Losensky

Year Published: 1971

Type: Document

Technical Report or White Paper

The seasonal trends in moisture content, ether extractives, and energy of ponderosa pine and Douglas-fir needles

www.nrfirescience.org/resource/11943

The moisture, ether extractive, and energy content of ponderosa pine (*Pinus ponderosa* Laws.) and Douglas-fir (*Pseudotsuga menziesii* L.) foliage were measured during two fire seasons. The moisture content of 1- and 2-year-old needles was found to rise throughout the summer. The ether extractive content was highest in the fir foliage...

Author(s): Charles W. Philpot, Robert W. Mutch

Year Published: 1971

Type: Document

Technical Report or White Paper

Tree-bole ignition in superimposed lightning scars

www.nrfirescience.org/resource/11921

This Note presents observations on a little-known mode of tree-bole ignition by lightning in which a fire-setting discharge partially superimposes its furrow upon an older lightning scar and causes ignition in the older injury.

Author(s): Alan R. Taylor

Year Published: 1969

Type: Document

Research Brief or Fact Sheet

Sundance Fire: an analysis of fire phenomena

www.nrfirescience.org/resource/11229

The Sundance Fire on September 1, 1967, made a spectacular run of 16 miles in 9 hours and destroyed more than 50,000 acres. This run became the subject of a detailed research analysis of the environmental, topographic, and vegetation variables aimed at reconstructing and describing fire phenomena. This report details the fire's...

Author(s): Hal E. Anderson

Year Published: 1968

Type: Document

Technical Report or White Paper

Project Fire Scan fire mapping final report, April 1962 to December 1966

www.nrfirescience.org/resource/11939

Information about a fire's perimeter is a prerequisite for the control of large fires, whether caused by nuclear war, lightning, or man's carelessness. Visual aerial reconnaissance is usually limited by smoke. Location of a fire's perimeter with respect to surrounding terrain is difficult to determine at night by

visual means. The...

Author(s): Stanley N. Hirsch

Year Published: 1968

Type: Document

Technical Report or White Paper

Mechanisms of fire spread research progress report no. 2

www.nrfirescience.org/resource/11937

In 1961 the National Science Foundation awarded grants to Washington State University and the Northern Forest Fire Laboratory of the Intermountain Forest and Range Experiment Station to further a joint study of the mechanisms of fire spread in wildland fuels. The combined efforts of the two research groups encompass theoretical...

Author(s): Hal E. Anderson

Year Published: 1966

Type: Document

Technical Report or White Paper

Temperatures in a large natural-fuel fire

www.nrfirescience.org/resource/11475

Temperatures in a large natural fuel test fire were measured with bare, shielded aspirated, and shielded unshielded chromel-alumel thermocouples. With the bare thermocouples, values of 2650 F. were recorded--much higher than most previously published data from field and laboratory wood fires. Soil temperatures were consistent with...

Author(s): Charles W. Philpot

Year Published: 1966

Type: Document

Research Brief or Fact Sheet

Project fire scan: fire detection interim report, April 1962 to December 1964

www.nrfirescience.org/resource/11935

The original program objectives were to develop and test a heat-sensitive system capable of: (1) locating small fires, (2) mapping fire perimeters, and (3) measuring rates of fire spread. The usefulness of infrared mappers was to be examined by surveillance of fire sources in forest environments. The capability for locating fire...

Author(s): Ralph A. Wilson, Nonan V. Noste

Year Published: 1966

Type: Document

Technical Report or White Paper

Characteristics of backfires and headfires in a pine needle fuel bed

www.nrfirescience.org/resource/11920

Burning characteristics of backfires, headfires, and no-wind fires in fuel beds of ponderosa pine needles were compared at the Northern Forest Fire Laboratory. Data gathered under controlled laboratory conditions indicate that fires backed into the wind (backfires) consistently burn slower, longer, and deeper than fires burned with...

Author(s): William R. Beaufait

Year Published: 1965

Type: Document

Research Brief or Fact Sheet

Calculating the National Fire-Danger Rating spread index by computer

www.nrfirescience.org/resource/11918

Changeover from use of the Intermountain Model-8 Burning Index Meter to use of the Spread Index of the National Fire-Danger Rating System required a comparative analysis of both systems. This note describes a program written in SPS to calculate various indexes of both systems on an IBM 1620 computer.

Author(s): Richard J. Barney

Year Published: 1964

Type: Document

Research Brief or Fact Sheet

Conversion tables for use with the National Fire-Danger Rating System in the Intermountain Area

www.nrfirescience.org/resource/11919

Two tables prepared for use with the National Fire-Danger Rating System replace 10 tables previously used with the Model-8 Fire-Danger Rating System. They provide for the conversion of Spread Index values at various altitudes, aspects, and times of day. A rate of spread table facilitates converting Spread Index values to chains per...

Author(s): Dwight S. Stockstad, Richard J. Barney

Year Published: 1964

Type: Document

Research Brief or Fact Sheet

The relationship of jet streams to forest fires

www.nrfirescience.org/resource/11470

Problems being encountered in implementing fire prevention programs were explored by studying the organization for fire prevention at the Fish Lake, Uinta, and Wasatch National Forests in Utah. The study focused on role congruency in fire prevention activities and on the social and organizational obstacles to effective programs. The...

Author(s): V. J. Schaefer

Year Published: 1957

Type: Document

Book or Chapter or Journal Article

Fire behavior in Northern Rocky Mountain Forests

www.nrfirescience.org/resource/11133

The main purpose of this publication is to summarize the most important aspects of fire behavior as we now know them. The author recognizes that there are still many unknowns in the behavior of forest and range fires. These unknowns will be the targets of future research. In the meantime it is important that the best available...

Author(s): Jack S. Barrows

Year Published: 1951

Type: Document

Technical Report or White Paper

Death in Blackwater Canyon

www.nrfirescience.org/resource/11494

On August 21, 1937, the tragic Blackwater Fire caused the death of 15 firefighters, burning approximately 1,700 acres of National Forest System lands on the Shoshone National Forest, near Cody, Wyoming. An electrical storm occurred in the general vicinity of Blackwater Creek on Wednesday, August 18th causing a fire, which was not...

Author(s): Erle Kauffman
Year Published: 1937
Type: Document
Book or Chapter or Journal Article

Meteorological conditions affecting the Freeman Lake (Idaho) Fire

www.nrfirescience.org/resource/8305

[Excerpt from text] Measurements of meteorological conditions prevailing during the rapid spread of forest fires are greatly needed so that when their recurrence seems probable, fire weather forecasters may issue warnings of the danger.

Author(s): George M. Jemison
Year Published: 1932
Type: Document
Book or Chapter or Journal Article

Meteorological factors in the Quartz Creek forest fire

www.nrfirescience.org/resource/8304

[Excerpted from text] It is not often that a large forest fire occurs conveniently near a weather station specially equipped for measuring forest-fire weather. The 13,000-acre Quartz Creek fire on the Kaniksu National Forest during the summer of 1936 was close enough to the Priest River Experimental...

Author(s): Harry T. Gisborne
Year Published: 1927
Type: Document
Book or Chapter or Journal Article

Predicting local smoke dispersion during low-intensity wildland fires in forested environments

www.nrfirescience.org/resource/12835

Smoke generated from low-intensity prescribed fires used for fuels management can have an adverse impact on local air quality, raising human health and safety concerns especially in wildland-urban-interface areas. Local smoke behavior is a complex process and is highly dependent on local ambient atmospheric conditions (e.g....

Type: Media

Webinar

Close call - What you can learn from the Ahorn fire shelter deployment

www.nrfirescience.org/resource/14120

A look at the "close call" firefighter shelter deployment that occurred on the Ahorn Fire—focusing on key lessons and effective practices to be learned from this incident. This video from the Wildland Fire Lessons Learned Center.

Type: Media

Video

Fire Modeling in the Wildland Fire Decision Support System - WFDSS

www.nrfirescience.org/resource/59

Mediasite video presentation given by Sam Amato, (National Fire Decision Support Center) at the 2011 Southwest Interagency Fuels Workshop, Flagstaff, AZ on March 10, 2011. The Wildland Fire Decision Support System (WFDSS) model uses different fire models to provide landscape scale fire modeling. This presentation defines the model...

Type: Media

Video

Energy transport in fires and how it relates to firefighter safety zones

www.nrfirescience.org/resource/14334

All wildland firefighters are required to identify a location to which they can retreat in the event that fire conditions threaten their safety. These areas termed safety zones. However it was not until the work by Butler and Cohen in 1995 that any quantitative information existed for actually gauging the...

Type: Media

Webinar

Beyond the stability index: fire management and forecasting tools for air quality, weather and climate impacts of prescribed fires

www.nrfirescience.org/resource/13063

This webinar introduced and described forecasting tools for air quality, weather and climate impacts of prescribed fires.

Type: Media

Webinar

The how, what, and where of safety zones: recent findings

www.nrfirescience.org/resource/12823

Bret Butler presented a webinar on December 2, 2014. Current safety zone guidelines for wildland firefighters are based on the assumption of flat ground, no wind, and radiative heating only. Recent measurements in grass, shrub and crown fires indicate that convective heating can be significant especially when wind or slope are...

Type: Media

Webinar

Part 2. Wildland fire, smoke & roadway visibility series: Weather information and tools available to stay ahead of superfog events

www.nrfirescience.org/resource/15295

In Part 2 of the Wildland Fire Smoke and Roadway Visibility Webinar Series, Gary Curcio, former Fire Environment Branch Head NC Forest Service, presented information on the following topics: • Obtaining and tracking key environmental variables • Reviewing operationally developed indexes (Turner Stability Index (TS),...

Type: Media

Webinar

Lodgepole pine ecology & fire behavior

www.nrfirescience.org/resource/14098

This webinar was not recorded. Media link below is to a pdf of the webinar slide show. This presentation covers the following points: 1) Surprises/Lessons from the 1988 fires in Yellowstone National Park; 2) Resistance to an aggressive invasive species in post-fire lodgepole pine forests; 3) Interactions of mountain pine...

Type: Media

Webinar

American burning: the Yarnell Hill fire tragedy and the nation's wildfire crisis

www.nrfirescience.org/resource/14305

On June 30, 2013, 19 firefighters from the Granite Mountain Hotshots were killed battling a wildfire near Yarnell, Arizona. Huge questions remain about the last moments of their lives. Why did they move out

of a safe area in their final minutes of life? Why did the fire move so quickly? Could their deaths have been prevented? The...

Type: Media

Video

An Assessment of Temperature and RH from a Variety of Weather Meters

www.nrfirescience.org/resource/15934

Do you use belt weather kits or electronic handheld weather meters for measuring temperature and relative humidity in the field? Which device do you trust? Belt weather kits for obtaining weather information on prescribed fires and wildfires have been in use since the 1960's and the use of sling psychrometers from these kits has...

Type: Media

Webinar

Burning rate of porous fuel beds with and without wind

www.nrfirescience.org/resource/13770

This webinar was presented as part of the 2015-2016 RMRS Fire Sciences Laboratory's weekly seminar series.

Type: Media

Seminar

Critical fire weather patterns - Western United States

www.nrfirescience.org/resource/12820

In this webinar, presented on February 11, 2015, Paul Werth, a fire weather meteorologist with Weather Research and Consulting Services, LLC, provides a discussion of weather elements that promote extreme fire behavior, regional critical fire weather patterns, and forecast products that are useful in determining areas at risk for...

Type: Media

Webinar

A new look at the seasonal dynamics of live fuel physio-chemistry and their potential influence on wildland fire behavior

www.nrfirescience.org/resource/13250

Wildland fires spread through combinations of living and dead vegetation and the largest fires generally occur in fuels that are dominated by living plants. While much is known about the factors that regulate fire spread through dead fuels, the controlling factors of live fuel flammability have proven elusive. Here we present an...

Type: Media

Webinar

A topographically resolved wildfire danger and drought monitoring system for the conterminous United States

www.nrfirescience.org/resource/15242

Patterns of energy and available moisture vary over small distances in mountainous regions and available climate data are too coarse to resolve these terrain-mediated effects. This seminar focused on efforts to improve the physical template we use to analyze vegetation patterns and post-fire ecological effects, including what has...

Type: Media

Seminar

How effective were fuel treatments in the 2011 Wallow fire?

www.nrfirescience.org/resource/14301

This webinar presents results of an opportunistic study to quantify the performance of thinning and surface fuel treatment in migrating wildfire behavior and severity, as represented by bole char, crown scorch proportion, tree burn severity index, on the largest wildfire in southwest USA history: 2011 Wallow fire. The results...

Type: Media

Webinar

Rapidly-updating numerical weather prediction for fire weather situational awareness and forecasting: The High-Resolution Rapid Refresh model

www.nrfirescience.org/resource/15804

The 3-km High-Resolution Rapid Refresh (HRRR) numerical weather prediction model, developed at the NOAA Earth System Research Laboratory and operational since September 2014, is a tool for situational weather awareness and short-range forecasting for a variety of end-user applications, ranging from severe weather prediction to...

Type: Media

Seminar

The fire lab

www.nrfirescience.org/resource/14664

Massive wildfires cost billions of dollars and burn millions of acres in the U.S. every year, but we know surprisingly little about the basic science of how they spread. At the Fire Lab in Missoula, Montana, researchers reverse-engineer spreading fires using wind tunnels, fire-whirl generators, and giant combustion chambers. They're...

Type: Media

Video

Elements of the National Weather Service fire weather forecast

www.nrfirescience.org/resource/13247

Casey Sullivan provides an overview of the National Weather Service fire weather forecast program and discusses elements of the fire weather forecast available to any fire practitioner. The hourly weather graph and definitions of surface winds were emphasized.

Type: Media

Webinar

Transitioning from a small fire: fire behavior driving episodic fire growth after 1988 in Yellowstone National Park

www.nrfirescience.org/resource/15154

This presentation was part of the 13th Biennial Scientific Conference on the Greater Yellowstone Ecosystem held at Jackson Lake Lodge in Grand Teton National Park, October 4-6, 2016. The conference theme was Building on the Past, Leading into the Future: Sustaining the Greater Yellowstone Ecosystem in the Coming Century.

Type: Media

Webinar

Fire behavior in the wildland/urban interface

www.nrfirescience.org/resource/14009

The National Wildland/Urban Interface Fire Protection Program (www.firewise.org) Firefighter Safety

Series FWC-602-03-DVD. Part 1: Fire Behavior in the Wildland/Urban Interface. The Fire Fighter Safety Series is a multipart instructional package developed for small community fire departments to address the...

Type: Media

Video

The structure of fire size distributions: a broad view of interacting gradients in wilderness management, spatial climate, and topography in three western regions

www.nrfirescience.org/resource/12813

Determining the effects of land management on fire regime characteristics is complicated by the interaction of several factors that vary in space and time. First, fire size and frequency are linked to climate conditions, including drought, as well as wind and temperature that define weather conditions during burning. Second,...

Type: Media

Webinar

Wildland Fire Assessment Tool

www.nrfirescience.org/resource/14297

WFAT provides an interface between ArcMap, FlamMap 5, and the First Order Fire Effects Model (FOFEM), combining their strengths into a spatial fire behavior and fire effects analysis tool in GIS. In the webinar, you will learn how to use WFAT to locate potential fuel treatment units, develop a prescription for those units, and...

Type: Media

Webinar

Predicting Burn Severity Patterns in Yosemite National Park and the Douglas Complex Fires in Oregon

www.nrfirescience.org/resource/15798

Mountainous topography creates fine-scale environmental mosaics that vary in precipitation, temperature, insolation, and slope position. This mosaic in turn influences fuel accumulation, moisture, and forest structure that in turn influence patterns of burn severity. We studied the effects of varying environmental conditions on burn...

Type: Media

Seminar

Introduction to remote sensing for wildfire applications: terrain data applications

www.nrfirescience.org/resource/13242

The fifth webinar in this series covered data access, tools, and recent terrain data releases.

Type: Media

Webinar

A summary of fire season 2016 in Oregon and Washington

www.nrfirescience.org/resource/15112

John Saltenberger, Meteorologist with the US Fish and Wildlife Service, presented A Summary of Fire Season 2016 in OR and WA. This webinar was hosted by the NW Fire Science Consortium.

Type: Media

Webinar

Climate, Megafires, and Conservation Financing

www.nrfirescience.org/resource/16356

Join us in a discussion on how climatic changes can influence wildland fire activity across the globe and how these critical fire weather variables have changed over the last 40 years. These changes in key weather variables have combined to both lengthen the fire season and increase the fire weather severity within the fire season....

Type: Media

Webinar

Development of a Fully Integrated Meteorological/Fire Behavior/Smoke Modeling

www.nrfirescience.org/resource/15793

An modeling/science team of the US Forest Service Washington Office, Rocky Mountain Research Station, and Pacific Northwest Research Station is conducting a proof-of-concept study integrating meteorological, fire behavior, fuels, and air quality models to improve the accuracy of smoke model dispersion forecasts. The atmospheric...

Type: Media

Seminar

A dynamic, severe fire weather potential mobile mapping program

www.nrfirescience.org/resource/14536

Goal of this tool is to provide spatial, dynamic fire danger and fire behavior assessment tools so that firefighters can abide by the Standard Fire Orders 1 and 3: "Keep informed of fire weather conditions and forecasts" and "Base all action on current and expected fire behavior".

Type: Media

Video

Vortices and wildland fire

www.nrfirescience.org/resource/13222

Scott Goodrick, a research meteorologist with the USDA Forest Service, and Jason Forthofer, a mechanical engineer with the USDA Forest Service, present a summary of vortices and wildland fire. Vortices are almost always present in the wildland fire environment and can sometimes interact with the fire in unpredictable ways, causing...

Type: Media

Webinar

The Story Behind the Yellowstone Fires of 198: retro Report

www.nrfirescience.org/resource/16084

This 11 minute video covers the lessons learned from the summer of 1988 when fires burned nearly one third of Yellowstone National Park. The 1988 fire continue to shape the way we fight wildfires raging across the West today.

Type: Media

Video

Spot fires

www.nrfirescience.org/resource/12940

Brian Potter, a research meteorologist with the USDA Forest Service, presented a summary of the state of science behind spot fires. Spotting is one characteristic of "extreme fire behavior," capable of short range acceleration of fires as well as producing long-distance spot fires that complicate management efforts. The...

Type: Media

Webinar

Evaluating the Swiss SNOWPACK modeling system across the Northern Rocky Mountains

www.nrfirescience.org/resource/15791

Since late 2015, a one dimensional model of snow pack structure, know as SNOWPACK, has been evaluated by the National Weather Service at Missoula, in collaboration with Montana State University. The model is driven by point-based output from a high-resolution numerical model (WRF-ARW).Hourly forecasts of incoming radiation,...

Type: Media

Seminar

Wildland Urban Interface Fires: An Overview for Homeowners

www.nrfirescience.org/resource/16067

This 58 minute video covers what the wildland-urban interface is and what the public and firefighters need to know about fighting fire in it.

Type: Media

Video

Weather forecast verification for fire behavior predictions

www.nrfirescience.org/resource/12876

Interpret results from a verification study of the NDFD grids from the local Missoula Weather Forecast Office and the implications for fire behavior forecasts that use NDFD data. Afternoon temperature, minimum humidity, and winds are investigated specifically, and the effects on a fire behavior forecast are evaluated with BehavePlus...

Type: Media

Webinar

Fires of 2000 overview: a fire manager perspective

www.nrfirescience.org/resource/13311

In this video, Jacquie Parks, Fire and Fuels Management Specialist with the Bitterroot National Forest, describes fire management challenges during the Bitterroot fires of 2000. This was filmed at the Bitterroot National Forest headquarters in Hamilton, MT, which was one of the stops during the Fires of 2000 field trip that was part...

Type: Media

Video

BehavePlus Fire Modeling System

www.nrfirescience.org/resource/16640

The BehavePlus fire modeling system is managed by the U.S.Forest Service, Rocky Mountain Research Station, Fire, Fuel, and Smoke Science Program (FFS) in Missoula, Montana. In 2014, information on BehavePlus was transferred from www.FireModels.org to this web location. If you are looking for information on FlamMap, FARSITE, or...

Type: Website

Website

Provision of science-based information and technology in support of the Canadian wildland fire strategy

www.nrfirescience.org/resource/14137

erry Anderson of the Canadian Forest Service, begins this presentation on the current fire research in Canada. The Canadian Forest Service provides national monitoring, model and software development,

mapping, and decision support systems, but is not in the business of fire suppression, since natural resources are owned by the...

Type: Media

Video

A research model of flame spread

www.nrfirescience.org/resource/14342

Current operational models of fire spread rely on several constraining assumptions that would ideally be relaxed. A promising method to do this is to develop a more physically based model rather than the mostly empirical basis for the current models. This seminar gives a preliminary look at one such model in...

Type: Media

Seminar

The New Generation Fire Shelter

www.nrfirescience.org/resource/16010

The New Generation Fire Shelter - National Wildfire Coordinating Group 2003 - NFES 2712 The new generation fire shelter offers improved protection from radiant and convective heat. All federal, state, and local wildland firefighters carry the fire shelter while working federal fires. As always, the fire shelter should be used only...

Type: Media

Video

Introduction to FlamMap5

www.nrfirescience.org/resource/12850

FlamMap is a fire behavior mapping and analysis program that computes potential fire behavior characteristics (spread rate, flame length, fireline intensity, etc.) over an entire FARSITE landscape for constant weather and fuel moisture conditions. Since 2006 FlamMap3 has been widely used by the U.S. Forest Service, National Park...

Type: Media

Webinar

WFDSS modeling and weather

www.nrfirescience.org/resource/14131

This webinar was facilitated by Tom St. Clair, Fairbanks, Alaska, and focused on WFDSS modeling and weather. The agenda items covered included: how to pick RAWs to get the best data for wind and fuels, using predicted weather, ERC classes tab in WFDSS, ERC streams tab in WFDSS, winds tab in WFDSS, dealing with weather forecast...

Type: Media

Webinar

National and global fire danger rating systems: development, applications, and improvements

www.nrfirescience.org/resource/14335

Wildland fire potential is best described as a combination of available fuels, suitable weather conditions and sources of ignitions and weather is the most spatially and temporally variable of these three components. Weather variables such as temperature, relative humidity, precipitation and wind speed...

Type: Media

Webinar

Look Up, Look Down, Look Around

www.nrfirescience.org/resource/15995

Look Up, Look Down, Look Around is a fire environment factors and fire behavior training video, released in 1993. It was assigned NFES #2244, and PMS #427. It contains several chapters on fuel characteristics that are important to fire behavior.

Type: Media

Video

Computer models for wildland and wildland-urban interface fires

www.nrfirescience.org/resource/13808

Hosted by the Northwest Fire Science Consortium. Ruddy Mell from the USFS Pacific Wildland Fire Sciences Lab in Seattle, WA provides an overview of the current state, limitations, and future developments in wildland and wildland-urban interface fire behavior models.

Type: Media

Webinar

Fuels and fire behavior data collected on wildland fires by the fire behavior assessment team

www.nrfirescience.org/resource/12833

Fire behavior and effects models are frequently used to inform fire and land management decisions despite a lack of testing against field measurements. The Adaptive Management Services Enterprise Team (AMSET, USFS) coordinates a module focused on the collection of pre- and post-fire fuels and fire behavior data during wildland fires...

Type: Media

Webinar

Part 3. Wildland fire, smoke & roadway visibility series: Planned Burn (PB) Piedmont Web Tool - Estimating Superfog potential from Smoldering Combustion

www.nrfirescience.org/resource/15297

In Part 3 of the Wildland Fire Smoke and Roadway Visibility Webinar Series, Matthew Fearon, research meteorologist for the Desert Research Institute, presented on the PB-Piedmont Web Tool, Super-Fog Potential, and Estimated Smoldering Potential - all with a focus on moving science to a usable tool for managers and others.

Type: Media

Webinar

Lessons from the Woodview fire burnover

www.nrfirescience.org/resource/14118

This video examines a near miss that occurred when inadequate planning and communication put an initial attack crew in the middle of a crowning fire without a viable escape route.

Type: Media

Video

Post-outbreak fire risk and behavior: mountain pine beetle influences on fuel characteristics and fire behavior

www.nrfirescience.org/resource/13033

This study attempts to understand how the Mountain Pine Beetle affects various fuels and how those various fuel changes actually affect fire behavior. This webinar was hosted by the Southern Rockies Fire Science Network, and was presented by Matt Jolly.

Type: Media

Webinar

Modeling Dynamic Fuels with an Index System: MoD-FIS in the Great Basin and Southwest U.S.

www.nrfirescience.org/resource/15947

This webinar is co-hosted by LANDFIRE and members of the Joint Fire Science Program: Great Basin Fire Science Exchange, Southwest Fire Science Consortium, and the Northern Rockies Fire Science Network. Content will address challenges that managers of large landscapes deal with in these regions. The LANDFIRE Program strives to...

Type: Media

Webinar

Comparison of sling psychrometer to digital weather meters

www.nrfirescience.org/resource/13774

Belt weather kits for recording of weather information have been in use since 1959. The use of a sling psychrometer from these kits is standard practice for the recording of dry and wet bulb temperatures to calculate relative humidity. Electronic based meters for recording weather information could replace belt...

Type: Media

Webinar

Effects of complex terrain on extreme fire behavior

www.nrfirescience.org/resource/12822

This webinar, presented on January 27, 2015 by Craig Clements and Neil Lareau from the Fire Weather Research Laboratory at San Jose State University, provides a discussion of wind systems in mountainous terrain, modeling fire behavior on slopes, and wind modeling tools.

Type: Media

Webinar

Influence of buoyant dynamics on wildfire spread

www.nrfirescience.org/resource/13251

Technology has improved our utilization of existing fire models but has contributed little to advancing knowledge of fire spread. The knowledge of physical processes, and their organization in producing fire spread, is essential to reliably modeling wildland fire behaviors beyond current capabilities (crown fire, thresholds etc.)....

Type: Media

Webinar

Part 1. Wildland fire, smoke & roadway visibility series: Superfog: how it forms, where it forms, where it goes, what to do

www.nrfirescience.org/resource/15293

In Part 1 of the Wildland Fire Smoke and Roadway Visibility Webinar Series, Gary Achtemeier, former research meteorologist for the USFS Southern Research Station, presented information on the following topics: • What is Superfog and how it forms on your burn site • How common is Superfog on burn sites • Superfog weather:...

Type: Media

Webinar

Past meets the present: using old burns in fire management

www.nrfirescience.org/resource/14303

Over the past two decades the size of wildfires has dramatically increased across the Southwest.

These large burned areas have become so common that newer wildfires are burning into and around them. Fire managers increasingly use these previous burns as treatments that either stop or slow fire spread. The interaction of past and...

Type: Media

Video

Burn Severity: Where, Why and So What?

www.nrfirescience.org/resource/15805

Do large fire “runs” consistently result in high severity fires? What are the trends in proportion burned severely? Do climate, vegetation and topography influence burn severity in the same way that they affect area burned? How do severe fire disturbances influence vegetation response? I draw on recent and ongoing work to...

Type: Media

Seminar

Assessing the drivers of 'spring dip' in foliar moisture content and their potential impact on forest fire behavior

www.nrfirescience.org/resource/13248

This webinar discussed the following - 1) Foliar moisture content changes are driven by changes in density, 2) Density changes are primarily due to an increase in starch, 3) Starch content may be the missing link in the increased flammability during the Spring Dip, 4) Density or LFM can be measured throughout the...

Type: Media

Webinar

Fundamental research on how wildfires spread

www.nrfirescience.org/resource/15228

About half of the Forest Service budget is spent on fire suppression, yet we still can't explain exactly how wildland fires spread. In order to make more informed decisions and improve fire fighter safety, a new research program at the Missoula Fire Lab is going back to the basics. This webinar with Sara McAllister discusses the...

Type: Media

Webinar

Fire columns and plume dynamics

www.nrfirescience.org/resource/12819

Brian Potter, a research meteorologist with the USDA Forest Service, presented a webinar on February 26, 2015 regarding the state of science with respect to the airflow associated with fire convection plumes. This includes the concepts of plume dominated fires, adverse wind profiles, the role of atmospheric stability in fire...

Type: Media

Webinar

A deadly beauty: the danger of fire whirls

www.nrfirescience.org/resource/14300

A 22-minute video about the dangers of fire whirls.

Type: Media

Video

Fire and Lightning from Space: Using the new GOES-16 Satellite for Fire and Total Lightning Detection

www.nrfirescience.org/resource/15802

GOES-16 is NOAA's latest earth-observing geostationary satellite, launched Nov 19, 2016. The GOES-16 platform hosts many improved earth-and sun-looking instruments, of which the Advanced Baseline Imager (ABI) and the Geostationary Lightning Mapper (GLM) are the primary earth-pointing instruments. Both instruments take current...

Type: Media

Seminar

Mega fire project PNW

www.nrfirescience.org/resource/13243

Haiganoush Preisler talks about her work modeling very large fires over very large areas. She is a research scientist and statistician with the USFS PSW Research Station and lead author on the attached paper. You can find out more about her work at: <http://www.wfas.net/index.php/large-fire-potential-and-fire-potential-indexes-...>

Type: Media

Webinar

The ability of wildfire to act as a fuel treatment

www.nrfirescience.org/resource/12802

This webinar highlighted results from a study investigating the ability of wildfire to act as a fuel treatment. The study evaluated whether or not wildfires limited the occurrence, size, and severity of subsequent wildfires in four large wilderness complexes in Idaho, Montana, and New Mexico. The study focused on protected areas to...

Type: Media

Webinar

Synthesis of knowledge of extreme fire behavior for fire managers

www.nrfirescience.org/resource/14287

Extreme fire behavior indicates a level of fire behavior characteristics that ordinarily precludes methods of direct control action. One or more of the following is usually involved: high rate of spread, prolific crowning/spotting, presence of fire whirls, and strong convection column. This webinar will summarize the recent JFSP...

Type: Media

Webinar

Temporal Dynamics of Wildfire Risk Assessments: Assessing tradeoffs and asking the hard questions

www.nrfirescience.org/resource/15794

Recent advances in integrating wildfire planning and strategic wildfire response can create more tangible fire outcomes that are better aligned the national cohesive strategy goals of living sustainably with wildfire. By integrating both in-situ and transboundary wildfire risk assessments with potential operations delineations, we...

Type: Media

Seminar

Demonstration of Canadian fire behavior calculator REDApp

www.nrfirescience.org/resource/13238

REDapp is a universal fire behavior calculator developed with financial support from the Canadian

Interagency Forest Fire Centre (CIFFC), and in-kind support from fire management agencies across Canada. This application is currently in a beta stage of development, with public release expected in early 2015. Unlike WFDSS, Behave,...

Type: Media

Webinar

Understanding the spread of wildfire

www.nrfirescience.org/resource/13878

Rocky Mountain Research Station Research Mechanical Engineer Sara McAllister talks about and demonstrates her research on the understanding of fire ignition and the dynamics behind the spread of wildfire.

Type: Media

Video

Lessons from the behavior of the 2002 Hayman fire

www.nrfirescience.org/resource/14187

Mark Finney, Research Forester, US Forest Service, Rocky Mountain Research Station, presents an overview fire behavior during the Hayman Fire at the Hayman Fire Science Symposium: Lessons Learned After Ten Years of Recovery, Rehabilitation, & Restoration on June 21, 2012.

Type: Media

Video

A day in the life of a fire behavior analyst

www.nrfirescience.org/resource/12944

Ever wish you could be out on the ground watching how fire behaves over the terrain, in different fuels with effects from weather, then use that experience to try and replicate what you saw and predict what will happen tomorrow? Well the Fire Behavior Analyst job is for you. Learn what it's like to be able to watch Mother Nature at...

Type: Media

Webinar

Complex Patterns of the Lolo Peak Fire from Carlton Ridge to Bass Creek

www.nrfirescience.org/resource/15792

The recent Lolo Peak Fire and associated burnouts and backburns resulted in both expected and unexpected burn patterns related to differences in forest structure, topography, and weather. It also illustrates the "perfect storm" of stifling constraints the Forest Service faces in attempting to implement ecologically-based management...

Type: Media

Seminar

Latest research on estimating safety zones

www.nrfirescience.org/resource/13343

Bret Butler, of the Fire Lab in Missoula, addresses the problem stated in the IRPG, of how to calculate the increase in Safety Zone sizes when considering slope and wind. Currently, there is a beta version Safety Zone Calculator android app available for testing and feedback. Contact Bret Butler if interested at: bwbutler@fs.fed...

Type: Media

Video

Wildland Urban Interface Fires: An Overview for Responders

www.nrfirescience.org/resource/16068

This 58 minute video is produced for fire responders to improve knowledge and safety when fighting fires in the wildland-urban interface

Type: Media

Video

Burn boss stories

www.nrfirescience.org/resource/14148

Veteran burn bosses share their stories and firsthand insights.

Type: Media

Video

Wildland Fire Lessons Learned Center

www.nrfirescience.org/resource/206

The LLC is a cutting-edge knowledge resource center for the entire wildland fire community. The LLC provides innovative strategies, processes and tools to assist the entire wildland fire community in performing more safely and effectively—using both past and present lessons. The LLC helps the entire wildland fire community use...

Type: Website

Publications List or Library

Learning From The Experts: Margit Bucher - Another Pair of Eyes

www.nrfirescience.org/resource/16040

In this 9 minute video, Margit Bucher explains how she uses her crew as another pair of eyes and the importance of double checking assumptions that you are working on within the burn plan. The goal of the Learning from the Experts video series is to speed up individual and organizational learning. Project personnel have...

Type: Media

Video

Introduction to WFDSS - air quality tools

www.nrfirescience.org/resource/12865

Introduction to WFDSS - Air Quality ToolsSmoke management is an important aspect of managing wildland fire. While mitigating smoke impacts from prescribed burns is important, smoke from large wildfire complexes (such as the AZ/NM fires in 2011) can expose millions of people to significant smoke, with hundreds of thousands living in...

Type: Media

Webinar

Introduction to the Canadian Forest Fire Weather Index System

www.nrfirescience.org/resource/14134

This video provides an introduction to the Canadian Forest Fire Weather Index System.

Type: Media

Video

Fire.org

www.nrfirescience.org/resource/114

Fire.org is the home page of Systems for Environmental Management, a Montana nonprofit research

and educational corporation. For over 29 years we've specialized in issues concerning wildland fire planning, behavior, fuel, weather, and effects. Here we post many of the publications and software packages we've developed in cooperation...

Type: Website

Website

Fuel particle heat exchange

www.nrfirescience.org/resource/14336

This seminar was recorded by the RMRS Fire Sciences Laboratory.

Type: Media

Seminar

STANDFIRE: a prototype 3-D fuels and fire modeling platform for fuel treatment analysis

www.nrfirescience.org/resource/14872

Across the country, hundreds of millions of dollars have been spent, and tens of millions of acres of fuels have been treated with the intention of altering fire behavior, either to mitigate threats to firefighters and communities, or to maintain or restore healthy ecosystems. While some case studies have shown...

Type: Media

Webinar