Ground wind generated near the base by the massive convective column of very large-scale mass fires

www.nrfirescience.org/resource/20737

In large-scale mass fires generated in forests or by a nuclear event, the area of the fire is large (diameter 1 or more kilometers) whereas the flame height is relatively small (less than 10 m) creating a large turbulent buoyant plume. This paper determines a correlation for the magnitude of velocity such a flow generates near...

Author(s): Michael Delichatsios, Jianping Zhang
Year Published: 2020
Type: Document
Book or Chapter or Journal Article

Flow visualization study of stationary fire whirls just downwind of meter-scale turbulent flames

www.nrfirescience.org/resource/19203

Laboratory experiments were conducted to determine whether stationary fire whirls just downwind of a meter-scale turbulent flame are the lowest part of the counter-rotating vortex pair (CVP) of the plume from the flame. Plumes from a turbulent pool fire and air flow around the fire were visualized. There are two types of stationary...

Author(s): Masahiko Shinohara, Sanae Matsushima
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Inside the megafire

www.nrfirescience.org/resource/20081

From the front line of the Camp Fire, the deadliest wildfire in California history, NOVA tells the stories of residents who had to flee for their lives during the 2018 fire season. Scientists racing to understand what's behind the rise of record-breaking megafires across the American West take to the forest, and even a fire lab,...

Year Published: 2019
Type: Document
Research Brief or Fact Sheet

Fuel mass and stand structure 13 years after logging of a severely burned ponderosa pine forest in northeastern Oregon, U.S.A

www.nrfirescience.org/resource/18135

Stand structure and fuel mass were measured in 2011, 13 years after logging of a seasonally dry, ponderosa pine-dominated forest that had burned severely in the 1996 Summit Wildfire, Malheur National Forest, northeastern Oregon, U.S.A. Data are compared to those taken one year after post-fire logging (1999), and analyzed in the...

Author(s): James D. McIver, Roger D. Ottmar
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Switching on the Big Burn of 2017

www.nrfirescience.org/resource/17761

Fuel, aridity, and ignition switches were all on in 2017, making it one of the largest and costliest wildfire years in the United States (U.S.) since national reporting began. Anthropogenic climate change helped flip on some of these switches rapidly in 2017, and kept them on for longer than usual. Anthropogenic changes to the fire...
Deconstructing the King Megafire
www.nrfirescience.org/resource/17735
Hypotheses that megafires - very large, high impact fires - are caused by either climate effects such as drought or fuel accumulation due to fire exclusion with accompanying changes to forest structure have long been alleged and guided policy but their physical basis remains untested. Here, unique airborne observations and...

The Cooney Ridge Fire Experiment: An Early Operation to Relate Pre-, Active, and Post-Fire Field and Remotely Sensed Measurements
www.nrfirescience.org/resource/17815
The Cooney Ridge Fire Experiment conducted by fire scientists in 2003 was a burnout operation supported by a fire suppression crew on the active Cooney Ridge wildfire incident. The fire experiment included measurements of pre-fire fuels, active fire behavior, and immediate post-fire effects. Heat flux measurements collected at...

Defining Extreme Wildfire Events: Difficulties, Challenges, and Impacts
www.nrfirescience.org/resource/17072
Every year worldwide some extraordinary wildfires occur, overwhelming suppression capabilities, causing substantial damages, and often resulting in fatalities. Given their increasing frequency, there is a debate about how to address these wildfires with significant social impacts, but there is no agreement upon terminology to...

Effects of fuels management on fire intensity, rate of spread, severity, and resultant forest structure within the 2013 Rim Fire landscape - Final Report to the Joint Fire Science Program
www.nrfirescience.org/resource/18259
Large wildfires with uncharacteristically high severity are occurring more frequently in western U.S. forests. The increasing size and severity of wildfires has been attributed to both an increase in weather
conducive to fire spread and changes to forest structure and fuel loads due to management practices that included fire...

Author(s): Brandon M. Collins, Jamie M. Lydersen, Van R. Kane, Nicholas A. Povak, Matthew L. Brooks, Douglas F. Smith
Year Published: 2018
Type: Document
Technical Report or White Paper

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...
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Quantitative evaluation of the Haines Index’s ability to predict fire growth events

www.nrfirescience.org/resource/17897
The Haines Index is intended to provide information on how midtropospheric conditions could lead to large or erratic wildfires. Only a few studies have evaluated its performance and those are primarily single fire studies. This study looks at 47 fires that burned in the United States from 2004 to 2017, with sizes from 9000 ha up to...
Author(s): Brian E. Potter
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Fire Control and the 2015 Canyon Creek Complex Fire

www.nrfirescience.org/resource/17757
Accordingly, the average annual risk of a wildfire destroying a home in the WUI was less than 1 onehundredth of 1 percent. Of course, the risk is much higher in fire-prone parts of the South and West, but so are expectations that government firefighters will come to the rescue (NWCG 2001; Pyne 2015; Stein and others 2013). Confident...
Author(s): Hutch Brown
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Human exposure and sensitivity to globally extreme wildfire events

www.nrfirescience.org/resource/15038
Extreme wildfires have substantial economic, social and environmental impacts, but there is uncertainty whether such events are inevitable features of the Earth’s fire ecology or a legacy of poor management and planning. We identify 478 extreme wildfire events defined as the daily clusters of fire radiative power from MODIS,...
Author(s): David M. J. S. Bowman, Grant J. Williamson, John T. Abatzoglou, Crystal A. Kolden, Mark A. Cochrane, Alistair M. S. Smith
Year Published: 2017
Evidence of fuels management and fire weather influencing fire severity in an extreme fire event
www.nrfirescience.org/resource/17228
Following changes in vegetation structure and pattern, along with a changing climate, large wildfire incidence has increased in forests throughout the western United States. Given this increase, there is great interest in whether fuels treatments and previous wildfire can alter fire severity patterns in large wildfires. We assessed...
Author(s): Jamie M. Lydersen, Brandon M. Collins, Matthew L. Brooks, John R. Matchett, Kristen L. Shive, Nicholas A. Povak, Van R. Kane, Douglas F. Smith
Year Published: 2017
Type: Document

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

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

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
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

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

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

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
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 < or =0....Author(s): E. Natasha Stavros, John T. Abatzoglou, Donald McKenzie, Narasimhan K. Larkin Year Published: 2014 Type: Document Book or Chapter or Journal Article

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

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

Defining extreme wildland fires using geospatial and ancillary metrics
www.nrfirescience.org/resource/12953
There is a growing professional and public perception that 'extreme' wildland fires are becoming more common due to changing climatic conditions. This concern is heightened in the wildland-urban interface where social and ecological effects converge. 'Mega-fires', 'conflagrations', 'extreme' and 'catastrophic' are descriptors...Author(s): Karen O. Lannom, Wade T. Tinkham, Alistair M. S. Smith, John T. Abatzoglou, Beth A. Newingham, Troy E. Hall, Penelope Morgan, Eva K. Strand, Travis B. Paveglio, John Anderson, Aaron M. Sparks Year Published: 2014 Type: Document Book or Chapter or Journal Article

Crown fire behavior characteristics and prediction in conifer forests: a state-of-knowledge
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

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

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

Modeling the impacts and effects of hazardous fuel reduction treatments is a pressing issue within the wildfire management community. Prospective evaluation of fuel treatment effectiveness allows for comparison of alternative treatment strategies in terms of socioeconomic and ecological impacts and facilitates analysis of tradeoffs...

Author(s): Matthew P. Thompson, Nicole M. Vaillant, Jessica R. Haas, Krista M. Gebert, Keith Stockmann
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

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

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

Towards the understanding of extreme wildland fire behavior

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

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

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

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

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

Fourmile Canyon Fire Findings
The Fourmile Canyon Fire burned in the fall of 2010 in the Rocky Mountain Front Range adjacent to Boulder, Colorado. The fire occurred in steep, rugged terrain, primarily on privately owned mixed ponderosa pine and Douglas-fir forests. The fire started on September 6 when the humidity of the air was very dry (about <7%) and the...

Author(s): Russell T. Graham, Mark A. Finney, Charles W. McHugh, Jack D. Cohen, David E. Calkin, Richard D. Stratton, Ned Nikolov
Year Published: 2012
Type: Document
Technical Report or White Paper

How fuel treatments saved homes from the 2011 Wallow fire

This is a fuel treatment effectiveness assessment report from Region 3 about the success of fuel treatments in protecting several communities from the recent Wallow fire in Arizona and New Mexico. The report narrative and graphics point to the success of good forest management and good community assistance to protect life, property...

Author(s): Pam Bostwick, James P. Menakis, Tim Sexton
Year Published: 2011
Type: Document
Technical Report or White Paper

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

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

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

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

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

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

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 creditable 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

Large scale fire whirls: can their formation be predicted?
www.nrfirescience.org/resource/16937
Large scale fire whirls have not traditionally been recognized as a frequent phenomenon on wildland fires. However, there are anecdotal data suggesting that they can and do occur with some regularity. This paper presents a brief summary of this information and an analysis of the causal factors leading to their formation.

Author(s): Jason M. Forthofer, Bret W. Butler
Year Published: 2010
Type: Document
Conference Proceedings

Characterization of convective heating in full scale wildland fires
www.nrfirescience.org/resource/16929
Data collected in the International Crown Fire modeling Experiment during 1999 are evaluated to characterize the magnitude and duration of convective energy heating in full scale crown fires. To accomplish this objective data on total and radiant incident heat flux, air temperature, and horizontal and vertical gas velocities were...

Author(s): Bret W. Butler
Year Published: 2010
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

In-situ characterization of wildland fire behavior
www.nrfirescience.org/resource/16932
A system consisting of two enclosures has been developed to characterize wildland fire behavior: The first enclosure is a sensor/data logger combination that measures and records convective/radiant energy released by the fire. The second is a digital video camera housed in a fire proof enclosure that records visual images of fire...
Author(s): Bret W. Butler, Daniel M. Jimenez, Jason M. Forthofer, Paul Sopko, Kyle S. Shannon, James J. Reardon
Year Published: 2010
Type: Document
Conference Proceedings

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

Fuel treatments, fire suppression, and their interaction with wildfire and its impact: the Warm Lake experience during the Cascade Complex of wildfires in central Idaho, 2007
www.nrfirescience.org/resource/17700
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
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

January 31st 2009 off-season grassland wildfire

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

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

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

An assessment of fuel treatments on three large 2007 Pacific Northwest fires

The Monument Fire burned across a landscape with extensive but relatively low intensity fuel treatments that reduced severe fire effects. The area that burned in the Egley Complex included both extensive underburns and intensive, strategically located fuel and other vegetation treatments that improved suppression effectiveness. The...

Author(s): Steve Harbert, Andrew T. Hudak, Laura Mayer, T. D. Rich, Sarah Robertson
Year Published: 2007
Type: Document
Technical Report or White Paper

A fuel treatment reduces fire severity and increases suppression efficiency in a mixed conifer forest

Fuel treatments are being implemented on public and private lands across the western United States. Although scientists and managers have an understanding of how fuel treatments can modify potential fire behaviour under modelled conditions, there is limited information on how treatments perform under
Organizational characteristics that contribute to success in engaging the public to accomplish fuels management at the wilderness/non-wilderness interface

In the fall of 2003, the Rocky Mountain Ranger District of the Lewis and Clark National Forest initiated a multi-year, large-scale prescribed burn in the Scapegoat Wilderness. The objectives of this burn were to make the non-wilderness side of the wilderness boundary more defensible from wildfire and to establish conditions that...

Author(s): Katie Knotek, Alan E. Watson
Year Published: 2006
Type: Document
Conference Proceedings

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

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

'Brewer fire mystery' discussion

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

Wildland fire behavior case studies and analysis: part 2

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
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

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 "tornadoes" 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

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

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

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...
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

Fuel moisture, forest type, and lightning-caused fire in Yellowstone National Park
www.nrfirescience.org/resource/13568
The occurrence and behavior of lightning-caused fires in Yellowstone National Park were summarized for 17 years (1972-1988) during a prescribed natural fire program. Both ignition (occurrence) and spread (Stand replacing fire activity) of fires were strongly influenced by fuel moisture and forest cover type. Fuel moisture estimates...
Author(s): Roy A. Renkin, Don G. Despain
Year Published: 1992
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

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

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

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

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

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

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 -0.15 foot for the FBPS. For flame length factors for...

Author(s): Jan W. van Wagendonk, Stephen J. Botti
Year Published: 1984
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

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

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

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

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