

Flame temperatures saturate with increasing dead material in *Ulex europaeus*, but flame duration, fuel consumption and overall flammability continue to increase

www.nrfirescience.org/resource/19340

A key determinant of wildfire behaviour is the flammability of constituent plants. One plant trait that influences flammability is the retention of dead biomass, as the low moisture content of dead material means less energy is required to achieve combustion. However, the effect of the dead-to-live ratio of fuel on plant...

Author(s): Jennifer M. Dent, Hannah L. Buckley, Audrey Lustig, Timothy J. Curran

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Econometric model for the diagnosis and evaluation of costs in the planning of prescribed fires in the forest landscape

www.nrfirescience.org/resource/19079

The increasing use of prescribed fires, as a fire management technique for preventing wildfires and reducing their impact, demands the development of tools that enable performing the necessary studies for determining application opportunities in the territory. The generation of interesting uses of this technique not only directed to...

Author(s): Francisco Rodriguez y Silva

Year Published: 2019

Type: Document

Conference Proceedings

LiDAR-Based Wildfire Prevention in WUI: The Automatic Detection, Measurement and Evaluation of Forest Fuels

www.nrfirescience.org/resource/19311

This paper describes a methodology using LiDAR point clouds with an ultra-high resolution in the characterization of forest fuels for further wildfire prevention and management. Biomass management strips were defined in three case studies using a particular Spanish framework. The data were acquired through a UAV platform. The...

Author(s): Marta Fernández-Álvarez, Julia Armesto, Juan Picos

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

A Device for Instantaneously Estimating Duff Moisture Content Is also Effective for Grassland Fuels

www.nrfirescience.org/resource/19056

Fine-fuel moisture is an important variable in the wildland fire environment, but measuring live fuel moisture is time-consuming. There is a strong incentive to develop technologies that provide instantaneous measurements of fine-fuel moisture. Campbell Scientific, Inc. markets a device that uses dielectric permittivity to measure...

Author(s): Devan A. McGranahan

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

How big is enough? Vegetation structure impacts effective fuel treatment width and forest resiliency

www.nrfirescience.org/resource/19052

Fuel treatments are designed with multiple management goals, including improving suppression capacity and restoring the historical structure of dry forests. Fuelbreaks are a class of fuel treatment that remove fuels within a wide strip of land, with an overarching objective to reduce fire behavior and provide safe access for...

Author(s): Maureen C. Kennedy, Morris C. Johnson, Kendra Fallon, Deborah Mayer

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Effects of fire severity on the composition and functional traits of litter-dwelling macroinvertebrates in a temperate forest

www.nrfirescience.org/resource/19034

High severity fires are likely to become more prevalent with global climate change, so it is critical that we understand their effects on forest ecosystems. Leaf litter dependent fauna are likely to be particularly vulnerable to habitat loss resulting from fire, which often destroys their leaf litter habitat. We hypothesised that,...

Author(s): Sebastian Buckingham, Nick P. Murphy, Heloise Gibb

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Future fire scenarios: predicting the effect of fire management strategies on the trajectory of high-quality habitat for threatened species

www.nrfirescience.org/resource/19421

Prescribed (or 'planned') burning is used by land managers to reduce fuel-loads in order to mitigate the spread of wildfire, thereby protecting life and property, and to promote environmental heterogeneity to enhance biodiversity. Globally, many fire management agencies focus on increasing extent and frequency of prescribed burning...

Author(s): Jemima Connell, Simon J. Watson, Rick S. Taylor, Sarah C. Avitabile, Natasha Schedvin, Kathryn Schneider, Michael F. Clarke

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Aboveground forest carbon shows different responses to fire frequency in harvested and unharvested forests

www.nrfirescience.org/resource/18801

Sequestration of carbon in forest ecosystems has been identified as an effective strategy to help mitigate the effects of global climate change. Prescribed burning and timber harvesting are two common, co-occurring, forest management practices that may alter forest carbon pools. Prescribed burning for forest management, such as...

Author(s): Luke Collins, Ross A. Bradstock, Fabiano de Aquino Ximenes, Bronwyn Horsey, Robert Sawyer, Trent D. Penman

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Comparison of measured and modelled change in coarse woody debris carbon stocks in New Zealand's natural forest

www.nrfirescience.org/resource/19028

Natural forest comprises approximately 78% of New Zealand's total forest area and their dead wood

carbon pools contribute to the national carbon balance reported under the United Nations Framework Convention on Climate Change. We investigate the accuracy of coarse woody debris (CWD) carbon stock estimates obtained from periodic...

Author(s): Mark O. Kimberley, Peter N. Beets, Thomas S.H. Paul

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Cost plus net value change (C+NVC) revisited: a sequential formulation of the wildfire economics model

www.nrfirescience.org/resource/19207

The effectiveness of annual investments in US wildfire management programs has been subject to public criticism. One source of inefficiency may arise from a fragmented budgeting process. In the United States, federal budgets for wildfire management operations are not determined simultaneously by a single decision rule but instead...

Author(s): David J. Rossi, Olli-Pekka Kuusela

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Calculation of critical water flow rates for wildfire suppression

www.nrfirescience.org/resource/19381

Predicting water suppression requirements and its impacts on firefighting strategies and logistics within the urban environment has been the subject of many previous studies, however the same level of research has yet to be applied in the realm of wildfire suppression. To work towards addressing this knowledge gap, this paper...

Author(s): Greg Penney, Daryoush Habibi, Marcus Cattani, Murray Carter

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Determining burnability: Predicting completion rates and coverage of prescribed burns for fuel management

www.nrfirescience.org/resource/19013

Prescribed burning is a widely used strategy in forested landscapes to reduce the risk from wildfires to human lives and valued assets. The ability for managers to undertake prescribed burns is contingent on fuel, weather and operational constraints. In practice, not all areas nominated to be burnt get completed, and within burns...

Author(s): Thomas J. Duff, Jane G. Cawson, Trent D. Penman

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

The downed and dead wood inventory of forests in the United States

www.nrfirescience.org/resource/19180

The quantity and condition of downed dead wood (DDW) is emerging as a major factor governing forest ecosystem processes such as carbon cycling, fire behavior, and tree regeneration. Despite this, systematic inventories of DDW are sparse if not absent across major forest biomes. The Forest Inventory and Analysis program of the United...

Author(s): Christopher W. Woodall, Vicente J. Monleon, Shawn Fraver, Matthew B. Russell, Mark H. Hatfield, John L. Campbell, Grant M. Domke

Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Flame spread and burning rates through vertical arrays of wooden dowels

www.nrfirescience.org/resource/19365

Fuel loads in real-world fire scenarios often feature discrete elements, discontinuities, or inhomogeneities; however, most models for flame spread only assume a continuous, homogeneous fuel. Because discrete fuels represent a realistic scenario not yet well-modeled, it is of interest to find simple methods to model fire growth...

Author(s): Jiang Lin, Zhao Zhao, Wei Tang, Colin H. Miller, Jin-Hua Sun, Michael J. Gollner

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Why is the effect of live fuel moisture content on fire rate of spread underestimated in field experiments in shrublands?

www.nrfirescience.org/resource/19002

Live fuel moisture content (LFMC) influences fire activity at landscape scale and fire behaviour in laboratory experiments. However, field evidence linking LFMC to fire behaviour are very limited, despite numerous field experiments. In this study, we reanalyse a shrubland fire dataset with a special focus on LFMC to investigate this...

Author(s): F. Pimont, Julien Ruffault, Nicolas K. Martin-StPaul, Jean-Luc Dupuy

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Contain and control: wildfire suppression effectiveness at incidents and across landscapes

www.nrfirescience.org/resource/19168

Purpose of Review: Containing and controlling wildfire incidents is one of the main functions of fire management. Understanding how this can be done effectively and efficiently informs many of the preparatory activities undertaken by fire management agencies to limit the impact of wildfires. This second article within a two-part...

Author(s): Matt P. Plucinski

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Season of fire influences seed dispersal by wind in a serotinous obligate seeding tree

www.nrfirescience.org/resource/19343

In temperate ecosystems, fire management involving prescribed burning and wildfire suppression often causes a shift in fire season from hot and dry summer conditions to cooler, moister conditions in spring or autumn. The effects of this change on seed dispersal by wind after fire are unknown. However, calmer wind conditions and...

Author(s): Bianca Dunker, C. Michael Bull, David A. Keith, Don A. Driscoll

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

A disturbance weighting analysis model (DWAM) for mapping wildfire burn severity in the

presence of forest disease

www.nrfirescience.org/resource/19095

Forest ecosystems are subject to recurring fires as one of their most significant disturbances. Accurate mapping of burn severity is crucial for post-fire land management and vegetation regeneration monitoring. Remote-sensing-based monitoring of burn severity faces new challenges when forests experience both fire and non-fire...

Author(s): Yinan HE, Gang Chen, Angela De Santis, Dar A. Roberts, Yuyu Zhou, Ross K. Meentemeyer

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Economic analysis of risk and choice under uncertainty in landscape planning in relation to wildfires

www.nrfirescience.org/resource/19076

Economic decision-making in wildfire defense and fire management programs is not easy when performed under efficiency criteria. The determination of variables to be considered and the lack of data analyzed in relation to the results achieved by the action plans adopted to reduce the impact of fires condition the adoption of...

Author(s): Francisco Rodriguez y Silva

Year Published: 2019

Type: Document

Conference Proceedings

Fire and Forest Management in Montane Forests of the Northwestern States and California, USA

www.nrfirescience.org/resource/19298

We reviewed forest management in the mountainous regions of several northwestern states and California in the United States and how it has impacted current issues facing these forests. We focused on the large-scale activities like fire suppression and logging which resulted in landscape level changes. We divided the region into two...

Author(s): Iris Allen, Sophan Chhin, Jainwei Zhang

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Incorporating biophysical gradients and uncertainty into burn severity maps in a temperate fire-prone forested region

www.nrfirescience.org/resource/19054

As forest fire activity increases worldwide, it is important to track changing patterns of burn severity (i.e., degree of fire-caused ecological change). Satellite data provide critical information across space and time, yet how satellite indices relate to individual measures of burn severity on the ground (e.g., tree mortality or...

Author(s): Brian J. Harvey, Robert A. Andrus, Sean C. Anderson

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Vegetation succession in an old-growth ponderosa pine forest following structural restoration with fire: implications for retreatment and maintenance - JFSP Final Report

www.nrfirescience.org/resource/19272

Stand changes brought on by fire exclusion have contributed to reduced resilience to wildfire in ponderosa pine forests throughout the western US. Growing recognition of how structural attributes

influence resilience has led to interest in restoring more heterogeneous conditions once common in these forests, but key information...

Author(s): Eric E. Knapp, Alan H. Taylor, Michelle Coppoletta, Natalie Pawlikowski

Year Published: 2019

Type: Document

Technical Report or White Paper

Estimating uncertainty in the volume and carbon storage of downed coarse woody debris

www.nrfirescience.org/resource/19043

Downed coarse woody debris, also known as coarse woody detritus or downed dead wood, is challenging to estimate for many reasons, including irregular shapes, multiple stages of decay, and the difficulty of identifying species. In addition, some properties are commonly not measured, such as wood density and carbon concentration. As a...

Author(s): John L. Campbell, Mark B. Green, Ruth D. Yanai, Christopher W. Woodall, Shawn Fraver, Mark E. Harmon, Mark A. Hatfield, Charles J. Barnett, Craig R. See, Grant M. Domke

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Tradeoffs between US national forest harvest targets and fuel management to reduce wildfire transmission to the wildland urban interface

www.nrfirescience.org/resource/19031

US public land management agencies are faced with multiple, often conflicting objectives to meet management targets and produce a wide range of ecosystem services expected from public lands. One example is managing the growing wildfire risk to human and ecological values while meeting programmatic harvest targets for economic...

Author(s): Alan A. Ager, Rachel M. Houtman, Michelle A. Day, Chris Ringo, Palaiologos Palaiologou

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Determinants of perceived risk and liability concerns associated with prescribed burning in the United States

www.nrfirescience.org/resource/19212

While prescribed burning is a proven tool in the management of forests and grasslands, its use has been limited due, in part, to potential risks that may result in legal liability, property damage, and personal injury. The purpose of this study is to understand the factors that shape landowners' and fire professionals' perceptions...

Author(s): Omkar Joshi, Neelam C. Poudyal, John R. Weir, Samuel D. Fuhlendorf, Thomas O. Ochuodho

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

A review of forest fire surveillance technologies: mobile ad-hoc network routing protocols perspective

www.nrfirescience.org/resource/19405

Mobile Ad-Hoc Network (MANET) is a type of structure-less wireless mobile network, in which each node plays the role of the router and host at the same time. MANET has gained increased interest from researchers and developers for various applications such as forest fire detection. Forest fires require continuous monitoring and...

Author(s): Fahad Taha AL-Dhief , Naseer Sabri, S. Fouad, N.M. Abdul Latiff, Musatafa Abbas Abbood Albader
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Improving long-term fuel treatment effectiveness in the National Forest System through quantitative prioritization

www.nrfirescience.org/resource/19015

Predicting the efficacy of fuel treatments aimed at reducing high severity fire in dry-mixed conifer forests in the western US is a challenging problem that has been addressed in a variety of ways using both field observations and wildfire simulation models. One way to describe the efficacy of fuel treatments is to quantify how...

Author(s): Ana M. G. Barros, Alan A. Ager, Michelle A. Day, Palaiologos Palaiologou
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Pixel-level statistical analyses of prescribed fire spread

www.nrfirescience.org/resource/19200

Wildland fire dynamics are a complex three-dimensional turbulent process. Cellular automata (CA) is an efficient tool to predict fire dynamics, but the main parameters of the method are challenging to estimate. To overcome this challenge, we compute statistical distributions of the key parameters of a CA model using infrared images...

Author(s): Miles Currie, Kevin Speer, J. Kevin Hiers, Joseph J. O'Brien, Scott L. Goodrick, Bryan Quaife
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Peatland vegetation change and establishment of re-introduced Sphagnum moss after prescribed burning

www.nrfirescience.org/resource/19377

Fire, including prescribed burning, is common on peatlands globally and can affect vegetation, including peat-forming Sphagnum mosses, and affect ecosystem services. We monitored vegetation in different burn-age categories at three UK peatland sites over a 19-month period. Half of the plots had Sphagnum fragments added and their...

Author(s): Alice Noble, Sheila M. Palmer, David J. Glaves, Alistair Crowle, Joseph Holden
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Fighting flames and forging firelines: wildfire suppression effectiveness at the fire edge

www.nrfirescience.org/resource/19169

Purpose of Review: The effectiveness of wildfire suppression is difficult to define as it can be assessed against different objectives and at a range of scales. The influence of multiple variables make it a challenge to research. This two-part series presents a synthesis of the current understanding of the effectiveness of wildfire...

Author(s): Matt P. Plucinski
Year Published: 2019
Type: Document
Book or Chapter or Journal Article

Object-based classification of forest disturbance types in the conterminous United States

www.nrfirescience.org/resource/19360

Forest ecosystems provide critical ecosystem goods and services, and any disturbance-induced changes can have cascading impacts on natural processes and human socioeconomic systems. Forest disturbance frequency, intensity, and spatial and temporal scale can be altered by changes in climate and human activity, but without baseline...

Author(s): Lian-Zhi Huo, Luigi Boschetti, Aaron M. Sparks

Year Published: 2019

Type: Document

Book or Chapter or Journal Article

Why do prescribed burning?

www.nrfirescience.org/resource/17801

Fire has always been a natural disturbance process that is essential to healthy ecological systems across the landscape in the western United States. In the early 1900s, land management agencies sought to suppress all fires in an effort to preserve the timber supply and other natural resources. Fire suppression policy was effective...

Year Published: 2018

Type: Document

Research Brief or Fact Sheet

Can Air Quality Management Drive Sustainable Fuels Management at the Temperate Wildland–Urban Interface?

www.nrfirescience.org/resource/18137

Sustainable fire management has eluded all industrial societies. Given the growing number and magnitude of wildfire events, prescribed fire is being increasingly promoted as the key to reducing wildfire risk. However, smoke from prescribed fires can adversely affect public health. We propose that the application of air quality...

Author(s): David M. J. S. Bowman, Lori D. Daniels, Fay H. Johnston, Grant J. Williamson, William Matt Jolly, Sheryl Magzamen, Ana G. Rappold, Michael Brauer, Sarah B. Henderson

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

A Sybil attack detection scheme for a forest wildfire monitoring application

www.nrfirescience.org/resource/17268

Wireless Sensor Networks (WSNs) have experienced phenomenal growth over the past decade. They are typically deployed in human-inaccessible terrains to monitor and collect time-critical and delay-sensitive events. There have been several studies on the use of WSN in different applications. All such studies have mainly focused on...

Author(s): Mian Ahmad Jan, Priyadarsi Nanda, Xiangjian He, Ren Ping Liu

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Dormant-Season Fire Inhibits Sixweeks Fescue and Enhances Forage Production in Shortgrass Steppe

www.nrfirescience.org/resource/17672

Semiarid rangelands experience substantial interannual variability in precipitation, which can determine

the relative abundance of species in any given year and influence the way that fire affects plant community composition and productivity. Long-term studies are needed to examine potential interactions between fluctuating...

Author(s): N. A. Dufek, David J. Augustine, Dana M. Blumenthal, Julie A. Kray, Justin D. Derner

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Stand dynamics 11 years after retention harvest in a lodgepole pine forest

www.nrfirescience.org/resource/17959

Structurally diverse forests provide resilience to an array of disturbances and are a mainstay of multiple-resource management. Silviculture based on natural disturbance can increase structural heterogeneity while providing other ecological and economic benefits. One useful silvicultural tool for promoting structural heterogeneity...

Author(s): Justin S. Crotteau, Christopher R. Keyes, Sharon M. Hood, Andrew J. Larson, Elaine Kennedy Sutherland, David K. Wright, Joel M. Egan

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Modeling thinning effects on fire behavior with STANDFIRE

www.nrfirescience.org/resource/18335

Key message: We describe a modeling system that enables detailed, 3D fire simulations in forest fuels. Using data from three sites, we analyze thinning fuel treatments on fire behavior and fire effects and compare outputs with a more commonly used model. Context: Thinning is considered useful in altering fire behavior, reducing fire...

Author(s): Russell A. Parsons, F. Pimont, Lucas Wells, Greg M. Cohn, William Matt Jolly, Francois P. deColigny, Eric Rigolot, Jean-Luc Dupuy, William E. Mell, Rodman Linn

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Modelling the management of forest ecosystems: Importance of wood decomposition

www.nrfirescience.org/resource/17790

Scarce and uncertain data on woody debris decomposition rates are available for calibrating forest ecosystem models, owing to the difficulty of their empirical estimations. Using field data from three experimental sites which are part of the North American Long-Term Soil Productivity (LTSP) Study in south-eastern British Columbia (...)

Author(s): Juan A. Blanco, Deborah S. Page-Dumroese, Martin F. Jurgensen, Michael P. Curran, Joanne M. Tirocke, Joanna Walitalo

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

How does forest recovery following moderate-severity fire influence effects of subsequent wildfire in mixed-conifer forests?

www.nrfirescience.org/resource/18117

Given regional increases in fire activity in western North American forests, understanding how fire influences the extent and effects of subsequent fires is particularly relevant. Remotely sensed estimates of fire effects have allowed for spatial partitioning into different severity categories based on the degree of fire-caused...

Author(s): Brandon M. Collins, Jamie M. Lydersen, Richard G. Everett, Scott L. Stephens
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Combination of Landsat and Sentinel-2 MSI data for initial assessing of burn severity

www.nrfirescience.org/resource/17251

Nowadays Earth observation satellites, in particular Landsat, provide a valuable help to forest managers in post-fire operations; being the base of post-fire damage maps that enable to analyze fire impacts and to develop vegetation recovery plans. Sentinel-2A MultiSpectral Instrument (MSI) records data in similar spectral...

Author(s): Carmen Quintano, Alfonso Fernández-Manso, O. Fernández-Manso
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Long-Term Effect of Prescribed Burning Regimes and Logging on Coarse Woody Debris in South-Eastern Australia

www.nrfirescience.org/resource/17624

Coarse woody debris (CWD) is vital within forest ecosystems for an array of fauna. Forest management practices, such as prescribed burning and logging, influence the creation or loss of CWD. We examined the effect of long-term prescribed burning and logging on (i) the abundance of hollow-bearing CWD, (ii) the volume of CWD in...

Author(s): Mitchell G. Stares, Luke Collins, Bradley Law, Kristine French
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Fire behaviour in masticated forest fuels: lab and prescribed fire experiments

www.nrfirescience.org/resource/17949

Managers masticate fuels to reduce extreme fire hazards, but the effect on fire behaviour within the resulting compact fuelbeds is poorly understood. We burned 54 masticated fuelbeds in laboratory experiments one and two growing seasons after mastication and 75 masticated fuelbeds in prescribed fire experiments one growing season...

Author(s): Zachary D. Lyon, Penelope Morgan, Camille Stevens-Rumann, Aaron M. Sparks, Robert F. Keefe, Alistair M. S. Smith
Year Published: 2018
Type: Document
Book or Chapter or Journal Article

Wildland fuel treatments

www.nrfirescience.org/resource/18313

The purposeful use of any silvicultural method, including mechanical methods, managed wildfire, prescribed fire, or a combination of approaches, to intentionally alter the fuel complex in such a way as to modify fire behavior and thereby minimize the potential negative impacts of future wildfires on ecosystem goods and services,...

Author(s): Chad M. Hoffman, Brandon M. Collins, Michael A. Battaglia
Year Published: 2018
Type: Document
Research Brief or Fact Sheet

Negligible impacts of biomass removal on Douglas-fir growth 29 years after outplanting in the northern Rocky Mountains

www.nrfirescience.org/resource/16753

To investigate the long-term impacts of biomass harvesting on site productivity, we remeasured trees in the 1974 Forest Residues Utilization Research and Development Program at Coram Experimental Forest in western Montana. Three levels (high, medium, and low) of biomass removal intensity combined with broadcast burning treatment...

Author(s): Woongsoon Jang, Christopher R. Keyes, Deborah S. Page-Dumroese

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

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/17723

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

Wildfires managed for restoration enhance ecological resilience

www.nrfirescience.org/resource/17222

Expanding the footprint of natural fire has been proposed as one potential solution to increase the pace of forest restoration programs in fire-adapted landscapes of the western USA. However, studies that examine the long-term socio-ecological trade-offs of expanding natural fire to reduce wildfire risk and create fire...

Author(s): Ana M. G. Barros, Alan A. Ager, Michelle A. Day, Meg A. Krawchuk, Thomas A. Spies

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Determining the minimum sampling frequency for ground measurements of burn severity

www.nrfirescience.org/resource/17932

Understanding burn severity is essential to provide an overview of the precursory conditions leading to fires as well as understanding the constraints placed on fire management services when mitigating their effects. Determining the minimum sampling frequency for ground measurements is not only essential for accurately assessing...

Author(s): Alexander W. Holmes, Christoph Rüdiger, Sarah Harris, Nigel J. Tapper

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Do Perennial Bunchgrasses Competitively Exclude *Bromus tectorum* in Post-Fire Rehabilitation? - JFSP Final Report

www.nrfirescience.org/resource/17720

Globally, wildfire size and frequency has increased in the last thirty years across numerous

ecosystems. Models predict that trend to continue with increases in temperature and shifts in seasonal precipitation caused by climate change. In the western United States, these trends are exacerbated by invasive annual grasses that create...

Author(s): Eva K. Strand, Beth A. Newingham, Chris Bowman-Prideaux

Year Published: 2018

Type: Document

Technical Report or White Paper

Prescribed fire policy barriers and opportunities: a diversity of challenges and strategies across the west

www.nrfirescience.org/resource/18856

We are conducting a project investigating policies that limit managers' ability to conduct prescribed fire on US Forest Service and Bureau of Land Management (BLM) lands in the 11 Western states. The goals for this phase of our work were to understand the extent to which various policies are limiting prescribed fire programs,...

Author(s): Courtney Schultz, Heidi Huber-Stearns, Sarah M. McCaffrey, Douglas Quirke, Gwen Ricco, Cassandra Moseley

Year Published: 2018

Type: Document

Research Brief or Fact Sheet

Bridging the Divide: Integrating Animal and Plant Paradigms to Secure the Future of Biodiversity in Fire-Prone Ecosystems

www.nrfirescience.org/resource/18075

Conserving animals and plants in fire-prone landscapes requires evidence of how fires affect modified ecosystems. Despite progress on this front, fire ecology is restricted by a dissonance between two dominant paradigms: 'fire mosaics' and 'functional types'. The fire mosaic paradigm focuses on animal responses to fire...

Author(s): Luke T. Kelly, Lluís Brotons, Katherine M. Giljohann, Michael A. McCarthy, Juli G. Pausas, Annabel L. Smith

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Conventional fire behavior modeling systems are inadequate for predicting fire behavior in bark beetle-impacted forests (Project INT-EM-F-11-03) - Chapter 13

www.nrfirescience.org/resource/17919

Understanding the impacts of mountain pine beetle (MPB; *Dendroctonus ponderosae* Hopkins) on fire behavior is important from both an ecological and land management viewpoint. However, numerous uncertainties exist in the linkages of MPB-caused tree mortality to changes in canopy and surface fuels (e.g., fuel loading, arrangement, and...)

Author(s): Sharon M. Hood, Robert E. Keane, Helen Y. Smith, Joel M. Egan, Lisa M. Holsinger

Year Published: 2018

Type: Document

Technical Report or White Paper

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

Quaking aspen woodland after conifer control: Herbaceous dynamics

www.nrfirescience.org/resource/16720

Western juniper (*Juniperus occidentalis* Hook.) woodlands are replacing low elevation (< 2100 m) quaking aspen (*Populus tremuloides* Michx.) stands in the northern Great Basin. Restoring aspen woodlands is important because they provide wildlife habitat for many species and contain a high diversity of understory shrubs and...

Author(s): Jonathan D. Bates, Kirk W. Davies

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

2018 National Prescribed Fire Use Survey Report

www.nrfirescience.org/resource/19230

The National Association of State Foresters (NASF) and the Coalition of Prescribed Fire Councils (CPFC) worked collaboratively to produce the 2018 National Prescribed Fire Use Survey Report. Since 2012, this report has been compiled every three years, and is unique among fire surveys. Numerous surveys have been conducted that...

Author(s): Mark A. Melvin

Year Published: 2018

Type: Document

Technical Report or White Paper

A review of community smoke exposure from wildfire compared to prescribed fire in the United States

www.nrfirescience.org/resource/17896

Prescribed fire, intentionally ignited low-intensity fires, and managed wildfires—wildfires that are allowed to burn for land management benefit—could be used as a land management tool to create forests that are resilient to wildland fire. This could lead to fewer large catastrophic wildfires in the future. However, we must...

Author(s): Kathleen M. Navarro, D.W. Schweizer, John R. Balmes, Ricardo Cisneros

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Change of clonal frequency in the second root sucker generation of hybrid aspen

www.nrfirescience.org/resource/16718

Two hybrid aspen (*Populus tremula* L. x *P. tremuloides* Michx.) trials in southern Sweden were used for studies of clonal composition in the second of two root sucker regenerations. Trial 1 was established in 1998 and originally included eight clones randomly distributed in four plots, each having 10x10 positions. Trial 2 was planted...

Author(s): Lars-Göran Stener, Dainis Rungis, Viktorija Belevich, Johan Malm

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Fire regimes approaching historic norms reduce wildfire-facilitated conversion from forest to non-forest

www.nrfirescience.org/resource/17545

Extensive high-severity wildfires have driven major losses of ponderosa pine and mixed-conifer forests in the southwestern United States, in some settings catalyzing enduring conversions to non-forested vegetation types. Management interventions to reduce the probability of stand-replacing wildfire have included mechanical...

Author(s): Ryan B. Walker, Jonathan D. Coop, Sean A. Parks, Laura Trader

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Monitoring Effectiveness of Forest Restoration Treatments: The Importance of Time and Space - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/16991

Fuel-reduction treatments have been used effectively in dry, fire-adapted forests to reduce risk of high-severity crown fire, but it is less certain if they achieve their ecosystem restoration objectives. To date, there has not been a comprehensive assessment of how the spatial and temporal dimensions of ecological assessments may...

Author(s): Jonathan D. Bakker, Charles B. Halpern, Richy J. Harrod, Lauren S. Urgenson, Allison K. Rossman, David W. Peterson

Year Published: 2018

Type: Document

Technical Report or White Paper

Pinus albicaulis Engelm. (Whitebark Pine) in Mixed-Species Stands throughout Its US Range: Broad-Scale Indicators of Extent and Recent Decline

www.nrfirescience.org/resource/17184

We used data collected from >1400 plots by a national forest inventory to quantify population-level indicators for a tree species of concern. Whitebark pine (*Pinus albicaulis*) has recently experienced high mortality throughout its US range, where we assessed the area of land with whitebark pine present, size-class distribution of...

Author(s): Sara Goeking, Deborah Kay Izlar

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Common ground on the role of wildfire in forested landscapes of the western United States

www.nrfirescience.org/resource/18203

For millennia, wildfires have markedly influenced forests and non-forested landscapes of the western United States (US), and they are increasingly seen as having substantial impacts on society and nature. There is growing concern over what kinds and amounts of fire will achieve desirable outcomes and limit harmful effects on people...

Author(s): Max A. Moritz, Christopher Topik, Craig D. Allen, Paul F. Hessburg, Penelope Morgan, Dennis C. Odion, Thomas T. Veblen, Ian M. McCullough

Year Published: 2018

Type: Document

Technical Report or White Paper

Surface analysis as a method to reconstruct past and recent dynamics of forest ecosystems

www.nrfirescience.org/resource/16707

The most direct way of deciphering the dynamics of an ecosystem is to examine its biotic and abiotic components based on analysis of living and dead organisms distributed above ground. The surface analysis method presented here provides a centennial to millennial stand-scale composition and disturbance history and is applicable in...

Author(s): Vanessa Pilon, Serge Payette, Pierre-Luc Couillard, Jason Laflamme

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Long-term effects of restoration fire and thinning on soil fungi, fine root biomass, and litter depth - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/16982

To increase ecosystem resiliency, and achieve the desired future condition of stands with large tree retention and low fuel loads, federal agencies have actively implemented a large number of fuel reduction and forest restoration projects in low-elevation dry conifer forests throughout the western United States. A noteworthy example...

Author(s): Jane E. Smith, Daniel L. Luoma, Benjamin T. N. Hart

Year Published: 2018

Type: Document

Technical Report or White Paper

Long-term effects of restoration fire and thinning on soil fungi, fine root biomass, and duff levels - Final report to the Joint Fire Science Program

www.nrfirescience.org/resource/17150

The proposed research will help managers understand how early soil ecosystem responses to fuel reduction treatments with prescribed fire may or may not be indicative of longer term responses. This research is necessary for better establishing, in forest management plans and decision documents, the ecosystem costs and benefits of...

Author(s): Jane E. Smith, Daniel L. Luoma, Robyn L. Darbyshire, James D. McIver, Andrew P. Youngblood

Year Published: 2018

Type: Document

Technical Report or White Paper

A Statement of Common Ground Regarding the Role of Wildfire in Forested Landscapes of the Western United States

www.nrfirescience.org/resource/18177

For millennia, wildfires have markedly influenced forests and non-forested landscapes of the western United States (US), and they are increasingly seen as having substantial impacts on society and nature. There is growing concern over what kinds and amounts of fire will achieve desirable outcomes and limit harmful effects on people...

Author(s): Max A. Moritz, Christopher Topik, Craig D. Allen, Paul F. Hessburg, Penelope Morgan, Dennis C. Odion, Thomas T. Veblen, Ian M. McCullough

Year Published: 2018

Type: Document

Technical Report or White Paper

Overlapping bark beetle outbreaks, salvage logging and wildfire restructure a lodgepole pine

ecosystem

www.nrfirescience.org/resource/17365

The 2010 Church's Park Fire burned beetle-killed lodgepole pine stands in Colorado, including recently salvage-logged areas, creating a fortuitous opportunity to compare the effects of salvage logging, wildfire and the combination of logging followed by wildfire. Here, we examine tree regeneration, surface fuels, understory plants...

Author(s): Charles C. Rhoades, Kristen Pelz, Paula J. Fornwalt, Brett Wolk, Anthony S. Cheng

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Overstory structure and surface cover dynamics in the decade following the Hayman Fire, Colorado

www.nrfirescience.org/resource/17140

The 2002 Hayman Fire burned with mixed-severity across a 400-ha dry conifer study site in Colorado, USA, where overstory tree and surface cover attributes had been recently measured on 20 0.1-ha permanent plots. We remeasured these plots repeatedly during the first post-fire decade to examine how the attributes changed through time...

Author(s): Paula J. Fornwalt, Camille Stevens-Rumann, Byron J. Collins

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Thermocouple probe orientation affects prescribed fire behavior estimation

www.nrfirescience.org/resource/18357

Understanding the relationship between fire intensity and fuel mass is essential information for scientists and forest managers seeking to manage forests using prescribed fires. Peak burning temperature, duration of heating, and area under the temperature profile are fire behavior metrics obtained from thermocouple-datalogger...

Author(s): Thomas Adam Coates, Alex T. Chow, Donald L. Hagan, Thomas A. Waldrop, G. Geoff Wang, William C. Bridges, Mary-Frances Rogers, James H. Dozier

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Survey design for precise fire management conservation targets

www.nrfirescience.org/resource/17305

Common goals of ecological fire management are to sustain biodiversity and minimize extinction risk. A novel approach to achieving these goals determines the relative proportions of vegetation growth stages (equivalent to successional stages, which are categorical representations of time since fire) that maximize a biodiversity...

Author(s): Holly Sitters, Julian Di Stefano, Timothy J. Wills, Matthew Swan, Alan York

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Moisture Content, Ignitability, and Fire Risk of Vegetation in Vertical Greenery Systems

www.nrfirescience.org/resource/17684

Vertical greenery systems (VGS) are getting popular as a green cladding material. However, they have not been adequately assessed in terms of fire safety. Lack of maintenance and improper irrigation systems will cause drying of plants in VGS, creating substantial fire risk. Dry plants may be easily

ignited and intensify the vertical...

Author(s): Kalani C. Dahanayake, Cheuk Lun Chow

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Quantifying understory vegetation density using small-footprint airborne lidar

www.nrfirescience.org/resource/17961

The ability to quantify understory vegetation structure in forested environments on a broad scale has the potential to greatly improve our understanding of wildlife habitats, nutrient cycling, wildland fire behavior, and wildland firefighter safety. Lidar data can be used to model understory vegetation density, but the accuracy of...

Author(s): Michael J. Campbell, Philip E. Dennison, Andrew T. Hudak, Lucy M. Parham, Bret W. Butler

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Woody material structural degradation through decomposition

www.nrfirescience.org/resource/16439

Dead woody material (DWM) plays numerous important roles in forest ecosystems; however, through the process of decomposition, it undergoes structural and chemical changes that progressively alter its function in these roles. Much remains unknown about how DWM mechanical strength and structural integrity change through decomposition...

Author(s): Shawn Fraver, Mehdi Tajvidi, Anthony W. D'Amato, Daniel I. Lindner, Jodi A. Forrester, Amy M. Milo

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Post-fire surface fuel dynamics in California forests across three burn severity classes

www.nrfirescience.org/resource/17129

Forest wildfires consume fuel and are followed by post-fire fuel accumulation. This study examines post-fire surface fuel dynamics over 9 years across a wide range of conditions characteristic of California fires in dry conifer and hardwood forests. We estimated post-fire surface fuel loadings (Mg ha⁻¹) from 191 repeatedly...

Author(s): Bianca N. I. Eskelson, Vicente J. Monleon

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

New development and application needs for Earth system modeling of fire–climate–ecosystem interactions

www.nrfirescience.org/resource/18339

Wildfire, climate and ecosystem are interactive components of the Earth system (Bowman et al 2009, Andela et al 2017). Climate and fuel moisture, which is heavily impacted by atmospheric conditions, are primary drivers for fire occurrence and behavior, while vegetation provides necessary fuels for combustion (Pyne et al 1996). On...

Author(s): Yongqiang Liu

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Preface: Special issue on wildland fires

www.nrfirescience.org/resource/17795

Wildland fires are a critical Earth-system process that impacts human populations in each settled continent [1,2]. Wildland fires have often been stated as being essential to human life and civilization through the impacts on land clearance, agriculture, and hunting, with fire as a phenomenon serving a key role in the development of...

Author(s): Alistair M. S. Smith, James A. Lutz, Chad M. Hoffman, Grant J. Williamson, Andrew T. Hudak

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Fuel bed response to vegetation treatments in juniper-invaded sagebrush steppe

www.nrfirescience.org/resource/18119

Expansion of juniper (*Juniperus* spp. L.) and pinyon (*Pinus* spp. L.) into sagebrush steppe habitats has been occurring for over a century across western United States. Vegetation and fuel treatments, with the goal of increasing landscape diversity and herbaceous productivity, and reducing woody fuels are commonly implemented to...

Author(s): Christopher R. Bernau, Eva K. Strand, Stephen C. Bunting

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Fuel treatment planning: fragmenting high fuel load areas while maintaining availability and connectivity of faunal habitat

www.nrfirescience.org/resource/17258

Reducing the fuel load in fire-prone landscapes is aimed at mitigating the risk of catastrophic wildfires but there are ecological consequences. Maintaining habitat for fauna of both sufficient extent and connectivity while fragmenting areas of high fuel loads presents land managers with seemingly contrasting objectives. Faced with...

Author(s): Ramya Rachmawati, Melih Ozlen, John W. Hearne, Karin J. Reinke

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Automatic Assessment of Crown Projection Area on Single Trees and Stand-Level, Based on Three-Dimensional Point Clouds Derived from Terrestrial Laser-Scanning

www.nrfirescience.org/resource/17630

Crown projection area (CPA) is a critical parameter in assessing inter-tree competition and estimating biomass volume. A multi-layer seeded region growing-based approach to the fully automated assessment of CPA based on 3D-point-clouds derived from terrestrial laser scanning (TLS) is presented. Independently repeated manual CPA-...

Author(s): Tim Ritter, Arne Nothdurft

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Fire behavior and ecological effects of burning masticated forest fuels

www.nrfirescience.org/resource/17950

Managers masticate fuels to redistribute fuels within a forest. They use machines to chip and shred whole trees, shrubs, and herbaceous vegetation to reduce the fuels in the canopy and move them to the forest floor. Fires burning in the dense, compact fuelbeds resulting from mastication often burn with lower intensity and shorter...

Author(s): Penelope Morgan, Alistair M. S. Smith, Aaron M. Sparks, Camille Stevens-Rumann, Pamela G. Sikkink, Zachary D. Lyon, Robert F. Keefe

Year Published: 2018

Type: Document

Research Brief or Fact Sheet

Can air quality management drive sustainable fuels management at the temperate wildland-urban interface?

www.nrfirescience.org/resource/18327

Sustainable fire management has eluded all industrial societies. Given the growing number and magnitude of wildfire events, prescribed fire is being increasingly promoted as the key to reducing wildfire risk. However, smoke from prescribed fires can adversely affect public health. We propose that the application of air quality...

Author(s): David M. J. S. Bowman, Lori D. Daniels, Fay H. Johnston, Grant J. Williamson, William Matt Jolly, Sheryl Magzamen, Ana G. Rappold, Michael Brauer, Sarah B. Henderson

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Human influences superseded climate to disrupt the 20th century fire regime in Jasper National Park, Canada

www.nrfirescience.org/resource/18402

To enhance understanding of how climate and humans influenced historical fire occurrence in the montane forests of Jasper National Park, we crossdated fire-scar and tree age samples from 172 plots. We tested effects of drought and climatic variation driven by the El Niño-Southern Oscillation (ENSO) and Pacific North American (PNA)...

Author(s): Raphael D. Chavardes, Lori D. Daniels, Ze'ev Gedalof, David W. Anderson

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Effect of woody debris on the rate of spread of surface fires in forest fuels in a combustion wind tunnel

www.nrfirescience.org/resource/17730

The treatment of the contribution of woody debris (WD, such as branches or small logs >6–50 mm diameter) to the rate of forward spread of a fire in current operational forest fire spread models is inconsistent. Some models do not take into account this fuel at all (i.e. only consider the combustion of fine fuels (< 6 mm...

Author(s): Andrew L. Sullivan, N. C. Surawski, Daniel A. Crawford, Richard J. Hurley, Liubov Volkova, Christopher J. Weston, Carl P. Meyer

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Conceptualizing Ecological Flammability: An Experimental Test of Three Frameworks Using Various Types and Loads of Surface Fuels

www.nrfirescience.org/resource/17609

Vegetation flammability remains poorly defined and involves many intercorrelated components and metrics. Schwilk (2015) proposed a flammability framework with only two axes: total heat release and rate of spread. Pausas et al. (2017) modified this framework by standardizing the heat release axis by fuel load, and adding a third axis...

Author(s): Lynda D. Prior, Brett P. Murphy, David M. J. S. Bowman

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Weak interspecific interactions in a sagebrush steppe? Conflicting evidence from observations and experiments

www.nrfirescience.org/resource/17939

Stable coexistence requires intraspecific limitations to be stronger than interspecific limitations. The greater the difference between intra- and interspecific limitations, the more stable the coexistence, and the weaker the competitive release any species should experience following removal of competitors. We conducted a removal...

Author(s): Peter B. Adler, Andrew R. Kleinhesselink, Giles Hooker, Joshua B. Taylor, Brittany Teller, Stephan P. Ellner

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Applications of the United States Forest Inventory and Analysis dataset: a review and future directions

www.nrfirescience.org/resource/18287

The United States Forest Inventory and Analysis (FIA) program has been monitoring national forest resources in the United States for over 80 years; presented here is a synthesis of research applications for FIA data. A review of over 180 publications that directly utilize FIA data is broken down into broad categories of application...

Author(s): Wade T. Tinkham, Patrick R. Mahoney, Andrew T. Hudak, Grant M. Domke, Michael J. Falkowski, Christopher W. Woodall, Alistair M. S. Smith

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Physical and chemical characteristics of surface fuels in masticated mixed-conifer stands of the U.S. Rocky Mountains

www.nrfirescience.org/resource/16749

Mastication is a wildland fuel treatment technique that is rapidly becoming the preferred method for many 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

Year Published: 2018

Type: Document

Technical Report or White Paper

Masticated Fuels and Fire Behavior in Forests of the Interior West - JFSP Final Report

www.nrfirescience.org/resource/17722

Managers masticate fuels to reduce extreme fire hazards, but the impact on fire behavior within the resulting compact fuelbeds is poorly understood. We burned 54 laboratory-based fuelbeds one and two

growing seasons after mastication and 75 masticated fuelbeds in prescribed fires one growing season after treatment in three replicate...

Author(s): Penelope Morgan, Alistair M. S. Smith, Robert F. Keefe

Year Published: 2018

Type: Document

Technical Report or White Paper

Environmental, Structural, and Disturbance Influences over Forest Floor Components in Interior Douglas-Fir Forests of the Intermountain West, USA

www.nrfirescience.org/resource/18077

Downed woody material (DWM) is a key component in forest ecosystems with age, structure, and disturbance described as primary factors that influence DWM dynamics. In particular, much emphasis is placed on large coarse woody debris (CWD). Fine woody debris (FWD) (less than 7.62 cm diameter), duff, and litter also contribute to carbon...

Author(s): Andrew D. Giunta, John D. Shaw

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

The nature of the beast: examining climate adaptation options in forests with stand?replacing fire regimes

www.nrfirescience.org/resource/17221

Building resilience to natural disturbances is a key to managing forests for adaptation to climate change. To date, most climate adaptation guidance has focused on recommendations for frequent?fire forests, leaving few published guidelines for forests that naturally experience infrequent, stand?replacing wildfires. Because most...

Author(s): Joshua S. Halofsky, Daniel C. Donato, Jerry F. Franklin, Jessica E. Halofsky, David L. Peterson, Brian J. Harvey

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Growth response of whitebark pine (*Pinus albicaulis* Engelm) regeneration to thinning and prescribed burn treatments

www.nrfirescience.org/resource/17921

Whitebark pine (*Pinus albicaulis* Engelm.) forests play a prominent role throughout high-elevation ecosystems in the northern Rocky Mountains, however, they are vanishing from the high mountain landscape due to three factors: exotic white pine blister rust (*Cronartium ribicola* Fischer) invasions, mountain pine beetle (*Dendroctonus*...

Author(s): Molly L. Retzlaff, Robert E. Keane, David L.R. Affleck, Sharon M. Hood

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Effects of fall and spring prescribed burning in sagebrush steppe in central Oregon

www.nrfirescience.org/resource/18263

The research objective was to examine the effects of fall and spring burning in a basin big sagebrush/Idaho fescue-bluebunch wheatgrass plant community, including fuel consumption and plant species' responses to fire treatments, and to reduce western juniper density [5,6]. Prefire data for the fall fire were collected in July and...

Year Published: 2018

Type: Document
Synthesis

Natural Areas Association Fire Compendium 2

www.nrfirescience.org/resource/18853

The Natural Areas Association Fire Compendium 2 compiles articles published in the Natural Areas Journal from 2010 to 2017. This is a supplement to the NAA Fire Compendium that was compiled in 2010 for articles published from 1983 to 2009. Like the first compendium, articles in the Fire Compendium 2 focus on fire ecology and...

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Simulation of fuel bed ignition by wildland firebrands

www.nrfirescience.org/resource/18061

A 3-D mathematical model of fuel bed (FB) ignition initiated by glowing firebrands originating during wildland fires is proposed. In order to test and verify the model, a series of experiments was conducted to determine the FB ignition time by a single pine bark and twig firebrand (*Pinus sylvestris*). Irrespective of the pine bark...

Author(s): O. V. Matvienko, Denis P. Kasymov, Alexander I. Filkov, O. I. Daneyko, D. A. Gorbatov

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Characterizing fire behavior from laboratory burns of multi-aged, mixed-conifer masticated fuels in the western United States

www.nrfirescience.org/resource/17916

Mastication is the process of chipping or shredding components of the tree canopy or above-ground vegetation to reduce the canopy, alter fire spread rates, and reduce crown fire potential. Mastication as a fuel treatment, either alone or in combination with prescribed fire, has been the subject of much research. This research has...

Author(s): Faith A. Heinsch, Pamela G. Sikkink, Helen Y. Smith, Molly L. Retzlaff

Year Published: 2018

Type: Document

Technical Report or White Paper

Do post-fire fuel treatments and annual grasses interact to affect fire regimes in the Great Basin? - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/18252

Shifting climates and annual grass invasions have contributed to the increased number and size of fires in the western United States costing millions of dollars in fire suppression and post-fire rehabilitation. Post-fire rehabilitation implements fuel treatments, such as aerial and drill seeding, to control annual grass invasion and...

Author(s): Beth A. Newingham, Eva K. Strand

Year Published: 2018

Type: Document

Technical Report or White Paper

Quaking aspen woodland after conifer control: Tree and shrub dynamics

www.nrfirescience.org/resource/16719

Western juniper (*Juniperus occidentalis* spp. *occidentalis* Hook.) woodlands are replacing many lower elevation (< 2100 m) quaking aspen (*Populus tremuloides* Michx.) stands in the northern Great Basin. We evaluated two juniper removal treatments (Fall, Spring) to restore aspen woodlands in southeast Oregon, spanning a 15-year...

Author(s): Jonathan D. Bates, Kirk W. Davies

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Prescribed fire regimes subtly alter ponderosa pine forest plant community structure

www.nrfirescience.org/resource/18802

Prescribed fire is an active management tool used to address wildfire hazard and ecological concerns associated with fire exclusion and suppression over the past century. Despite widespread application in the United States, there is considerable inconsistency and lack of information regarding the extent to which specific outcomes...

Author(s): Becky K. Kerns, Michelle A. Day

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Wildfire fuel management: network-based models and optimization of prescribed burning

www.nrfirescience.org/resource/17866

Wildfires are a common phenomenon on most continents. They have occurred for an estimated 60 million years and are part of a regular climatic cycle. Nevertheless, wildfires represent a real and continuing problem that can have a major impact on people, wildlife and the environment. The intensity and severity of wildfires can be...

Author(s): Dmytro Matsypura, Oleg A. Prokopyev, Aizat Zahar

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Common ground on the role of wildfire in forested landscapes of the Western US

www.nrfirescience.org/resource/18204

Wildfire affects the health and well-being of people, yet the science behind its management grapples with uncertainties that have led to scientific debates. In particular, diverging views over how "natural" high-severity fire is in conifer forests across the western US have, in some cases, impeded the effective integration of...

Year Published: 2018

Type: Document

Research Brief or Fact Sheet

Tree spatial patterns and stand attributes in temperate forests: The importance of plot size, sampling design, and null model

www.nrfirescience.org/resource/16713

Detection of tree spatial patterns and structural attributes in a forest stand can provide critical information on occurring dynamics, and steer management decisions. However, since tree spatial distribution depends on factors that operate at different scales, including environmental heterogeneity and tree-to-tree interactions, both...

Author(s): Marco Carrer, Daniele Castagneri, Ionel Popa, Mario Pividori, Emanuele Lingua

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

High-severity fire: Evaluating its key drivers and mapping its probability across western US forests

www.nrfirescience.org/resource/17541

Wildland fire is a critical process in forests of the western United States (US). Variation in fire behavior, which is heavily influenced by fuel loading, terrain, weather, and vegetation type, leads to heterogeneity in fire severity across landscapes. The relative influence of these factors in driving fire severity, however, is...

Author(s): Sean A. Parks, Lisa M. Holsinger, Matthew Panunto, William Matt Jolly, Solomon Z. Dobrowski, Gregory K. Dillon

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Programmatic Analysis of Fuel Treatments: from the landscape to the national level - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/16989

The importance of cost effective fuel treatment programs has appeared consistently in federal directives (FLAME ACT, National Cohesive Strategy, U.S Department of Interior Office of Policy Analysis) as a priority. Implementing cost effective fuel treatment programs requires a spatially explicit and integrated systematic approach...

Year Published: 2018

Type: Document

Technical Report or White Paper

Fuel dynamics after a bark beetle outbreak impacts experimental fuel treatments

www.nrfirescience.org/resource/18779

Background: Fuel reduction treatments have been widely implemented across the western US in recent decades for both fire protection and restoration. Although research has demonstrated that combined thinning and burning effectively reduces crown fire potential in the few years immediately following treatment, little research has...

Author(s): Justin S. Crotteau, Christopher R. Keyes, Sharon M. Hood, David L.R. Affleck, Anna Sala

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Interactions between large high-severity fires and salvage logging on a short return interval reduce the regrowth of fire-prone serotinous forests

www.nrfirescience.org/resource/17175

New fire disturbance regimes under accelerating global environmental change can have unprecedented consequences for ecosystem resilience, lessening ecosystem natural regeneration. In the Mediterranean Basin, firedependent obligate seeder forests that are prone to increasingly frequent stand-replacing fires and then salvaged logged...

Author(s): Angela Taboada, Víctor Fernández-García, Elena Marcos, Leonor Calvo

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

A conservation paradox in the Great Basin-altering sagebrush landscapes with fuel breaks to

reduce habitat loss from wildfire

www.nrfirescience.org/resource/17420

Interactions between fire and nonnative, annual plant species (that is, 'the grass/fire cycle') represent one of the greatest threats to sagebrush (*Artemisia* spp.) ecosystems and associated wildlife, including the greater sage-grouse (*Centrocercus urophasianus*). In 2015, U.S. Department of the Interior called for a 'science-based...

Author(s): Douglas J. Shinneman, Cameron L. Aldridge, Peter S. Coates, Matthew J. Germino, David S. Pilliod, Nicole M. Vaillant

Year Published: 2018

Type: Document

Technical Report or White Paper

A numerical study of atmospheric perturbations induced by heat from a wildland fire: sensitivity to vertical canopy structure and heat source strength

www.nrfirescience.org/resource/17142

An improved understanding of atmospheric perturbations within and above a forest during a wildland fire has relevance to many aspects of wildland fires including fire spread, smoke transport and dispersion, and tree mortality. In this study, the ARPS-CANOPY model, a version of the Advanced Regional Prediction System (ARPS) model...

Author(s): Michael T. Kiefer, Shiyuan Zhong, Warren Heilman, Joseph J. Charney, Xindi Bian

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Multi-scale assessment of post-fire tree mortality models

www.nrfirescience.org/resource/19003

Post-fire tree mortality models are vital tools used by forest land managers to predict fire effects, estimate delayed mortality and develop management prescriptions. We evaluated the performance of mortality models within the First Order Fire Effects Model (FOFEM) software, and compared their performance to locally-parameterised...

Author(s): Tucker J. Furniss, Andrew J. Larson, Van R. Kane, James A. Lutz

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Evaluating the influence of prior burn mosaics on subsequent wildfire behavior, severity, and fire management options - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/18369

The Reburn Project was motivated by a need to better understand wildfires as fuel reduction treatments and to assess the impacts of decades of wildland fire suppression activities on forested landscapes. Our study examined three areas, located in the inland Pacific Northwest, central Idaho and interior British Columbia. Each area...

Author(s): Susan J. Prichard, Paul F. Hessburg, Robert W. Gray, Nicholas A. Povak, R. Brion Salter, Camille Stevens-Rumann, Penelope Morgan

Year Published: 2018

Type: Document

Technical Report or White Paper

Multiobjective prioritization of preselected fuel treatment strategies for public forestland: a case study in Flathead County, Montana

www.nrfirescience.org/resource/17346

Preferred fuel treatment strategies (FTSs) were determined for two public forests in Flathead County, Montana, for the period 2010–59 using a multiple-objective evaluation method that accounts for future residential development in the WUI and climate change. Three fuel management objectives were used to evaluate and rank FTSs:...

Author(s): Tony Prato, Travis B. Paveglio

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Does plant flammability differ between leaf and litter bed scale? Role of fuel characteristics and consequences for flammability assessment

www.nrfirescience.org/resource/17696

The increasing concern regarding fire in the wildland–urban interface (WUI) around the world highlights the need to better understand the flammability of WUI fuels. Research on plant flammability is rapidly increasing but commonly only considers a single fuel scale. In some cases, however, different fuel scales (e.g. leaf and...

Author(s): Anne Ganteaume

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

It matters when you measure it: using snow-cover Normalised Difference Vegetation Index (NDVI) to isolate post-fire conifer regeneration

www.nrfirescience.org/resource/18734

Landsat Normalized Difference Vegetation Index (NDVI) is commonly used to monitor post-fire green-up; however, most studies do not distinguish new growth of conifer from deciduous or herbaceous species, despite potential consequences for local climate, carbon and wildlife. We found that dual season (growing and snow cover) NDVI...

Author(s): Melanie K. Vanderhoof, Todd J. Hawbaker

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Mixed-severity fire fosters heterogeneous spatial patterns of conifer regeneration in a dry conifer forest

www.nrfirescience.org/resource/17138

We examined spatial patterns of post-fire regenerating conifers in a Colorado, USA, dry conifer forest 11–12 years following the reintroduction of mixed-severity fire. We mapped and measured all post-fire regenerating conifers, as well as all other post-fire regenerating trees and all residual (i.e., surviving) trees, in three 4-...

Author(s): Sparkle L. Malone, Paula J. Fornwalt, Michael A. Battaglia, Marin Chambers, Jose M. Iniguez, Carolyn Hull Sieg

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Resilience and resistance in sagebrush ecosystems are associated with seasonal soil temperature and water availability

www.nrfirescience.org/resource/18350

Invasion and dominance of exotic grasses and increased fire frequency threaten native ecosystems worldwide. In the Great Basin region of the western United States, woody and herbaceous fuel

treatments are implemented to decrease the effects of wildfire and increase sagebrush (*Artemisia* spp.) ecosystem resilience to disturbance and...

Author(s): Bruce A. Roundy, Jeanne C. Chambers, David A. Pyke, Richard F. Miller, Robin J. Tausch, Eugene Schupp, Ben Rau, Trevor Gruell

Year Published: 2018

Type: Document

Book or Chapter or Journal Article

Improving forest sampling strategies for assessment of fuel reduction burning

www.nrfirescience.org/resource/16665

Land managers typically make post hoc assessments of the effectiveness of fuel reduction burning (FRB), but often lack a rigorous sampling framework. A general, but untested, assumption is that variability in soil and fuel properties increases from small (1 m) to large spatial scales (10–100 km). Based on a recently published...

Author(s): Mana Gharun, Malcolm Possell, Meaghan E. Jenkins, Lai Fan Poon, Tina L. Bell, Mark A. Adams

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Prediction of forest canopy and surface fuels from lidar and satellite time series data in a bark beetle-affected forest

www.nrfirescience.org/resource/15535

Wildfire behavior depends on the type, quantity, and condition of fuels, and the effect that bark beetle outbreaks have on fuels is a topic of current research and debate. Remote sensing can provide estimates of fuels across landscapes, although few studies have estimated surface fuels from remote sensing data. Here we predicted and...

Author(s): Benjamin C. Bright, Andrew T. Hudak, Arjan J. H. Meddens, Todd J. Hawbaker, Jennifer S. Briggs, Robert E. Kennedy

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Mapping tree canopy cover in support of proactive prairie grouse conservation in western North America

www.nrfirescience.org/resource/14922

Invasive woody plant expansion is a primary threat driving fragmentation and loss of sagebrush (*Artemisia* spp.) and prairie habitats across the central and western United States. Expansion of native woody plants, including conifer (primarily *Juniperus* spp.) and mesquite (*Prosopis* spp.), over the past century is...

Author(s): Michael J. Falkowski, Jeffrey S. Evans, David E. Naugle, Christian A. Hagen, Scott A. Carleton, Jeremy D. Maestas, Azad Henareh Khalyani, Aaron J. Poznanovic, Andrew J. Lawrence

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Uneven-aged silviculture can reduce negative effects of forest management on beetles

www.nrfirescience.org/resource/16656

Decline in biodiversity have increased the interest in alternative forest management approaches. Unevenaged silviculture has been proposed as a mean to maintain continuity of forest canopy cover, mimic small-scale disturbances and provide a stratified forest structure similar to that of old-growth

forests and therefore better...

Author(s): Klara Joellsson, Joakim Hjältén, Timothy Work, Heloise Gibb, Jean-Michel Roberge, Therese Löfroth

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Prescribed burning in ponderosa pine: fuel reductions and redistributing fuels near boles to prevent injury

www.nrfirescience.org/resource/15214

Fire suppression and other factors have resulted in high wildfire risk in the western US, and prescribed burning can be an effective tool for thinning forests and reducing fuels to lessen wildfire risks. However, prescribed burning sometimes fails to substantially reduce fuels and sometimes damages and kills valuable, large trees....

Author(s): Robert Progar, Kathryn H. Hrinkevich, Edward S. Clark, Matthew J. Rinella

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Impacts of Mastication Fuel Treatments on California, USA, Chaparral Vegetation Structure and Composition

www.nrfirescience.org/resource/16334

Mechanical fuel treatments are a primary pre-fire strategy for potentially mitigating the threat of wildland fire, yet there is limited information on how they impact shrubland ecosystems. Our goal was to assess the impact of mechanical mastication fuel treatments on chaparral vegetation and to determine the extent to which they...

Author(s): Teresa J. Brennan, Jon E. Keeley

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Early forest thinning changes aboveground carbon distribution among pools, but not total amount

www.nrfirescience.org/resource/16641

Mounting concerns about global climate change have increased interest in the potential to use common forest management practices, such as forest density management with thinning, in climate change mitigation and adaptation efforts. Long-term effects of forest density management on total aboveground C are not well understood,...

Author(s): Michael S. Schaedel, Andrew J. Larson, David L.R. Affleck, R. Travis Belote, John M.

Goodburn, Deborah S. Page-Dumroese

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Landscape-scale quantification of fire-induced change in canopy cover following mountain pine beetle outbreak and timber harvest

www.nrfirescience.org/resource/15137

Across the western United States, the three primary drivers of tree mortality and carbon balance are bark beetles, timber harvest, and wildfire. While these agents of forest change frequently overlap, uncertainty remains regarding their interactions and influence on specific subsequent fire effects such as change in canopy cover....

Author(s): T. Ryan McCarley, Crystal A. Kolden, Nicole M. Vaillant, Andrew T. Hudak, Alistair M. S. Smith, Jason Kreitler
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

Understory recovery after low- and high-intensity fires in ponderosa pine forests of northern Idaho

www.nrfirescience.org/resource/18266

Researchers compared early postfire vegetation recovery on sites burned with different intensities in seral ponderosa pine communities of the Douglas-fir/mallow ninebark habitat type. The plots were burned over 30 days under varying conditions of temperature, fuel moisture, and relative humidity, resulting in fires of varying...

Year Published: 2017

Type: Document

Synthesis

Predicting Post-Fire Tree Mortality for 12 Western US Conifers Using the First Order Fire Effects Model (FOFEM)

www.nrfirescience.org/resource/16738

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 (*Abies...*

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

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Long-term impacts of wildfire on fuel loads, vegetation composition, and potential fire behavior and management in sagebrush-dominated ecosystems - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/17010

An understanding of the long-term vegetation structure, patterns of fuel succession, and potential for reburn in sagebrush-dominated ecosystems is important for managing the landscape at a temporal scale that is appropriate for the ecological interactions in these systems. Our overarching research objective was to fill existing...

Author(s): Lisa M. Ellsworth, J. Boone Kauffman

Year Published: 2017

Type: Document

Technical Report or White Paper

Radial and stand-level thinning treatments: 15-year growth response of legacy ponderosa and Jeffrey pine trees

www.nrfirescience.org/resource/16563

Restoration efforts to improve vigor of large, old trees and decrease risk to high-intensity wildland fire and drought-mediated insect mortality often include reductions in stand density. We examined 15-year growth response of old ponderosa pine (*Pinus ponderosa*) and Jeffrey pine (*Pinus jeffreyi*) trees in northeastern California, U...

Author(s): Sharon M. Hood, Danny R. Cluck, Bobette E. Jones, Sean Pinnell

Year Published: 2017

Type: Document
Book or Chapter or Journal Article

Fine-scale spatial climate variation and drought mediate the likelihood of reburning

www.nrfirescience.org/resource/17220

In many forested ecosystems, it is increasingly recognized that the probability of burning is substantially reduced within the footprint of previously burned areas. This self-limiting effect of wildland fire is considered a fundamental emergent property of ecosystems and is partly responsible for structuring landscape...

Author(s): Sean A. Parks, Marc-Andre Parisien, Carol Miller, Lisa M. Holsinger, Scott L. Baggett

Year Published: 2017

Type: Document
Book or Chapter or Journal Article

Towards enhanced risk management: planning, decision making and monitoring of US wildfire response

www.nrfirescience.org/resource/15485

This paper is the preface to a special issue focused on US wildfire response. The nine papers included build from a 2016 conference special session on monitoring, modelling and accountability of fire management policies and practices. Here we provide the unifying theme for these papers, summarise each from this perspective, and...

Author(s): Christopher J. Dunn, David E. Calkin, Matthew P. Thompson

Year Published: 2017

Type: Document
Book or Chapter or Journal Article

Are litter decomposition and fire linked through plant species traits?

www.nrfirescience.org/resource/16276

Biological decomposition and wildfire are connected carbon release pathways for dead plant material: slower litter decomposition leads to fuel accumulation. Are decomposition and surface fires also connected through plant community composition, via the species' traits? Our central concept involves two axes of trait variation...

Author(s): Johannes H. C. Cornelissen, Saskia Grootemaat, Lieneke M. Verheijen, William K. Cornwell, Peter M. van Bodegom, Rene Van der Wal, Rien Aerts

Year Published: 2017

Type: Document
Book or Chapter or Journal Article

Evaluating spatiotemporal tradeoffs under alternative fuel management and suppression policies: measuring returns on investment - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/16996

The primary theme of our study is the cost-effectiveness of fuel treatment at multiple scales, addressing the question of whether fuel treatments can be justified on the basis of saved suppression costs. Our study was designed to track the influence of a dollar invested in fuel treatments on final fire outcomes, and to quantify this...

Author(s): Matthew P. Thompson, Karen L. Riley, Dan R. Loeffler, Jessica R. Haas

Year Published: 2017

Type: Document
Technical Report or White Paper

Wildland urban interface part II: response of components, systems, and mitigation strategies in the United States

www.nrfirescience.org/resource/17715

Structure loss in wildland fires has significantly increased over the past few decades, affected by increased development in rural areas, changing fuel management policies, and climate change, all of which are projected to increase in the future. This paper is Part II of a two-part review, which presents a summary of fundamental and...

Author(s): Raquel S. P. Hakes, Sara E. Caton, Daniel J. Gorham, Michael J. Gollner

Year Published: 2017

Type: Document

Synthesis

Effect of particle aging on chemical characteristics, smoldering, and fire behavior in mixed-conifer masticated fuel

www.nrfirescience.org/resource/15782

Mastication is a silvicultural technique that grinds, shreds, or chops trees or shrubs into pieces and redistributes the biomass onto the forest floor to form a layer of woody debris. Unlike other fuel treatments that remove this biomass, masticated biomass often remains on site, which increases total fuel loading and causes concern...

Author(s): Pamela G. Sikkink, Theresa B. Jain, James J. Reardon, Faith A. Heinsch, Robert E. Keane, Bret W. Butler, Scott L. Baggett

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Importance of fuel treatment for limiting moderate-to-high intensity fire: Findings from comparative fire modeling

www.nrfirescience.org/resource/16502

Wildland fire intensity influences natural communities, soil properties, erosion, and sequestered carbon. Measuring effectiveness of fuel treatment for reducing area of higher intensity unplanned fire is argued to be more meaningful than determining effect on total unplanned area burned. Objectives To contrast the relative...

Author(s): Geoffrey J. Cary, Ian D. Davies, Ross A. Bradstock, Robert E. Keane, Michael D. Flannigan

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Adapting fuel treatments in a changing climate - Prescribed fire, mechanical treatments, wildfire, and restoration

www.nrfirescience.org/resource/15075

The Available Science Assessment Project (ASAP) leads, EcoAdapt and Oregon State University's Institute for Natural Resources, hosted a workshop during the International Association of Wildland Fire's 5th Fire Behavior and Fuels Conference, in cooperation with the Northwest Fire Science Consortium and the Northern Rockies...

Author(s): Corey L. Gucker

Year Published: 2017

Type: Document

Research Brief or Fact Sheet

Return on investment from fuel treatments to reduce severe wildfire and erosion in a watershed investment program in Colorado

www.nrfirescience.org/resource/17708

A small but growing number of watershed investment programs in the western United States focus on wildfire risk reduction to municipal water supplies. This paper used return on investment (ROI) analysis to quantify how the amounts and placement of fuel treatment interventions would reduce sediment loading to the Strontia Springs...

Author(s): Kelly W. Jones, Jeffery B. Cannon, Freddy A. Saavedra, Stephanie Kampf, Rob Addington, Anthony S. Cheng, Lee H. MacDonald, Codie Wilson, Brett Wolk

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

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

Review of Pathways for Building Fire Spread in the Wildland Urban Interface Part I: Exposure Conditions

www.nrfirescience.org/resource/17814

While the wildland–urban interface (WUI) is not a new concept, fires in WUI communities have rapidly expanded in frequency and severity over the past few decades. The number of structures lost per year has increased significantly, due in part to increased development in rural areas, fuel management policies, and climate change,...

Author(s): Sara E. Caton, Raquel S. P. Hakes, Daniel J. Gorham, Aixi Zhou, Michael J. Gollner

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

Changes in mass, carbon, nitrogen, and phosphorus in logs decomposing for 30 years in three Rocky Mountain coniferous forests

www.nrfirescience.org/resource/16468

Estimates of decomposition rates of coarse woody debris (CWD) and fluxes of nutrients therein are essential components of carbon (C) and nutrient budget models. In a 30-year field experiment, we periodically measured mass remaining and nutrient concentrations in log segments of pine, spruce, and fir in natural, mature coniferous...

Author(s): Cindy E. Prescott, Kristen Corrao, Anya Reid, Jenna M. Zukswert, Shalom D. Addo-Danso

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Productivity and sustainability of hybrid aspen (*Populus tremula* L. *P. Tremuloides* Michx.) root sucker stands with varying management strategies

www.nrfirescience.org/resource/16694

Hybrid aspen (*Populus tremula* L. *P. tremuloides* Michx.) has recently been introduced commercially in the Nordic and Baltic forestry. The hybrid is suitable for biomass production under high latitude conditions and the productivity is promising. Regeneration may be based on vigorous root sucker sprouting. Management strategies for...

Author(s): Lars Rytter, Rose-Marie Rytter

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Wildland fire risk reduction: a Government Accountability Office report

www.nrfirescience.org/resource/15283

This report examines federal officials' and stakeholders' views on (1) factors that affect federal-nonfederal collaboration aimed at reducing wildland fire risk to communities and (2) actions that could improve their ability to reduce risk to communities.

Author(s): U.S. Government Accountability Office

Year Published: 2017

Type: Document

Technical Report or White Paper

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

Smoke in a new era of fire

www.nrfirescience.org/resource/17804

Smoke from fire can sharply reduce air quality by releasing particulate matter, one of the most dangerous types of air pollution for human health. A third of U.S. households have someone sensitive to smoke. Minimizing the amount and impact of smoke is a high priority for land managers and regulators. One tool for achieving that goal...

Author(s): Rachel White, Paul F. Hessburg, Narasimhan K. Larkin, J. Morgan Varner

Year Published: 2017

Type: Document

Technical Report or White Paper

The effects of thinning and burning on understory vegetation in North America: A meta-analysis

www.nrfirescience.org/resource/16668

Management in fire-prone ecosystems relies widely upon application of prescribed fire and/or firesurrogate (e.g., forest thinning) treatments to maintain biodiversity and ecosystem function. The literature suggests fire and mechanical treatments proved more variable in their effects on understory vegetation as compared to their...

Author(s): Joshua Willms, Anne Bartuszevige, Dylan W. Schwilk, Patricia L. Kennedy

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Long-term effects of fuel treatments on aboveground biomass accumulation in ponderosa pine forests of the northern Rocky Mountains

www.nrfirescience.org/resource/15543

Fuel treatments in ponderosa pine forests of the northern Rocky Mountains are commonly used to modify fire behavior, but it is unclear how different fuel treatments impact the subsequent production and distribution of aboveground biomass, especially in the long term. This research evaluated aboveground biomass responses 23 years...

Author(s): Kate A. Clyatt, Christopher R. Keyes, Sharon M. Hood

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Targeted woodland removal to recover at-risk grouse and their sagebrush-steppe and prairie ecosystems

www.nrfirescience.org/resource/14924

In this paper, we summarize key findings from a special issue of the journal Rangeland Ecology & Management examining socioecological aspects of woodland expansion and management actions to address this threat in sagebrush and prairie ecosystems. We highlight species and ecosystem outcomes that may result from recent...

Author(s): Richard F. Miller, David E. Naugle, Jeremy D. Maestas, Christian A. Hagen, Galon Hall

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Forest succession along a productivity gradient following fire exclusion

www.nrfirescience.org/resource/16658

Numerous studies have documented significant change in conifer forests of the American West following the cessation of recurrent fire at the end of the 19th century. But the successional dynamics that characterize different forested settings in the absence of fire remain poorly understood. This study reconstructs structural and...

Author(s): James D. Johnston

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Aging masticated fuels - How do they change over time?

www.nrfirescience.org/resource/15226

Mastication is becoming a common fuel treatment method in forests and shrublands of the United States, especially where prescribed fire or mechanical fuel removal is difficult. Such sites are often located in the wildland urban interface (WUI) where fuel treatments must be carefully administered because of the risk to nearby...

Author(s): Pamela G. Sikkink

Year Published: 2017

Type: Document

Research Brief or Fact Sheet

An evaluation of the Forest Service Hazardous Fuels Treatment Program—Are we treating enough to promote resiliency or reduce hazard?

www.nrfirescience.org/resource/15522

The National Cohesive Wildland Fire Management Strategy recognizes that wildfire is a necessary natural process in many ecosystems and strives to reduce conflicts between fire-prone landscapes and people. In an effort to mitigate potential negative wildfire impacts proactively, the Forest Service fuels program reduces wildland fuels...

Author(s): Nicole M. Vaillant, Elizabeth D. Reinhardt

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Mulching fuels treatments promote understory plant communities in three Colorado, USA, coniferous forest types

www.nrfirescience.org/resource/14906

Mulching fuels treatments have been increasingly implemented by forest managers in the western USA to reduce crown fire hazard. These treatments use heavy machinery to masticate or chip unwanted shrubs and small-diameter trees and broadcast the mulched material on the ground. Because mulching treatments are relatively novel and have...

Author(s): Paula J. Fornwalt, Monique E. Rocca, Michael A. Battaglia, Charles C. Rhoades, Michael G. Ryan

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Mortality predictions of fire-injured large Douglas-fir and ponderosa

www.nrfirescience.org/resource/16642

Wild and prescribed fire-induced injury to forest trees can produce immediate or delayed tree mortality but fire-injured trees can also survive. Land managers use logistic regression models that incorporate tree-injury variables to discriminate between fatally injured trees and those that will survive. We used data from 4024...

Author(s): Lisa Ganio, Robert A. Progar
Year Published: 2017
Type: Document
Book or Chapter or Journal Article

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

Book or Chapter or Journal Article

Decomposition rates for hand-piled fuels

www.nrfirescience.org/resource/15138

Hand-constructed piles in eastern Washington and north-central New Mexico were weighed periodically between October 2011 and June 2015 to develop decay-rate constants that are useful for estimating the rate of piled biomass loss over time. Decay-rate constants (k) were determined by fitting negative exponential curves to time series...

Author(s): Clinton S. Wright, Alexander M. Evans, Joseph C. Restaino

Year Published: 2017

Type: Document

Technical Report or White Paper

Long-term effects of burn season and frequency on ponderosa pine forest fuels and seedlings

www.nrfirescience.org/resource/16327

Prescribed fire is widely applied in western US forests to limit future fire severity by reducing tree density, fuels, and excessive seedlings. Repeated prescribed burning attempts to simulate historical fire regimes in frequent-fire forests, yet there is limited long-term information regarding optimal burn season and frequency. In...

Author(s): Douglas J. Westlind, Becky K. Kerns

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Do Fuel Treatments Restore Ecosystem Function? Water Use Efficiency Before and After Fire Suppression and Fuels Treatments in Fire-Prone Pine Forests in the Western United States - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/17013

This project had three objectives. The first objective was to identify variation in discrimination of $\delta^{13}C$ and intrinsic water use efficiency (iWUE) in Ponderosa pine (*Pinus ponderosa*) tree rings from 1800 to 2012 at two Fire and Fire Surrogate study sites (Arizona, Washington). The sites are both dominated by ponderosa pine but...

Author(s): Alan H. Taylor, Soumaya Belmecheri, Lucas B. Harris

Year Published: 2017

Type: Document

Technical Report or White Paper

Methods to reduce forest residue volume after timber harvesting and produce black carbon

www.nrfirescience.org/resource/16572

Forest restoration often includes thinning to reduce tree density and improve ecosystem processes and function while also reducing the risk of wildfire or insect and disease outbreaks. However, one drawback of these restoration treatments is that slash is often burned in piles that may damage the soil and require further restoration...

Author(s): Deborah S. Page-Dumroese, Matt Busse, Jim Archuleta, Darren McAvoy, Eric Roussel

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

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

Whither the paradigm shift? Large wildland fires and the wildfire paradox offer opportunities for a new paradigm of ecological fire management

www.nrfirescience.org/resource/15487

The growing frequency of large wildland fires has raised awareness of the 'wildfire paradox' and the 'firefighting trap' that are both rooted in the fire exclusion paradigm. However, a paradigm shift has been unfolding in the wildland fire community that seeks to restore fire ecology processes across broad landscapes. This...

Author(s): Timothy Ingalsbee

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Selecting Control Sites for Post-Fire Ecological Studies Using Biological Criteria and MODIS Time Series Data

www.nrfirescience.org/resource/16737

Wildland fires play a key role in the functioning and structure of vegetation. The availability of sensors aboard satellites, such as Moderate Resolution Imaging Spectroradiometer (MODIS), makes possible the construction of a time series of vegetation indices (VI) and the monitoring of post-fire vegetation recovery. One of the...

Author(s): Marcos A. Landi, Carlos Di Bella, Silvia Ojeda, Paola Salvatierra, Juan Argañaraz, Laura M. Bellis

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Spatiotemporal Evaluation of Fuel Treatment and Previous Wildfire Effects on Suppression Costs - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/16999

This project quantifies the effects of fuel treatments and previously burned areas on daily fire management costs, as well as summarizes recent encounter rates between fuel treatments and wildland fires across the conterminous United States. Using national-scale, spatially explicit data on recent fuel treatments and wildland fires,...

Author(s): Helen T. Naughton, Kevin M. Barnett

Year Published: 2017

Type: Document

Technical Report or White Paper

Production rates for United States Forest Service brush disposal planning in the northern Rocky Mountains

www.nrfirescience.org/resource/16536

Timber harvesting operations generate brush and other vegetative debris, which often has no marketable value. In many western U.S. forests, these materials represent a fire hazard and a potential threat to forest health and must be removed or burned for disposal. Currently, there is no established, consistent method to estimate...

Author(s): Dan R. Loeffler, Stu Hoyt, Nathaniel Anderson

Year Published: 2017

Type: Document

Technical Report or White Paper

Short-term ecological consequences of collaborative restoration treatments in ponderosa pine forests of Colorado

www.nrfirescience.org/resource/15484

Ecological restoration treatments are being implemented at an increasing rate in ponderosa pine and other dry conifer forests across the western United States, via the USDA Forest Service's Collaborative Forest Landscape Restoration (CFLR) program. In this program, collaborative stakeholder groups work with National Forests (NFs)...

Author(s): Jennifer S. Briggs, Paula J. Fornwalt, Jonas A. Feinstein

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Artemisia tridentata subsp. vaseyana (mountain big sagebrush)

www.nrfirescience.org/resource/16200

Mountain big sagebrush is a widely distributed shrub native to the western United States. Mountain big sagebrush ecosystems support hundreds of plant and animal species, including several sagebrush obligates. The distribution of mountain big sagebrush has been reduced since European-American settlement, and is likely to be further...

Author(s): Robin J. Innes

Year Published: 2017

Type: Document

Synthesis

Unplanned Wildfire in Areas With Slash Piles

www.nrfirescience.org/resource/17549

Each year, fuel treatments reduce the likelihood of uncharacteristically severe wildland fire in overstocked stands across millions of acres in the United States. Typically, these treatments target

small-diameter trees for removal, producing large amounts of unmerchantable material and increasing surface fuels. Currently, few...

Author(s): Alexander M. Evans, Clinton S. Wright

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Do fuel treatment costs affect wildfire suppression costs and property damages? An analysis of costs, damages avoided and return on investment - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/16993

Spatial wildfire suppression costs regressions have been re-estimated at a more disaggregated level for the nine Geographic Area Coordination Center (GACC's) regions using five years of data for fires involving National Forests. Results of these revised regression determined that only in the California GACCs did mechanical fuel...

Author(s): Armando Gonzalez-Caban, John B. Loomis, Robin Reich, Douglas B. Rideout, José J. Sánchez

Year Published: 2017

Type: Document

Technical Report or White Paper

Post-fire vegetation response at the woodland-shrubland interface is mediated by the pre-fire community

www.nrfirescience.org/resource/16496

Understanding the drivers of ecosystem responses to disturbance is essential for management aimed at maintaining or restoring ecosystem processes and services, especially where invasive species respond strongly to disturbance. In this study, we used repeat vegetation surveys from a network of prescribed fire treatments at the...

Author(s): Alexandra K. Urza, Peter J. Weisberg, Jeanne C. Chambers, Jessica M. Dhaemers, David Board

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Does the presence of large down wood at the time of a forest fire impact soil recovery?

www.nrfirescience.org/resource/15068

Fire may remove or create dead wood aboveground, but it is less clear how high severity burning of soils affects belowground microbial communities and soil processes, and for how long. In this study, we investigated soil fungal and bacterial communities and biogeochemical responses of severely burned "red" soil and less severely...

Author(s): Jane E. Smith, Laurel A. Kluber, Tara N. Jennings, Donaraye McKay, Greg Brenner, Elizabeth W. Sulzman

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Site preparation severity influences lodgepole pine plant community composition, diversity, and succession over 25 years

www.nrfirescience.org/resource/16474

Lodgepole pine (*Pinus contorta* var. *latifolia* Engelm.) ecosystems of central British Columbia face cumulative stresses, and management practices are increasingly scrutinized. We addressed trade-offs

between “light-on-the-land” versus more aggressive silvicultural approaches by examining plant communities and indicator species (...)

Author(s): Sybille Haeussler, Torsten Kaffanke, Jacob O. Boateng, John McClarnon, Lorne Bedford
Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Predicting forest floor and woody fuel consumption from prescribed burns in southern and western pine ecosystems of the United States

www.nrfirescience.org/resource/16699

Reliable estimates of pre-burn biomass and fuel consumption are important to estimate wildland fire emissions and assist in prescribed burn planning. We present empirical models for predicting fuel consumption in natural fuels from 60 prescribed fires in ponderosa pine-dominated forests in the western US and 60 prescribed fires in...

Author(s): Susan J. Prichard, Maureen C. Kennedy, Clinton S. Wright, J.B. Cronan, Roger D. Ottmar
Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Density-dependent woody detritus accumulation in an even-aged, single-species forest

www.nrfirescience.org/resource/16462

Deadwood in forests influences fire intensity, stores carbon and nutrients, and provides wildlife habitat. We used a 54-year-old density management experiment in *Larix occidentalis* Nutt. forests to evaluate density dependence of woody detritus accumulation. Based on self-thinning theory, we expected woody detritus produced by the...

Author(s): Michael S. Schaedel, Andrew J. Larson, Cullen J. Weisbrod, Robert E. Keane
Year Published: 2017

Type: Document

Book or Chapter or Journal Article

Effects of conifer treatments on soil nutrient availability and plant composition in sagebrush steppe

www.nrfirescience.org/resource/16691

Piñon-juniper woodlands of the western United States have expanded 2 to 10-fold since the late 1800's. Tree control measures using chainsaws, heavy equipment and prescribed fire have been used to reduce woodlands and restore big sagebrush steppe and decrease woody fuel loading. We evaluated nutrient availability and herbaceous...

Author(s): Jonathan D. Bates, Kirk W. Davies

Year Published: 2017

Type: Document

Book or Chapter or Journal Article

The effect of salvage logging on surface fuel loads and fuel moisture in beetle-infested lodgepole pine forests

www.nrfirescience.org/resource/15246

Widespread tree mortality from mountain pine beetle (MPB; *Dendroctonus ponderosae* Hopkins) outbreaks has prompted forest management activities to reduce crown fire hazard in the Rocky Mountain region. However, little is known about how beetle-related salvage logging and biomass utilization options affect woody surface fuel loads and...

Author(s): Paul R. Hood, Kellen N. Nelson, Charles C. Rhoades, Daniel B. Tinker

Year Published: 2017

Type: Document
Book or Chapter or Journal Article

Surface fuel changes after severe disturbances in northern Rocky Mountain ecosystems

www.nrfirescience.org/resource/15549

It is generally assumed that severe disturbances predispose damaged forests to high fire hazard by creating heavy fuel loading conditions. Of special concern is the perception that surface fuel loadings become high as recently killed trees deposit foliage and woody material on the ground and that these high fuel loadings may cause...

Author(s): Christine Stalling, Robert E. Keane, Molly L. Retzlaff

Year Published: 2017

Type: Document
Book or Chapter or Journal Article

Long-term precommercial thinning effects on *Larix occidentalis* (western larch) tree and stand characteristics

www.nrfirescience.org/resource/16449

Precommercial thinning (PCT) is used to increase tree size and shorten harvest rotation time. Short-term results from PCT studies often show a trade-off between individual-tree growth and net stand yield, while longer-term effects of PCT on tree growth and stand yield are less well documented. We used a 54-year-old PCT study to test...

Author(s): Michael S. Schaedel, Andrew J. Larson, David L.R. Affleck, R. Travis Belote, John M. Goodburn, David K. Wright, Elaine Kennedy Sutherland

Year Published: 2017

Type: Document
Book or Chapter or Journal Article

Effects of prescribed fire on wildlife and wildlife habitat in selected ecosystems of North America

www.nrfirescience.org/resource/14715

Prescribed fire is applied widely as a management tool in North America to meet various objectives such as reducing fuel loads and fuel continuity, returning fire to an ecosystem, enhancing wildlife habitats, improving forage, preparing seedbeds, improving watershed conditions, enhancing nutrient cycling, ...

Author(s): William M. Block, L. Mike Conner, Paul A. Brewer, Paulette Ford, Jonathan Haufler, Andrea Litt, Ronald E. Masters, Laura R. Mitchell, Jane Park

Year Published: 2016

Type: Document
Technical Report or White Paper

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. Crotteau, Christopher R. Keyes, Elaine Kennedy Sutherland, David K. Wright, Joel M. Egan

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Evaluation and optimization of fuel treatment effectiveness with an integrated experimental/modeling approach - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/17048

The effectiveness of a hazardous fuel reduction treatment must take into account both the physical change on fuel loading and structure and the effect that this change may have on wildland fire behavior. We first took a remote sensing and field measurement approach to quantify the effects of an aggressive fuel treatment program on...

Author(s): Nick Skowronski, Albert Simeoni, Kenneth L. Clark, William E. Mell, Rory Hadden

Year Published: 2016

Type: Document

Technical Report or White Paper

Does prescribed fire promote resistance to drought in low elevation forests of the Sierra Nevada, California, USA?

www.nrfirescience.org/resource/14244

Prescribed fire is a primary tool used to restore western forests following more than a century of fire exclusion, reducing fire hazard by removing dead and live fuels (small trees and shrubs). It is commonly assumed that the reduced forest density following prescribed fire also reduces competition for resources among the...

Author(s): Phillip J. van Mantgem, Anthony C. Caprio, Nathan L. Stevenson, Adrian J. Das

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

Longevity and Effectiveness of Mechanical Mastication Treatments - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/17032

This report summarizes research funded by the Joint Fire Science Program (JFSP Project Number 12-1-03-31) addressing needs for information regarding the effectiveness and longevity of fuels treatments. We investigated the longevity of effects associated with mastication treatments on variables including fuels, vegetation, and fire...

Author(s): J. Morgan Varner, Eric E. Knapp, Stacy Drury, Jesse K. Kreye, Gregory Hamby, Warren Reed

Year Published: 2016

Type: Document

Technical Report or White Paper

Landscape variation in tree regeneration and snag fall drive fuel loads in 24-year old post-fire lodgepole pine forests

www.nrfirescience.org/resource/14901

Escalating wildfire in subalpine forests with stand-replacing fire regimes is increasing the extent of early-seral forests throughout the western USA. Post-fire succession generates the fuel for future fires, but little is known about fuel loads and their variability in young post-fire stands. We sampled fuel profiles in 24-year-old...

Author(s): Kellen N. Nelson, Monica G. Turner, William H. Romme, Daniel B. Tinker

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Bayesian techniques for surface fuel loading estimation

www.nrfirescience.org/resource/14681

A study by Keane and Gray (2013) compared three sampling techniques for estimating surface fine woody fuels. Known amounts of fine woody fuel were distributed on a parking lot, and researchers estimated the loadings using different sampling techniques. An important result was that precise estimates of biomass required intensive...

Author(s): Kathy L. Gray, Robert E. Keane, Ryan Karpisz, Alyssa Pedersen, Rick Brown, Taylor Russell

Year Published: 2016

Type: Document

Technical Report or White Paper

Short-term impacts of fire-mediated habitat alterations on an isolated bighorn sheep population

www.nrfirescience.org/resource/14889

Habitat alterations may improve and expand wildlife habitats, and bolster waning wildlife populations. We used global positioning system (GPS) locations to monitor 38 bighorn sheep (*Ovis canadensis* Shaw) that were translocated to the Seminoe Mountains, Wyoming, USA, in 2009 and 2010, and 24 bighorns captured in 2011 to investigate...

Author(s): Justin G. Clapp, Jeffrey L. Beck

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Riparian fuel treatments in the western USA: challenges and considerations

www.nrfirescience.org/resource/14663

Fuel reduction treatments are being conducted throughout watersheds of the western United States to reduce hazardous fuels in efforts to decrease the risk of high-severity fire. The number of fuel reduction projects that include near-stream environments is increasing, bringing new challenges to riparian management. Riparian areas...

Author(s): Kathleen A. Dwire, Kristen E. Meyer, Gregg M. Riegel, Timothy A. Burton

Year Published: 2016

Type: Document

Technical Report or White Paper

Development and validation of fuel height models for terrestrial lidar - RxCADRE 2012

www.nrfirescience.org/resource/13846

Terrestrial laser scanning (TLS) was used to collect spatially continuous measurements of fuelbed characteristics across the plots and burn blocks of the 2012 RxCADRE experiments in Florida. Fuelbeds were scanned obliquely from plot/block edges at a height of 20 m above ground. Pre-fire

blocks were scanned from six perspectives and...
Author(s): Eric Rowell, Carl A. Seielstad, Roger D. Ottmar
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Emissions from prescribed burning of timber slash piles in Oregon

www.nrfirescience.org/resource/14886

Emissions from burning piles of post-harvest timber slash (Douglas-fir) in Grande Ronde, Oregon were sampled using an instrument platform lofted into the plume using a tether-controlled aerostat or balloon. Emissions of carbon monoxide, carbon dioxide, methane, particulate matter (PM2.5), black carbon, ultraviolet absorbing PM,...

Author(s): Johanna Aurell, Brian K. Gullett, Dennis Tabor, Nick Yonker
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Wicked Problem, New Solutions: Our Fire, Our Problem

www.nrfirescience.org/resource/18393

This conference is being presented to bring focus to the many issues associated with fuels, fire behavior, large wildfires, and the future of fire management. Much attention is being given to wildland fire management. It seems with each passing year we recognize escalating complexity, increasing risk, and mounting challenges....

Year Published: 2016
Type: Document
Conference Proceedings

Burning the legacy? Influence of wildfire reburn on dead wood dynamics in a temperate conifer forest

www.nrfirescience.org/resource/14473

Dynamics of dead wood, a key component of forest structure, are not well described for mixed-severity fire regimes with widely varying fire intervals. A prominent form of such variation is when two stand-replacing fires occur in rapid succession, commonly termed an early-seral "reburn." These events are thought to strongly...

Author(s): Daniel C. Donato, Joseph B. Fontaine, John L. Campbell
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

Tamm Review: Are fuel treatments effective at achieving ecological and social objectives? A systematic review

www.nrfirescience.org/resource/14425

The prevailing paradigm in the western U.S. is that the increase in stand-replacing wildfires in historically frequent-fire dry forests is due to unnatural fuel loads that have resulted from management activities including fire suppression, logging, and grazing, combined with more severe drought conditions and increasing...

Author(s): Elizabeth L. Kalies, Larissa L. Yocom Kent

Year Published: 2016

Type: Document

Book or Chapter or Journal Article, Synthesis

Landscape variation in tree regeneration and snag fall drive fuel loads in 24-year old post-fire lodgepole pine forests

www.nrfirescience.org/resource/18454

Escalating wildfire in subalpine forests with stand-replacing fire regimes is increasing the extent of early-seral forests throughout the western USA. Post-fire succession generates the fuel for future fires, but little is known about fuel loads and their variability in young post-fire stands. We sampled fuel profiles in...

Author(s): Kellen N. Nelson, Monica G. Turner, William H. Romme, Daniel B. Tinker

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Seasonal relationships between foliar moisture content, heat content and biochemistry of lodgepole pine and big sagebrush foliage

www.nrfirescience.org/resource/14378

Wildland fires propagate by liberating energy contained within living and senescent plant biomass. The maximum amount of energy that can be generated by burning a given plant part can be quantified and is generally referred to as its heat content (HC). Many studies have examined heat content of wildland fuels but studies examining...

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

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

A guide to fuels management in riparian areas of the Interior West

www.nrfirescience.org/resource/12632

Fuel treatments in riparian areas pose distinct challenges. Riparian areas are protected by administrative regulations, many of which are largely custodial and restrict active management. However, riparian areas have also been affected by fire suppression, land use, and disturbance and manipulative treatments of fuels...

Author(s): Kathleen A. Dwire, Kristen E. Meyer, Sandra E. Ryan, Gregg M. Riegel, Timothy A. Burton

Year Published: 2016

Type: Document

Synthesis, Technical Report or White Paper

Estimating ladder fuels: a new approach combining field photography with LiDAR

www.nrfirescience.org/resource/14768

Forests historically associated with frequent fire have changed dramatically due to fire suppression and past harvesting over the last century. The buildup of ladder fuels, which carry fire from the surface of

the forest floor to tree crowns, is one of the critical changes, and it has contributed to uncharacteristically large and...

Author(s): Heather A. Kramer, Brandon M. Collins, Frank K. Lake, Marek K. Jakubowski, Scott L. Stephens, Maggi Kelly

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Examining alternative fuel management strategies and the relative contribution of National Forest System land to wildfire risk to adjacent homes - a pilot assessment on the Sierra National Forest, California, USA

www.nrfirescience.org/resource/14352

Determining the degree of risk that wildfires pose to homes, where across the landscape the risk originates, and who can best mitigate risk are integral elements of effective co-management of wildfire risk. Developing assessments and tools to help provide this information is a high priority for federal land management agencies such...

Author(s): Joe H. Scott, Matthew P. Thompson, Julie W. Gilbertson-Day

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

The Interagency Fuels Treatment Decision Support System: functionality for fuels treatment planning

www.nrfirescience.org/resource/14255

The Interagency Fuels Treatment Decision Support System (IFTDSS) is a web-based software and data integration framework that organizes fire and fuels software applications into a single online application. IFTDSS is designed to make fuels treatment planning and analysis more efficient and ...

Author(s): Stacy Drury, H. Michael Rauscher, Erin M. Banwell, Shih Ming Huang, Tami L. Lavezzo

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Management impacts on carbon dynamics in a Sierra Nevada mixed conifer forest

www.nrfirescience.org/resource/14230

Forest ecosystems can act as sinks of carbon and thus mitigate anthropogenic carbon emissions. When forests are actively managed, treatments can alter forests carbon dynamics, reducing their sink strength and switching them from sinks to sources of carbon. These effects are generally characterized by fast temporal dynamics. Hence...

Author(s): Sabina Dore, Danny L. Fry, Brandon M. Collins, Rodrigo Vargas, Robert A. York, Scott L. Stephens

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Assessing the effectiveness of spatially heterogeneous fuels reduction restoration treatments - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/17044

In response to increasing wildfire severity and extent across the dry forests of the western United States in the last several decades, federal policy initiatives have encouraged joint vegetation management and fuels treatments to restore ecosystem composition, structure and function and reduce the potential for extreme fire...

Author(s): Chad M. Hoffman, Michael A. Battaglia, Tony S. Cheng, Yvette Dickinson, Frederick W. Smith
Year Published: 2016
Type: Document
Technical Report or White Paper

Spatiotemporal variability of wildland fuels in US Northern Rocky Mountain forests

www.nrfirescience.org/resource/14689

Fire regimes are ultimately controlled by wildland fuel dynamics over space and time; spatial distributions of fuel influence the size, spread, and intensity of individual fires, while the temporal distribution of fuel deposition influences fire's frequency and controls fire size. These "shifting fuel mosaics" are both a cause and a...

Author(s): Robert E. Keane
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Social preferences toward energy generation with woody biomass from public forests in Montana, USA

www.nrfirescience.org/resource/14893

In Montana, USA, there are substantial opportunities for mechanized thinning treatments on public forests to reduce the likelihood of severe and damaging wildfires and improve forest health. These treatments produce residues that can be used to generate renewable energy and displace fossil fuels. The choice modeling method is...

Author(s): Tyron J. Venn, Nathaniel Anderson, Robert M. Campbell
Year Published: 2016
Type: Document
Book or Chapter or Journal Article

Resolving future fire management conflicts using multicriteria decision making

www.nrfirescience.org/resource/13893

Management strategies to reduce the risks to human life and property from wildfire commonly involve burning native vegetation. However, planned burning can conflict with other societal objectives such as human health and biodiversity conservation. These conflicts are likely to intensify as fire regimes change under future climates...

Author(s): Don A. Driscoll, Michael Bode, Ross A. Bradstock, David A. Keith, Trent D. Penman, Owen F. Price
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

Beyond fuel treatment effectiveness: characterizing interactions between fire and treatments in the US

www.nrfirescience.org/resource/14662

In the United States, fuel reduction treatments are a standard land management tool to restore the structure and composition of forests that have been degraded by past management. Although treatments can have multiple purposes, their principal objective is to create landscape conditions where wildland fire can be safely managed to...

Author(s): Kevin M. Barnett, Sean A. Parks, Carol Miller, Helen T. Naughton

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Fuel moisture sensitivity to temperature and precipitation: climate change implications

www.nrfirescience.org/resource/13839

The objective of this paper is to examine the sensitivity of fuel moisture to changes in temperature and precipitation and explore the implications under a future climate. We use the Canadian Forest Fire Weather Index System components to represent the moisture content of fine surface fuels (Fine Fuel Moisture Code, FFMC), upper...

Author(s): Michael D. Flannigan, B. Mike Wotton, Ginny A. Marshall, William J. de Groot, Jill F. Johnstone, N. Jurko, Alan S. Cantin

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Fuel size impacts on carbon residuals and combustion dynamics in masticated woody debris

www.nrfirescience.org/resource/14488

Mastication of standing trees to reduce crown fuel loading is an increasingly popular method of reducing wildfire hazard in the wildland-urban interface of Canada. Previous research has shown that masticated fuel beds can leave considerable pyrogenic and black carbon residuals after burning, though the impact of fuel particle size...

Author(s): Dan K. Thompson, Tom J. Schiks, B. Mike Wotton

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Using the photoload technique with double sampling to improve surface fuel loading estimates

www.nrfirescience.org/resource/13802

Accurate surface fuel load estimates based on the planar intercept method require a considerable amount of time and cost. Recently the photoload method has been proposed as an alternative for sampling of fine woody surface fuels. To evaluate the use of photoload fuel sampling, six simulated fuel beds of 100 photoload visual...

Author(s): Wade T. Tinkham, Chad M. Hoffman, Jesse M. Canfield, Emma Vakili, Robin Reich

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

STANDFIRE: an IFT-DSS module for spatially explicit, 3D fuel treatment analysis - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/15584

Managers are increasingly called upon to implement fuel treatments to alter potential fire behavior, in order to mitigate threats to firefighters and communities, or to maintain or restore healthy ecosystems. While some case studies have shown positive results, many questions remain about how effective certain kinds of fuel...

Author(s): Russell A. Parsons, Lucas Wells, F. Pimont, William Matt Jolly, Rodman Linn, William E. Mell

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

Development of the rangeland vegetation simulator: a module for FVS

www.nrfirescience.org/resource/15570

The escalating awareness of non-forested landscapes and realization that more emphasis is needed for an all lands approach to management increasingly requires timely information to improve management effectiveness. The Forest Vegetation Simulator (FVS) has been used in a large number of studies to project future vegetation...

Author(s): Matthew C. Reeves

Year Published: 2016

Type: Document

Technical Report or White Paper

Fortifying the forest: thinning and burning increase resistance to a bark beetle outbreak and promote forest resilience

www.nrfirescience.org/resource/14810

Fire frequency in low-elevation coniferous forests in western North America has greatly declined since the late 1800s. In many areas, this has increased tree density and the proportion of shade-tolerant species, reduced resource availability, and increased forest susceptibility to forest insect pests and high-severity wildfire. In...

Author(s): Sharon M. Hood, Stephen P. Baker, Anna Sala

Year Published: 2016

Type: Document

Book or Chapter or Journal Article

Data assimilation of dead fuel moisture observations from remote automated weather stations

www.nrfirescience.org/resource/14377

Fuel moisture has a major influence on the behaviour of wildland fires and is an important underlying factor in fire risk assessment. We propose a method to assimilate dead fuel moisture content (FMC) observations from remote automated weather stations (RAWS) into a time lag fuel moisture model. RAWS are spatially sparse and a...

Author(s): Martin Vejmelka, Adam K. Kochanski, Jan Mandel

Year Published: 2016

Type: Document
Book or Chapter or Journal Article

Long-term effects on distribution of forest biomass following different harvesting levels in the Northern Rocky Mountains

www.nrfirescience.org/resource/13625

With increasing public demand for more intensive biomass utilization from forests, the concerns over adverse impacts on productivity by nutrient depletion are increasing. We remeasured the 1974 site of the Forest Residues Utilization Research and Development in northwestern Montana to investigate long-term impacts of intensive...

Author(s): Woongsoon Jang, Christopher R. Keyes, Deborah S. Page-Dumroese

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Optimizing fuel treatments to reduce wildland fire risk

www.nrfirescience.org/resource/13273

Fuel treatments have been widely used as an effective fire management tool to mitigate catastrophic wildland fire risk in forested landscapes. Fire research efforts of the last two decades have significantly advanced fire behavior modeling and fuel treatment effects analysis, but integrated fuel treatment planning and optimization...

Author(s): Woodam Chung

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

First approximations of prescribed fire risks relative to other management techniques used on private lands

www.nrfirescience.org/resource/13593

Fire is widely recognized as a critical ecological and evolutionary driver that needs to be at the forefront of land management actions if conservation targets are to be met. However, the prevailing view is that prescribed fire is riskier than other land management techniques. Perceived risks associated with the application of fire...

Author(s): Dirac Twidwell, Carissa L. Wonkka, Michael T. Sindelar, John R. Weir

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Modeling fuel treatment impacts on fire suppression cost savings: a review

www.nrfirescience.org/resource/13950

High up-front costs and uncertain return on investment make it difficult for land managers to economically justify large-scale fuel treatments, which remove trees and other vegetation to improve conditions for fire control, reduce the likelihood of ignition, or reduce potential damage from wildland fire if it occurs. In the short-...

Author(s): Matthew P. Thompson, Nathaniel Anderson

Year Published: 2015

Type: Document

Book or Chapter or Journal Article, Synthesis

Fire, fuels, and streams: the effects and effectiveness of riparian treatments

www.nrfirescience.org/resource/13214

Fire is an important disturbance in riparian systems—consuming vegetation; increasing light; creating snags and debris flows; altering habitat structure; and affecting stream conditions, erosion, and hydrology. For many years, land managers have worked to keep fire out of riparian systems through the use of buffers...

Author(s): Josh McDaniel

Year Published: 2015

Type: Document

Research Brief or Fact Sheet

Effects of tree cutting and fire on understory vegetation in mixed conifer forests

www.nrfirescience.org/resource/12896

Mixed conifer forests of western North America are challenging for fire management, as historical fire regimes were highly variable in severity, timing, and spatial extent. Complex fire histories combined with site factors and other disturbances, such as insect outbreaks, led to great variation in understory plant communities, and...

Author(s): Scott R. Abella, Judith D. Springer

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Proceedings of the large wildland fires conference

www.nrfirescience.org/resource/18395

Large fires or “megafires” have been a major topic in wildland fire research and management for over a decade. There is great debate regarding the impacts of large fires. Many believe that they (1) are occurring too frequently, (2) are burning abnormally large areas, (3) cause uncharacteristically adverse ecological harm, and (4...

Year Published: 2015

Type: Document

Conference Proceedings

Temporal fuel dynamics following high-severity fire in dry mixed conifer forests of the eastern Cascades, Oregon, USA

www.nrfirescience.org/resource/12889

Fire-resilient landscapes require the recurrent use of fire, but successful use of fire in previously burned areas must account for temporal fuel dynamics. We analysed factors influencing temporal fuel dynamics across a 24-year spatial chronosequence of unmanipulated dry mixed conifer forests following high-severity fire. Duff and...

Author(s): Christopher J. Dunn, John D. Bailey

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

2015 National Prescribed Fire Use Survey Report

www.nrfirescience.org/resource/13795

Prescribed fire activity is complex and poorly understood when evaluated at a national scale. Most often fire complexity is defined by scale, frequency, season, and location in the context of local and state laws and local community acceptance. In an effort to gain better knowledge of prescribed fire use in the United...

Author(s): Mark A. Melvin

Year Published: 2015

Type: Document
Technical Report or White Paper

Developing a post-processor to link the Forest Vegetation Simulator (FVS) and the Fuel Characteristic Classification System (FCCS)

www.nrfirescience.org/resource/15561

In this project, we developed a Forest Vegetation Simulator (FVS, JFSP Project #) post-processor (FVS2FCCS) to convert FVS simulated treelist and surface fuel data into Fuel Characteristics Classification System (FCCS, JFSP Project #98-1-1-06) fuelbed format (.xml) that can be read and processed by the FCCS to create estimates of...

Author(s): Morris C. Johnson, Sarah J. Beukema, Stephanie A. Rebain, Paige C. Eagle, Kjell Swedin, Maria Petrova, Susan J. Prichard

Year Published: 2015

Type: Document
Technical Report or White Paper

Measurements, datasets and preliminary results from the RxCADRE project - 2008, 2011 and 2012

www.nrfirescience.org/resource/13696

The lack of independent, quality-assured field data prevents scientists from effectively evaluating and advancing wildland fire models. To rectify this, scientists and technicians convened in the south-eastern United States in 2008, 2011 and 2012 to collect wildland fire data in six integrated core science disciplines defined by the...

Author(s): Roger D. Ottmar, J. Kevin Hiers, Bret W. Butler, Craig B. Clements, Matthew B. Dickinson, Andrew T. Hudak, Joseph J. O'Brien, Brian E. Potter, Eric Rowell, Tara Strand, Thomas J. Zajkowski

Year Published: 2015

Type: Document
Book or Chapter or Journal Article

Initial results from a field experiment to support the assessment of fuel treatment effectiveness in reducing wildfire intensity and spread rate

www.nrfirescience.org/resource/16917

Hazardous fuel reduction treatments conducted both through prescribed fire and mechanical means are a critical part of the mitigation of wildland fire risk in the United States. The US Federal Government has spent an average of \$500 million each year on fuel reduction, from 2002-2012 (Gorte 2011). At present, however, rigorous...

Author(s): Eric Mueller, Nick Skowronski, Kenneth L. Clark, Robert L. Kremens, Michael R. Gallagher, Jan C. Thomas, M. El Houssami, Alexander I. Filkov, Bret W. Butler, John L. Hom, William E. Mell, Albert Simeoni

Year Published: 2015

Type: Document
Conference Proceedings

The flammability of forest and woodland litter: a synthesis

www.nrfirescience.org/resource/13276

Fire behavior and effects in forests and woodlands are influenced by surface fuels and senesced leaf litter in particular. We have known that species exhibit differential flammability for some time, but isolated efforts have often attributed differences to disparate mechanisms. Recent research has expanded the diversity of species...

Author(s): J. Morgan Varner, Jeffrey M. Kane, Jesse K. Kreye, Eamon A. Engber

Year Published: 2015

Type: Document
Book or Chapter or Journal Article, Synthesis

Evaluating the effectiveness of wildfire mitigation activities in the wildland-urban interface

www.nrfirescience.org/resource/14047

Each year wildfires damage homes, businesses, communities, watersheds, and forests on millions of acres across the U.S. However there are effective ways to reduce the impact of wildfire. A new report, Evaluating the Effectiveness of Wildfire Mitigation Activities in the Wildland-Urban Interface, shares lessons learned from...

Author(s): Alexander M. Evans, Sarah Auerbach, Lara Wood Miller, Rachel Wood, Krys Nystrom, Jonathan Loevner, Amanda Aragon, Matthew Piccarello, Eytan Krasilovsky

Year Published: 2015

Type: Document

Technical Report or White Paper

Automated integration of lidar into the LANDFIRE product suite

www.nrfirescience.org/resource/13609

Accurate information about three-dimensional canopy structure and wildland fuel across the landscape is necessary for fire behaviour modelling system predictions. Remotely sensed data are invaluable for assessing these canopy characteristics over large areas; lidar data, in particular, are uniquely suited for quantifying three-...

Author(s): Birgit Peterson, Kurtis J. Nelson, Carl A. Seielstad, Jason Stoker, William Matt Jolly, Russell A. Parsons

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Quantifying and predicting fuels and the effects of reduction treatments along successional and invasion gradients in sagebrush habitats - JFSP final report

www.nrfirescience.org/resource/15504

Sagebrush shrubland ecosystems in the Great Basin are prime examples of how altered successional trajectories can create dynamic fuel conditions and, thus, increase uncertainty about fire risk and behavior. Although fire is a natural disturbance in sagebrush, post-fire environments are highly susceptible to conversion to an invasive...

Author(s): Douglas J. Shinneman, David S. Pilliod, Robert S. Arkle, Nancy F. Glenn

Year Published: 2015

Type: Document

Technical Report or White Paper

Collaborative fuels reduction and restoration - Experiences from the Southwestern Crown of the Continent

www.nrfirescience.org/resource/13064

Forests that historically burned in mixed-severity fire regimes prove difficult to manage, especially when they border homes and prized recreation areas. This management challenge was the focus of the Fuels Reduction and Restoration in Mixed-Conifer Forests of the Southwestern Crown of the Continent field trip, following the May...

Author(s): Corey L. Gucker

Year Published: 2015

Type: Document

Research Brief or Fact Sheet

Post-fire logging reduces surface woody fuels up to four decades following wildfire

www.nrfirescience.org/resource/16307

Severe wildfires create pulses of dead trees that influence future fuel loads, fire behavior, and fire effects as they decay and deposit surface woody fuels. Harvesting fire-killed trees may reduce future surface woody fuels and related fire hazards, but the magnitude and timing of post-fire logging effects on woody fuels have not...

Author(s): David W. Peterson, Erich K. Dodson, Richy J. Harrod

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Managing fire, understanding ourselves: human dimensions in safety and wildland fire

www.nrfirescience.org/resource/18394

Wildland fire management has risen to the forefront of land management and now receives greater social and political attention than ever before. As we progress through the 21st century, these areas of attention are continually presenting challenges never experienced before. We may consider ourselves well positioned to move into the...

Year Published: 2015

Type: Document

Conference Proceedings

A case study comparison of LANDFIRE fuel loading and emissions on a mixed conifer forest in northern Idaho, USA

www.nrfirescience.org/resource/13750

The use of fire as a land management tool is well recognized for its ecological benefits in many natural systems. To continue to use fire while complying with air quality regulations, land managers are often tasked with modeling emissions from fire during the planning process. To populate such models, the Landscape Fire...

Author(s): Joshua C. Hyde, Eva K. Strand, Andrew T. Hudak, Dale Hamilton

Year Published: 2015

Type: Document

Book or Chapter or Journal Article

Tracking progress - The monitoring process used in collaborative forest landscape restoration projects in the Pacific Northwest

www.nrfirescience.org/resource/13348

Several trends have emerged in recent years that affect the management of the National Forest System, particularly in the western U.S. One is the recognition of landscapes departed from a natural range of variation, especially with implications for wildfire management. Another trend is the economic...

Author(s): Thomas DeMeo, Amy Markus, Bernard Bormann, Jodi Leingang

Year Published: 2015

Type: Document

Technical Report or White Paper

Dead fuel moisture research: 1991-2012

www.nrfirescience.org/resource/12389

The moisture content of dead fuels is an important determinant of many aspects of bushfire behaviour. Understanding the relationships of fuel moisture with weather, fuels and topography is useful for fire managers and models of fuel moisture are an integral component of fire behaviour models. This paper reviews research into dead...

Author(s): Stuart Matthews
Year Published: 2014
Type: Document
Book or Chapter or Journal Article, Synthesis

Building resilience into quaking aspen management

www.nrfirescience.org/resource/16373

Throughout the 20th century, forest scientists and land managers were guided by principles of succession with regard to aspen forests. The historical model depicted aspen as a "pioneer species" that colonizes a site following disturbance and is eventually overtopped by conifers. Aspen systems are more diverse, however, than...

Author(s): Paul C. Rogers
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

A comprehensive guide to fuel management practices for dry mixed conifer forests in the northwestern United States: monitoring

www.nrfirescience.org/resource/12920

Short- and medium-term evaluation of how fuel treatments are working is the only way to know if the hundreds of activities on the ground are adding up to the goals of more resilient landscapes and increased safety of people and property. Monitoring is a critical resource for decision makers who design fuels management programs,...

Author(s): Theresa B. Jain, Michael A. Battaglia, Han-Sup Han, Russell T. Graham, Christopher R. Keyes, Jeremy S. Fried, Jonathan Sandquist
Year Published: 2014
Type: Document
Research Brief or Fact Sheet

One-hundred years of wildfire research: a legacy of the Priest River, Deception Creek, and Boise Basin Experimental Forests of Idaho

www.nrfirescience.org/resource/13104

The 1910 fires, which burned more than 1.3 million ha of northern Rocky Mountain forests, provided a mission and management objectives for the newly created Forest Service. By 1911, the Priest River Experimental Station (Forest- PREF) was established in northern Idaho to help meet the needs of the Forest Service. Harry T. Gisborne,...

Author(s): Russell T. Graham, Theresa B. Jain, Kathy L. Graham, Robert Denner, Colin C. Hardy
Year Published: 2014
Type: Document

Book or Chapter or Journal Article

A comprehensive guide to fuel management practices for dry mixed conifer forests in the northwestern United States: mechanical, chemical, and biological fuel treatment methods

www.nrfirescience.org/resource/12918

Several mechanical approaches to managing vegetation fuels hold promise when applied to the dry mixed conifer forests in the western United States. These are most useful to treat surface, ladder, and crown fuels. There are a variety of techniques to remove or alter all kinds of plant biomass (live, dead, or decomposed) that affect...

Author(s): Theresa B. Jain, Michael A. Battaglia, Han-Sup Han, Russell T. Graham, Christopher R. Keyes, Jeremy S. Fried, Jonathan Sandquist

Year Published: 2014

Type: Document

Research Brief or Fact Sheet

Reburns and their impact on carbon pools, site productivity, and recovery

www.nrfirescience.org/resource/14531

Prior to fire suppression and exclusion, wildfires and other disturbances (e.g., insects, disease, and weather) sustained ecosystem processes in many landscapes of the Western United States. However, wildfires have been increasing in size, frequency, and intensity in recent years (Kellogg and others 2008). Recognizing the value of...

Author(s): Deborah S. Page-Dumroese, Theresa B. Jain, Jonathan Sandquist, Joanne M. Tirocke, John Errecart, Martin F. Jurgensen

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

The role of wildfire, prescribed fire, and mountain pine beetle infestations on the population dynamics of black-backed woodpeckers in the Black Hills, South Dakota

www.nrfirescience.org/resource/18216

Wildfire and mountain pine beetle infestations are naturally occurring disturbances in western North American forests. Black-backed woodpeckers (*Picoides arcticus*) are emblematic of the role these disturbances play in creating wildlife habitat, since they are strongly associated with recently-killed forests. However, management...

Author(s): Christopher T. Rota, Joshua J. Millspaugh, Mark A. Rumble, Chad P. Lehman, Dillon C. Kesler

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

Contrasting effects of wildfire and ecological restoration in old-growth western larch forests

www.nrfirescience.org/resource/13003

The scientific basis for restoration of fire-excluded western larch/mixed-conifer forests is not as well developed as that for dry fire-frequent forests. We compared the effects of wildfire and restoration (combined thinning and prescribed fire) in fire-excluded western larch forests. In 2012, the wildfire site had more, taller, and...

Author(s): Taylor Hopkins, Andrew J. Larson, R. Travis Belote

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

Characterizing spatial reference conditions in southwestern warm/dry mixed-conifer forests

www.nrfirescience.org/resource/12951

Reference conditions describe attributes of ecosystem structure, composition, and function and are used to inform ecological restoration efforts. Reference condition information on tree spatial patterns that occurred prior to wide-spread fire exclusion is limited for warm/dry mixed-conifer forests of the western U.S., particularly...

Author(s): Kyle Rodman, Andrew Sanchez Meador

Year Published: 2014

Type: Document

Research Brief or Fact Sheet

Fuels treatments in ponderosa pine - Visits to the Boise National Forest and Boise Basin Exp. Forest

www.nrfirescience.org/resource/12928

Terrie Jain, Research Forester with the USFS Rocky Mountain Research Station, together with foresters, and fire and wildlife managers from the Boise National Forest led a tour of fuels treatments in dry conifer forests around Idaho City, Idaho. Site visits provided a visual of high forest fuel conditions with potential to support...

Author(s): Corey L. Gucker

Year Published: 2014

Type: Document

Research Brief or Fact Sheet

A spatial stochastic programming model for timber and core area management under risk of fires

www.nrfirescience.org/resource/12386

Previous stochastic models in harvest scheduling seldom address explicit spatial management concerns under the influence of natural disturbances. We employ multistage stochastic programming models to explore the challenges and advantages of building spatial optimization models that account for the influences of random stand-...

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

Year Published: 2014

Type: Document

Book or Chapter or Journal Article

A comprehensive guide to fuel management practices for dry mixed conifer forests in the northwestern United States: inventory and model-based economic analysis of mechanical fuel treatments

www.nrfirescience.org/resource/12921

Implementing fuel treatments in every place where it could be beneficial to do so is impractical and not cost effective under any plausible specification of objectives. Only some of the many possible kinds of treatments will be effective in any particular stand and there are some stands that seem to defy effective treatment. In many...

Author(s): Theresa B. Jain, Michael A. Battaglia, Han-Sup Han, Russell T. Graham, Christopher R. Keyes, Jeremy S. Fried, Jonathan Sandquist

Year Published: 2014

Type: Document

Research Brief or Fact Sheet

A comprehensive guide to fuel management practices for dry mixed conifer forests in the northwestern United States: prescribed fire

www.nrfirescience.org/resource/12919

Fire has had a profound historical role in shaping dry mixed conifer forests in the western United States. However, the uncertainty and complexity of prescribed fires raises the question "Is fire always the best option for treating fuels?" The decision to use prescribed fire is dependent upon several factors.

Author(s): Theresa B. Jain, Michael A. Battaglia, Han-Sup Han, Russell T. Graham, Christopher R. Keyes, Jeremy S. Fried, Jonathan Sandquist

Year Published: 2014

Type: Document

Research Brief or Fact Sheet

Interagency prescribed fire planning and procedures guide

www.nrfirescience.org/resource/12453

Fire is an essential ecological process in many fire-dependent ecosystems. In large areas of the country, fire exclusion from these ecosystems has led to unhealthy forest, woodland and rangeland conditions. These areas are at risk of intense, severe wildfires that threaten communities and cause significant damage to key ecological...

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

Year Published: 2014

Type: Document

Management or Planning Document, Technical Report or White Paper

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

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

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

Restoration fuels treatments in old-growth- Visiting research plots in western larch and ponderosa pine forests

www.nrfirescience.org/resource/12674

Mick Harrington and Steve Arno, retired research foresters with the USFS Rocky Mountain Research Station, took participants of the May 2014 Large Wildland Fires Conference through a 300-year-old stand of ponderosa pine (*Pinus ponderosa*) and western larch (*Larix occidentalis*). While there, they discussed their research, which...

Author(s): Corey L. Gucker

Year Published: 2014

Type: Document

Research Brief or Fact Sheet

Fuel treatment effectiveness in reducing fire intensity and spread rate -- an experimental overview

www.nrfirescience.org/resource/16924

Fuel treatments represent a significant component of the wildfire mitigation strategy in the United States. However, the lack of research aimed at quantifying the explicit effectiveness of fuel treatments in reducing wildfire intensity and spread rate limits our ability to make educated decisions about the type and placement of...

Author(s): Eric Mueller, Nick Skowronski, Albert Simeoni, Kenneth L. Clark, Robert L. Kremens, William E. Mell, Michael R. Gallagher, Jan C. Thomas, Alexander I. Filkov, M. El Houssami, John L. Hom, Bret W. Butler

Year Published: 2014

Type: Document

Conference Proceedings

Integrated fuel/restoration treatments - Field tour at the Priest River Experimental Forest

www.nrfirescience.org/resource/13694

Terrie Jain, Russell Graham, Andrew Hudak, and Bill Elliot with the United States Forest Service's (USFS) Rocky Mountain Research Station, led a tour of fuels treatments in mostly moist mixed-conifer forests in the Priest River Experimental Forest (PREF) near Priest River, Idaho. Site visits and discussions highlighted how...

Author(s): Corey L. Gucker

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

Bark beetle effects on fuel profiles across a range of stand structures in Douglas-fir forests of Greater Yellowstone

www.nrfirescience.org/resource/13301

Consequences of bark beetle outbreaks for forest wildfire potential are receiving heightened attention, but little research has considered ecosystems with mixed-severity fire regimes. Such forests are widespread, variable in stand structure, and often fuel limited, suggesting that beetle outbreaks could substantially alter fire...

Author(s): Daniel C. Donato, Brian J. Harvey, William H. Romme, Martin Simard, Monica G. Turner

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Wildfire exposure and fuel management on western US national forests

www.nrfirescience.org/resource/12756

Substantial investments in fuel management activities on national forests in the western US are part of a national strategy to reduce human and ecological losses from catastrophic wildfire and create fire resilient landscapes. Prioritizing these investments within and among national forests remains a challenge, partly because a...

Author(s): Alan A. Ager, Michelle A. Day, Charles W. McHugh, Karen C. Short, Julie W. Gilbertson-Day, Mark A. Finney, David E. Calkin

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

Wildland fire management: are actively managed forests more resilient than passively managed forests?

www.nrfirescience.org/resource/12434

Large areas of federal lands in the western states are currently at high risk of severe wildfire and have many insect and disease problems, indicating a significant decline in forest health and resilience.

Although research studies have not been done that would measure whether actively managed forests are more resilient to wildfires...

Author(s): Jay O'Laughlin

Year Published: 2013

Type: Document

Do carbon offsets work? The role of forest management in greenhouse gas mitigation

www.nrfirescience.org/resource/12450

As forest carbon offset projects become more popular, professional foresters are providing their expertise to support them. But when several members of the Society of American Foresters questioned the science and assumptions used to design the projects, the organization decided to convene a task force to examine whether these...

Author(s): Marie Oliver

Year Published: 2013

Type: Document

Research Brief or Fact Sheet

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

Fire intensity and fire severity: how hot is your fire and why is that important?

www.nrfirescience.org/resource/12398

Achieving natural resource objectives typically requires the application of periodic fire because fire is truly THE ECOLOGICAL IMPERATIVE! But how does one measure success or failure? Determining how close a fire came to meeting your objective(s) is a difficult but crucial part of every burn evaluation and is not always immediately...

Author(s): Dale D. Wade

Year Published: 2013

Type: Document

Research Brief or Fact Sheet

Postfire changes in forest carbon storage over a 300-year chronosequence of Pinus contorta-dominated forests

www.nrfirescience.org/resource/18457

A warming climate may increase the frequency and severity of stand-replacing wildfires, reducing carbon (C) storage in forest ecosystems. Understanding the variability of post-fire C cycling on heterogeneous landscapes is critical for predicting changes in C storage with more frequent disturbance. We measured C pools and fluxes...

Author(s): Daniel M. Kashian, William H. Romme, Daniel B. Tinker, Monica G. Turner, Michael G. Ryan

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Hazardous fuel treatments, suppression cost impacts, and risk mitigation

www.nrfirescience.org/resource/16170

Land management agencies face uncertain tradeoffs regarding investments in preparedness and fuels

management versus future suppression costs and impacts to valued resources and assets. Prospective evaluation of fuel treatments allows for comparison of alternative treatment strategies in terms of socioeconomic and ecological impacts...

Author(s): Matthew P. Thompson, Michael S. Hand, Julie W. Gilbertson-Day, Nicole M. Vaillant, Derek J. Nalle

Year Published: 2013

Type: Document

Conference Proceedings

Foliar moisture content variations in lodgepole pine over the diurnal cycle during the red stage of mountain pine beetle attack

www.nrfirescience.org/resource/12141

Widespread outbreaks of the mountain pine beetle (*Dendroctonus ponderosae* Hopkins) in the lodgepole pine (*Pinus contorta* Dougl. ex Loud. var. *latifolia* Engelm.) forests of North America have produced stands with significant levels of recent tree mortality. The needle foliage from recently attacked trees typically turns red within...

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

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Social and ecological factors influencing attitudes toward the application of high-intensity prescribed burns to restore fire adapted grassland ecosystems

www.nrfirescience.org/resource/12401

Fire suppression in grassland systems that are adapted to episodic fire has contributed to the recruitment of woody species in grasslands worldwide. Even though the ecology of restoring these fire prone systems back to grassland states is becoming clearer, a major hurdle to the reintroduction of historic fires at a landscape scale...

Author(s): David Toledo, Michael G. Sorice, Urs P. Kreuter

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Duff mound consumption and cambium injury for centuries-old western larch from prescribed burning in western Montana

www.nrfirescience.org/resource/11974

Western larch is one of the most fire-adapted conifers in western North America. Its historical perpetuation depended upon regular fire disturbances, which creates open stand conditions and mineral seedbeds. A stand of 200- to 500-year-old larch in western Montana with deep duff mounds resulting from an unusually long 150-year fire-...

Author(s): Michael G. Harrington

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Comparing three sampling techniques for estimating fine woody down dead biomass

www.nrfirescience.org/resource/12038

Designing woody fuel sampling methods that quickly, accurately and efficiently assess biomass at relevant spatial scales requires extensive knowledge of each sampling method's strengths, weaknesses and tradeoffs. In this study, we compared various modifications of three common sampling methods (planar intercept, fixed-area microplot...

Author(s): Robert E. Keane, Kathy L. Gray
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

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

Fuel treatments and fire severity: a meta-analysis

www.nrfirescience.org/resource/18721

We employed meta-analysis and information theory to synthesize findings reported in the literature on the effects of fuel treatments on subsequent fire intensity and severity. Data were compiled from 19 publications that reported observed fire responses from 62 treated versus untreated contrasts. Effect sizes varied widely and the...

Author(s): Erik J. Martinson, Philip N. Omi
Year Published: 2013
Type: Document
Technical Report or White Paper

Wildfire and fuel treatment effects on forest carbon dynamics in the western United States

www.nrfirescience.org/resource/11981

Sequestration of carbon (C) in forests has the potential to mitigate the effects of climate change by offsetting future emissions of greenhouse gases. However, in dry temperate forests, wildfire is a natural disturbance agent with the potential to release large fluxes of C into the atmosphere. Climate-driven increases in wildfire...

Author(s): Joseph C. Restaino, David L. Peterson
Year Published: 2013
Type: Document
Book or Chapter or Journal Article

Restoring forest resilience: from reference spatial patterns to silvicultural prescriptions and monitoring

www.nrfirescience.org/resource/14006

Stand-level spatial pattern influences key aspects of resilience and ecosystem function such as disturbance behavior, regeneration, snow retention, and habitat quality in frequent-fire pine and mixed-conifer forests. Reference sites, from both pre-settlement era reconstructions and contemporary forests with active fire regimes,...

Author(s): Derek J. Churchill, Andrew J. Larson, Matthew C. Dahlgreen, Jerry F. Franklin, Paul F. Hessburg, James A. Lutz

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Analyzing the transmission of wildfire exposure on a fire-prone landscape in Oregon, USA

www.nrfirescience.org/resource/12755

We develop the idea of risk transmission from large wildfires and apply network analyses to understand its importance on a 0.75 million ha US national forest. Wildfires in the western US frequently burn over long distances (e.g., 20-50 km) through highly fragmented landscapes with respect to ownership, fuels, management intensity,...

Author(s): Alan A. Ager, Michelle A. Day, Mark A. Finney, Ken W. Vance-Borland, Nicole M. Vaillant

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

The rising Great Plains fire campaign: citizens' response to woody plant encroachment

www.nrfirescience.org/resource/12011

Despite years of accumulating scientific evidence that fire is critical for maintaining the structure and function of grassland ecosystems in the US Great Plains, fire has not been restored as a fundamental grassland process across broad landscapes. The result has been widespread juniper encroachment and the degradation of the...

Author(s): Dirac Twidwell, William E. Rogers, Samuel D. Fuhlendorf, Carissa L. Wonkka, David M. Engle, John R. Weir, Urs P. Kreuter, Charles A. Taylor

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Silviculture research: the intersection of science and art across generations

www.nrfirescience.org/resource/12912

A research silviculturist's work is firmly grounded in the scientific method to acquire knowledge on forest dynamics. They also integrate information from numerous sources to produce new knowledge not readily identified by single studies. Results and interpretation subsequently provide the scientific foundation for developing...

Author(s): Theresa B. Jain

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Public perceptions of smoke from wildfire, prescribed fire, and fire use

www.nrfirescience.org/resource/13483

Managers and policy-makers across broad disciplines and organizations are calling for a better understanding of public opinion on natural resource issues. One such issue is that of fire and its role in

the management of our forests and rangelands. Public perceptions of fuel reduction techniques, with a particular emphasis on using...

Author(s): Stacey S. Frederick

Year Published: 2013

Type: Document

Dissertation or Thesis

Fighting fire with fire: does a policy of broad-scale prescribed burning improve community safety?

www.nrfirescience.org/resource/17711

Wildfires cause enormous damage worldwide, particularly in Victoria, Australia, with growing populations in fire-prone ecosystems. Broad-scale prescribed burning is an established, yet controversial, wildfire management policy in Victoria and Australia. But does broad-scale prescribed burning reduce fire damage? The answer depends...

Author(s): Danielle Clode, Mark A. Elgar

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

The merits of prescribed fire outweigh potential carbon emission effects

www.nrfirescience.org/resource/12426

While North American ecosystems vary widely in their ecology and natural historical fire regimes, they are unified in benefitting from prescribed fire when judiciously applied with the goal of maintaining and restoring native ecosystem composition, structure, and function. On a modern landscape in which historical fire regimes...

Author(s): Association for Fire Ecology, International Association of Wildland Fire, Tall Timbers Research Station, The Nature Conservancy

Year Published: 2013

Type: Document

Technical Report or White Paper

Wildfire risk and optimal investments in watershed protection

www.nrfirescience.org/resource/16172

Following what was then one of the most destructive fire years on record, President Bush signed into law the Healthy Forests Restoration Act of 2003. The law requires no less than fifty percent of all funds allocated for hazardous fuels reductions to occur in the wildland-urban interface (WUI), with the aim of enhancing the...

Author(s): Travis Warziniack, Matthew P. Thompson

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Quantifying the potential impacts of fuel treatments on wildfire suppression costs

www.nrfirescience.org/resource/16138

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

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

Fuel moisture influences on fire-altered carbon in masticated fuels: an experimental study

www.nrfirescience.org/resource/12021

Biomass burning is a significant contributor to atmospheric carbon emissions, but may also provide an avenue in which fire-affected ecosystems can accumulate carbon over time, through the generation of highly resistant fire-altered carbon. Identifying how fuel moisture, and subsequent changes in the fire behavior, relates to the...

Author(s): Nolan W. Brewer, Alistair M. S. Smith, Jeff A. Hatten, Philip E. Higuera, Andrew T. Hudak, Roger D. Ottmar, Wade T. Tinkham

Year Published: 2013

Type: Document

Book or Chapter or Journal Article

Ignition devices for prescribed burning

www.nrfirescience.org/resource/12399

The prescribed burner has numerous tools at his/her disposal to start fire. Ground ignition devices continue to be developed and refined and include a wide range of options from kitchen matches to state-of-the-art hand-held 'ping-pong ball' launchers. This fact sheet describes many of these devices and includes a table to summarize...

Author(s): Dale D. Wade

Year Published: 2013

Type: Document

Research Brief or Fact Sheet

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

The effects of forest fuel-reduction treatments in the United States

www.nrfirescience.org/resource/12579

The current conditions of many seasonally dry forests in the western and southern United States, especially those that once experienced low- to moderate-intensity fire regimes, leave them uncharacteristically susceptible to high-severity wildfire. Both prescribed fire and its mechanical surrogates are generally successful in meeting...

Author(s): Scott L. Stephens, James D. McIver, Ralph E. Boerner, Christopher J. Fettig, Joseph B. Fontaine, Bruce R. Hartsough, Patricia L. Kennedy, Dylan W. Schwilk

Year Published: 2012

Type: Document

Book or Chapter or Journal Article, Synthesis

Using fire to increase the scale, benefits, and future maintenance of fuels treatments

www.nrfirescience.org/resource/11493

The USDA Forest Service is implementing a new planning rule and starting to revise forest plans for many of the 155 National Forests. In forests that historically had frequent fire regimes, the scale of current fuels reduction treatments has often been too limited to affect fire severity and the Forest Service has predominantly...

Author(s): Malcolm P. North, Brandon M. Collins, Scott L. Stephens

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Effects of fuels reductions on plant communities and soils in a piñon-juniper woodland

www.nrfirescience.org/resource/8326

Over the past decade, a variety of fuels reduction strategies have been implemented across western US forests to lower the risk of high severity fires. In two separate studies, we evaluated the short-term effects of hand thinning and mechanical mastication on understory plant communities and soil resources in an upland Piñon-...

Author(s): Matthew R. Ross, S. C. Castle, Nichole N. Barger

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

National to local: a pre & post assessment of the Fuel Characteristic Classification System (FCCS) landscape variables for the Confederated Salish and Kootenai Tribes

www.nrfirescience.org/resource/13486

A modified Fuel Characteristic and Classification System (FCCS) fuelbed was created for the Confederated Salish & Kootenai Tribes (CSKT) of Montana. This crosswalk of data combined two principal sources of data: (1) locally the Bureau of Indian Affairs (BIA) Continuous Forest Inventory Data (CFI) and (2) nationally the US Forest...

Author(s): Laurel L. James

Year Published: 2012

Type: Document

Dissertation or Thesis

Understanding the effects of fire management practices on forest health: implications for weeds and vegetation structure

www.nrfirescience.org/resource/11986

Current fire policy to restore ecosystem function and resiliency and reduce buildup of hazardous fuels implies a larger future role for fire (both natural and human ignitions) (USDA Forest Service and U.S.

Department of the Interior 2000). Yet some fire management (such as building fire line, spike camps, or helispots) potentially...

Author(s): Anne E. Black, Peter Landres

Year Published: 2012

Type: Document

Technical Report or White Paper

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

Roads impact the distribution of noxious weeds more than restoration treatments in a lodgepole pine forest in Montana, U.S.A.

www.nrfirescience.org/resource/8346

A century of fire suppression has created unnaturally dense stands in many western North American forests, and silviculture treatments are being increasingly used to reduce fuels to mitigate wildfire hazards and manage insect infestations. Thinning prescriptions have the potential to restore forests to a more historically...

Author(s): Jennifer L. Birdsall, Ward W. McCaughey, Justin B. Runyon

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Tree spatial patterns in fire-frequent forests of western North America, including mechanisms of pattern formation and implications for designing fuel reduction and restoration treatments

www.nrfirescience.org/resource/8316

Restoring characteristic fire regimes and forest structures are central objectives of many restoration and fuel reduction projects. Within-stand spatial pattern is a fundamental attribute of forest structure and influences many ecological processes and ecosystem functions. In this review we synthesize the available spatial reference...

Author(s): Andrew J. Larson, Derek J. Churchill

Year Published: 2012

Type: Document

Book or Chapter or Journal Article, Synthesis

Fourmile Canyon Fire Findings

www.nrfirescience.org/resource/17701

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

Spatial scaling of wildland fuels for six forest and rangeland ecosystems of the Northern Rocky Mountains, USA

www.nrfirescience.org/resource/8355

Wildland fuels are important to fire managers because they can be manipulated to achieve management goals, such as restoring ecosystems, decreasing fire intensity, minimizing plant mortality, and reducing erosion. However, it is difficult to accurately measure, describe, and map wildland fuels because of the great variability of...

Author(s): Robert E. Keane, Kathy L. Gray, Valentina Bacciu, Signe B. Leirfallom

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Management guide to ecosystem restoration treatments: two-aged lodgepole pine forests of central Montana, USA

www.nrfirescience.org/resource/11276

Lodgepole pine is one of the most widely distributed conifers in North America, with a mixed-severity rather than stand-replacement fire regime throughout much of its range. These lodgepole pine forests are patchy and often two-aged. Fire exclusion can reduce two-aged lodgepole pine heterogeneity. This management guide summarizes...

Author(s): Sharon M. Hood, Helen Y. Smith, David K. Wright, Lance S. Glasgow

Year Published: 2012

Type: Document

Synthesis, Technical Report or White Paper

Effect of suppression strategies on federal wildland fire expenditures

www.nrfirescience.org/resource/17807

Policymakers and decisionmakers alike have suggested that the use of less aggressive suppression strategies for wildland fires might help stem the tide of rising emergency wildland fire expenditures. However, the interplay of wildland fire management decisions and expenditures is not well understood. In this study, we assess the...

Author(s): Krista M. Gebert, Anne E. Black

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Burning questions for managers: fuels management practices in riparian areas

www.nrfirescience.org/resource/8354

Vegetation treatment projects for fuel reduction in riparian areas can pose distinct challenges to resource managers. Riparian areas are protected by administrative regulations, many of which are largely custodial and restrict active management. Like uplands, however, riparian areas have been affected by fire suppression, land use,...

Author(s): Kristen E. Meyer, Kathleen A. Dwire, Patricia A. Champ, Sandra E. Ryan, Gregg M. Riegel, Timothy A. Burton

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Principal short-term findings of the National Fire and Fire Surrogate study

www.nrfirescience.org/resource/12600

Principal findings of the National Fire and Fire Surrogate (FFS) study are presented in an annotated bibliography and summarized in tabular form by site, discipline (ecosystem component), treatment type, and major theme. Composed of 12 sites, the FFS is a comprehensive multidisciplinary experiment designed to evaluate the costs and...

Author(s): James D. McIver, Karen Erickson, Andrew P. Youngblood

Year Published: 2012

Type: Document

Synthesis, Technical Report or White Paper

Effects of ungulate herbivory on aspen, cottonwood, and willow development under forest fuels treatment regimes

www.nrfirescience.org/resource/8337

Herbivory by domestic and wild ungulates can dramatically affect vegetation structure, composition and dynamics in nearly every terrestrial ecosystem of the world. These effects are of particular concern in forests of western North America, where intensive herbivory by native and domestic ungulates has the potential to substantially...

Author(s): Bryan A. Endress, Michael J. Wisdom, Martin Vavra, Catherine G. Parks, Brian L. Dick, Bridgett J. Naylor, Jennifer M. Boyd

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Cumulative effects of fire and fuels management on stream water quality and ecosystem dynamics - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/18951

Prescribed fires and wildland fire-use are increasingly important management tools used to reduce fuel loads and restore the ecological integrity of western forests. Although a basic understanding of the effects of fire on aquatic ecosystems exists, the cumulative and possibly synergistic effects of wildfire following prescribed...

Author(s): David S. Pilliod, Robert S. Arkle

Year Published: 2012

Type: Document

Technical Report or White Paper

A comparison of two methods for estimating conifer live foliar moisture content

www.nrfirescience.org/resource/8319

Foliar moisture content is an important factor regulating how wildland fires ignite in and spread through live fuels but moisture content determination methods are rarely standardised between studies. One such difference lies between the uses of rapid moisture analysers or drying ovens. Both of these methods are commonly used in...

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

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

A comprehensive guide to fuel management practices for dry mixed conifer forests in the northwestern United States

www.nrfirescience.org/resource/11274

This guide describes the benefits, opportunities, and trade-offs concerning fuel treatments in the dry mixed conifer forests of northern California and the Klamath Mountains, Pacific Northwest Interior, northern and central Rocky Mountains, and Utah. Multiple interacting disturbances and diverse physical settings have created a...

Author(s): Theresa B. Jain, Michael A. Battaglia, Han-Sup Han, Russell T. Graham, Christopher R. Keyes, Jeremy S. Fried, Jonathan Sandquist

Year Published: 2012

Type: Document

Synthesis, Technical Report or White Paper

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

Do thinning and/or burning treatments in western USA ponderosa or Jeffrey pine-dominated forests help restore natural fire behavior?

www.nrfirescience.org/resource/8318

We carried out a systematic review and meta-analysis of the effects of forest thinning and burning treatments on restoring fire behavior attributes in western USA pine forests. Ponderosa pine (*Pinus ponderosa*) and Jeffrey pine (*Pinus jeffreyi*), with co-occurring species, are adapted to a disturbance regime of frequent surface fires...

Author(s): Peter Z. Fule, Joseph E. Crouse, John Paul Roccaforte, Elizabeth L. Kalies

Year Published: 2012

Type: Document

Book or Chapter or Journal Article, Synthesis

Effects of restoration thinning on spatial heterogeneity in mixed conifer forest

www.nrfirescience.org/resource/18202

Spatial pattern is an essential attribute of forest ecosystems and influences many ecological processes and functions. We hypothesized that restoration thinning conducted in fire-excluded ponderosa pine (*Pinus ponderosa* Douglas ex P. Lawson & C. Lawson) – western larch (*Larix occidentalis* Nutt.) – mixed-conifer forest would...

Author(s): Andrew J. Larson, Kyle C. Stover, Christopher R. Keyes

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

Beyond fire behavior and fuels: learning from the past to help guide us in the future

www.nrfirescience.org/resource/18397

The third IAWF Fire Behavior and Fuels Conference was held in Spokane, Washington, October 25-29, 2010, and commemorated the 100th anniversary of the 1910 fires in the Northern Rocky Mountains. The theme of the conference was appropriately titled 'Beyond Fire Behavior and Fuels: Learning from

the Past to Help Guide Us in the...

Year Published: 2011

Type: Document

Conference Proceedings

Integrated national-scale assessment of wildfire risk to human and ecological values

www.nrfirescience.org/resource/12735

The spatial, temporal, and social dimensions of wildfire risk are challenging U.S. federal land management agencies to meet societal needs while maintaining the health of the lands they manage. In this paper we present a quantitative, geospatial wildfire risk assessment tool, developed in response to demands for improved risk-based...

Author(s): Matthew P. Thompson, David E. Calkin, Mark A. Finney, Alan A. Ager, Julie W. Gilbertson-Day

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

A comparative risk assessment framework for wildland fire management: the 2010 cohesive strategy science report

www.nrfirescience.org/resource/12728

The FLAME Act of 2009 requires the U.S. Department of Agriculture Forest Service and the U.S. Department of Interior to submit to Congress a Cohesive Wildfire Management Strategy. In this report, we explore the general science available for a risk-based approach to fire and fuels management and suggest analyses that may be applied...

Year Published: 2011

Type: Document

Technical Report or White Paper

Can fuel-reduction treatments really increase forest carbon storage in the western US by reducing future fire emissions?

www.nrfirescience.org/resource/8300

It has been suggested that thinning trees and other fuel-reduction practices aimed at reducing the probability of high-severity forest fire are consistent with efforts to keep carbon (C) sequestered in terrestrial pools, and that such practices should therefore be rewarded rather than penalized in C-accounting schemes. By evaluating...

Author(s): John L. Campbell, Mark E. Harmon, Stephen R. Mitchell

Year Published: 2011

Type: Document

Book or Chapter or Journal Article, Synthesis

Restoration of whitebark pine forests in the northern Rocky Mountains, USA

www.nrfirescience.org/resource/11900

Whitebark pine (*Pinus albicaulis*) has been declining across much of its range in North America because of the combined effects of mountain pine beetle epidemics, fire exclusion policies, and widespread exotic blister rust infections. Whitebark pine seed is dispersed by a bird, the Clark's nutcracker, which caches seed in open,...

Author(s): Robert E. Keane

Year Published: 2011

Type: Document

Conference Proceedings

A regional experiment to evaluate effects of fire and fire surrogate treatments in the sagebrush biome - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11225

SageSTEP is a comprehensive regional experiment that provides critical information to managers faced with a sagebrush steppe ecosystem that is increasingly at risk from wildfire, invasive plants, and climate change. The experiment provides managers with information that can be used to restore ecological communities across the 100+...

Author(s): James D. McIver, Hugh Barrett, Mark W. Brunson, Stephen C. Bunting, Jeanne C. Chambers, Carla M. D'Antonio, Paul S. Doescher, Dale Johnson, Sherm Karl, Steve Knick, Richard F. Miller, Michael L. Pellant, Frederick B. Pierson, David A. Pyke, Kimberly Rollins, Bruce A. Roundy, Eugene Schupp, Robin J. Tausch, David Turner, Michael J. Wisdom

Year Published: 2011

Type: Document

Technical Report or White Paper

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

How fuel treatments saved homes from the 2011 Wallow fire

www.nrfirescience.org/resource/17699

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

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

Comprehensive fuels treatment practices guide for mixed conifer forests: California, central and southern Rockies, and the Southwest

www.nrfirescience.org/resource/12630

The goal of this guide is to provide a resource for managers of mixed conifer forests of the Southwestern plateaus and uplands, the Central and Southern Rocky Mountains, the Sierra Nevada, and the Transverse and Peninsular Ranges in Southern California. Mixed conifer forests have different species, structures, and spatial patterns...

Author(s): Alexander M. Evans, Rick G. Everett, Scott L. Stephens, James A. Youtz

Year Published: 2011

Type: Document

Synthesis, Technical Report or White Paper

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

Advancing effects analysis for integrated, large-scale wildfire risk assessment

www.nrfirescience.org/resource/12729

In this article, we describe the design and development of a quantitative, geospatial risk assessment tool intended to facilitate monitoring trends in wildfire risk over time and to provide information useful in prioritizing fuels treatments and mitigation measures. The research effort is designed to develop, from a strategic view,...

Author(s): Matthew P. Thompson, David E. Calkin, Julie W. Gilbertson-Day, Alan A. Ager

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

Deriving fuel mass by size class in Douglas-fir (*Pseudotsuga menziesii*) using terrestrial laser scanning

www.nrfirescience.org/resource/13152

Requirements for describing coniferous forests are changing in response to wildfire concerns, bio-energy needs, and climate change interests. At the same time, technology advancements are transforming how forest properties can be measured. Terrestrial Laser Scanning (TLS) is yielding promising results for measuring tree biomass...

Author(s): Carl A. Seielstad, Crystal S. Stonesifer, Eric Rowell, Lloyd P. Queen

Year Published: 2011

Type: Document

Book or Chapter or Journal Article

What Is Limiting More Flexible Fire Management—Public or Agency Pressure?

www.nrfirescience.org/resource/17812

Conventional wisdom within American federal fire management agencies suggests that external influence such as community or political pressure for aggressive suppression are key factors circumscribing the ability to execute less aggressive fire management strategies. Thus, a better

understanding of external constraints on fire...
Author(s): Toddi A. Steelman, Sarah M. McCaffrey
Year Published: 2011
Type: Document
Book or Chapter or Journal Article

Guide for quantifying post-treatment fuels in the sagebrush steppe and juniper woodlands of the Great Basin

www.nrfirescience.org/resource/11108

Invasive species and woodland encroachment have caused extensive changes in the fire regimes of sagebrush steppe over the past 150 years. Land managers and resource specialists of the Great Basin are increasingly required to implement vegetation treatments to maintain habitat, reduce fire risk and restore landscapes to a more...

Author(s): Andrea Bourne, Stephen C. Bunting
Year Published: 2011
Type: Document
Research Brief or Fact Sheet

Evaluating wildland fire danger and prioritizing vegetation and fuels treatments

www.nrfirescience.org/resource/11465

We present a prototype decision support system for evaluating wild-land fire danger and prioritizing subwatersheds for vegetation and fuels treatment. We demonstrate the use of the system with an example from the Rocky Mountain region in the State of Utah, which represents a planning area of about 4.8 million ha and encompasses 575...

Author(s): Paul F. Hessburg, Keith M. Reynolds, Robert E. Keane, Kevin M. James, R. Brion Salter
Year Published: 2010
Type: Document
Technical Report or White Paper

Thinning and burning in dry coniferous forests of the western United States: effectiveness in altering diameter distributions

www.nrfirescience.org/resource/8376

Western United States land managers are conducting fuel reduction and forest restoration treatments in forests with altered structural conditions. As part of the National Fire and Fire Surrogate (FFS) study, thinning and burning treatments were evaluated for changing forest structure. Shifts between pretreatment and posttreatment...

Author(s): Andrew P. Youngblood
Year Published: 2010
Type: Document
Book or Chapter or Journal Article

Biomass utilization for bioenergy in the western United States

www.nrfirescience.org/resource/8178

ANNOTATION: This study examines the use of woody residues, primarily from forest harvesting or wood products manufacturing operations (and to a limited degree from urban wood wastes), as a feedstock for direct-combustion bioenergy systems for electrical or thermal power applications. Opportunities for utilizing biomass for energy at...

Author(s): Deborah S. Page-Dumroese, Martin F. Jurgensen, Thomas A. Terry
Year Published: 2010
Type: Document
Book or Chapter or Journal Article, Synthesis

Large scale forest fuels projects and collaborative groups improvement study: analysis of a survey conducted for the Western Governors' Association's Forest Health Advisory Committee (FHAC)

www.nrfirescience.org/resource/11135

The Western Governors' Association's Forest Health Advisory Committee (FHAC) sought answers to questions on how large scale forest treatment collaboratives are doing throughout the West. They were particularly interested in finding out where groups of different stakeholders were finding 'zones of agreement', what successes they are...

Author(s): Cheryl R. Renner

Year Published: 2010

Type: Document

Technical Report or White Paper

Comment on 'Estimating canopy fuel characteristics in five conifer stands in the western United States using tree and stand measurements'

www.nrfirescience.org/resource/8220

Reinhardt et al. (E. Reinhardt, J. Scott, K. Gray, and R. Keane, Can. J. For. Res. 36: 2803-2814, 2006) questioned the validity of the regression equations for estimating canopy base heights in coniferous forest fuel types developed by Cruz et al. (M.G. Cruz, M.E. Alexander, and R.H. Wakimoto, Int. J. Wildland Fire, 12: 39-50, 2003...

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

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Prescribed fires as ecological surrogates for wildfires: a stream and riparian perspective

www.nrfirescience.org/resource/11444

Forest managers use prescribed fire to reduce wildfire risk and to provide resource benefits, yet little information is available on whether prescribed fires can function as ecological surrogates for wildfire in fire-prone landscapes. Information on impacts and benefits of this management tool on stream and riparian ecosystems is...

Author(s): Robert S. Arkle, David S. Pilliod

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Effects of fuel treatments on carbon-disturbance relationships in forests of the Northern Rocky Mountains

www.nrfirescience.org/resource/8188

Fuel treatments alter conditions in forested stands at the time of the treatment and subsequently. Fuel treatments reduce on-site carbon and also change the fire potential and expected outcome of future wildfires, including their carbon emissions. We simulated effects of fuel treatments on 140 stands representing seven major habitat...

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

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

A comparison of landscape fuel treatment strategies to mitigate wildland fire risk in the urban

interface and preserve old forest structure

www.nrfirescience.org/resource/12725

We simulated fuel reduction treatments on a 16,000 ha study area in Oregon, US, to examine tradeoffs between placing fuel treatments near residential structures within an urban interface, versus treating stands in the adjacent wildlands to meet forest health and ecological restoration goals. The treatment strategies were evaluated...

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

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

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

Type: Document

Conference Proceedings

Restoration treatment effects on stand structure, tree growth, and fire hazard in a ponderosa pine/Douglas-fir forest in Montana

www.nrfirescience.org/resource/8159

Crown fires that burned thousands of ha of ponderosa pine (*Pinus ponderosa* Dougl. ex Laws.) forests in recent years attest to the hazardous conditions extant on the western landscape. Managers have responded with broad-scale implementation of fuel reduction treatments; however, because threats to pine forests extend beyond fire, so...

Author(s): Carl E. Fiedler, Kerry L. Metlen, Erich K. Dodson

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Fuel reduction management practices in riparian areas of the Western USA

www.nrfirescience.org/resource/12577

Two decades of uncharacteristically severe wildfires have caused government and private land managers to actively reduce hazardous fuels to lessen wildfire severity in western forests, including riparian areas. Because riparian fuel treatments are a fairly new management strategy, we set out to document their frequency and extent on...

Author(s): Katharine R. Stone, David S. Pilliod, Kathleen A. Dwire, Charles C. Rhoades, Sherry P. Wollrab, Michael K. Young

Year Published: 2010

Type: Document

Book or Chapter or Journal Article, Synthesis

Management guide to ecosystem restoration treatments: whitebark pine forests of the Northern Rocky Mountains, U.S.A.

www.nrfirescience.org/resource/11143

Whitebark pine is declining across much of its range in North America because of the combined effects of mountain pine beetle epidemics, fire exclusion policies, and widespread exotic blister rust infections.

This management guide summarizes the extensive data collected at whitebark pine treatment sites for three periods: (1) pre-...

Author(s): Robert E. Keane, Russell A. Parsons

Year Published: 2010

Type: Document

Technical Report or White Paper

Wildfire risk and hazard: procedures for the first approximation

www.nrfirescience.org/resource/12726

This report was designed to meet three broad goals: (1) evaluate wildfire hazard on Federal lands; (2) develop information useful in prioritizing where fuels treatments and mitigation measures might be proposed to address significant fire hazard and risk; and (3) develop risk-based performance measures to document the effectiveness...

Author(s): David E. Calkin, Alan A. Ager, Julie W. Gilbertson-Day

Year Published: 2010

Type: Document

Technical Report or White Paper

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 $10 \pm 0.5 \text{ mol\% O}_2$. 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

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

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

Restoring whitebark pine forests of the northern Rocky Mountains, USA

www.nrfirescience.org/resource/8394

Whitebark pine (*Pinus albicaulis*) has been declining across much of its range in North America because of the combined effects of mountain pine beetle (*Dendroctonus ponderosae*) epidemics, fire exclusion policies, and widespread exotic blister rust infections. Whitebark pine seed is dispersed by a bird, the Clark's nutcracker (...)

Author(s): Robert E. Keane, Russell A. Parsons

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Integrating fuel treatment into ecosystem management: a proposed project planning process

www.nrfirescience.org/resource/8206

Concern over increased wildland fire threats on public lands throughout the western United States makes fuel reduction activities the primary driver of many management projects. This single-issue focus recalls a management planning process practiced frequently in recent decades - a least-harm approach where the primary objective is...

Author(s): Keith Stockmann, Kevin D. Hyde, J. Greg Jones, Dan R. Loeffler, Robin P. Silverstein

Year Published: 2010

Type: Document

Book or Chapter or Journal Article, Management or Planning Document

Critique of Sikkink and Keane's comparison of surface fuel sampling techniques

www.nrfirescience.org/resource/8370

The 2008 paper of Sikkink and Keane compared several methods to estimate surface fuel loading in western Montana: two widely used inventory techniques (planar intersect and fixed-area plot) and three methods that employ photographs as visual guides (photoload, photoload macroplot and photo series). We feel, however, that their study...

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

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Interactive effects of historical logging and fire exclusion on ponderosa pine forest structure in the northern Rockies

www.nrfirescience.org/resource/8210

Increased forest density resulting from decades of fire exclusion is often perceived as the leading cause of historically aberrant, severe, contemporary wildfires and insect outbreaks documented in some fire-prone forests of the western United States. Based on this notion, current U.S. forest policy directs managers to reduce stand...

Author(s): Cameron Naficy, Anna Sala, Eric G. Keeling, Jon Graham, Thomas H. DeLuca

Year Published: 2010

Type: Document

Book or Chapter or Journal Article

Willingness-to-pay function for two fuel treatments to reduce wildfire acreage burned: a scope test and comparison of white and hispanic households

www.nrfirescience.org/resource/11065

We estimate a marginal benefit function for using prescribed burning and mechanical fuel reduction programs to reduce acres burned by wildfire in three states. Since each state had different acre reductions, a statistically significant coefficient on the reduction in acres burned is also a split sample scope test frequently used as...

Author(s): John B. Loomis, Le Trong Hung, Armando Gonzalez-Caban

Year Published: 2009

Type: Document

Conference Proceedings, Technical Report or White Paper

Ecological effects of prescribed fire season: a literature review and synthesis for managers

www.nrfirescience.org/resource/12616

This synthesis project on season of prescribed burning is to summarize results from studies to date in order to provide managers a resource for predicting fire effects and understanding what variables drive these fire effects in different areas of the country with varying fire regimes. A secondary objective will be to identify key...

Author(s): Eric E. Knapp, Becky L. Estes, Carl N. Skinner

Year Published: 2009

Type: Document

Synthesis, Technical Report or White Paper

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

Mapping and estimating forest fuel with radar remote sensing

www.nrfirescience.org/resource/11084

With an increase in the risk of large fires across much of the Western United States, along with a growing variety of fuel types that result from changes in the landscape and management strategies, there has never been a more pressing need for accurate, cost-efficient, large scale forest fuel maps. Emerging remote sensing...

Emerging remote sensing...

Author(s): Rachel Clark

Year Published: 2009

Type: Document

Research Brief or Fact Sheet

Assessing fuel treatment effectiveness using satellite imagery and spatial statistics

www.nrfirescience.org/resource/8227

Understanding the influences of forest management practices on wildfire severity is critical in fire-prone ecosystems of the western United States. Newly available geospatial data sets characterizing vegetation, fuels, topography, and burn severity offer new opportunities for studying fuel treatment effectiveness at regional to...

Author(s): Michael C. Wimberly, Mark A. Cochrane, Adam D. Baer, Kari Pabst

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Recovery of greater sage-grouse habitat features in Wyoming big sagebrush following prescribed fire

www.nrfirescience.org/resource/12127

The ability of prescribed fire to enhance habitat features for Greater Sage-Grouse (*Centrocercus urophasianus*) in Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) in western North America is poorly understood. We evaluated recovery of habitat features important to wintering, nesting, and early brood-rearing Sage-Grouse in...

Author(s): Jeffrey L. Beck, John W. Connelly, Kerry P. Reese

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

From the ground up, way up: measuring live fuel moisture with satellite imagery to fine-tune fire modeling in western ecosystems

www.nrfirescience.org/resource/11431

Remote sensing from space may well become one of the world's most effective, accurate, and efficient ways to assess fire risk and thus manage large landscapes. The technology is evolving quickly, and researchers are busy keeping up. Some major western U.S. landscapes are just now being assessed for integrating remote sensing data...

Author(s): Rachel Clark

Year Published: 2009

Type: Document

Research Brief or Fact Sheet

Analysing Designed Experiments In Distance Sampling

www.nrfirescience.org/resource/17472

Distance sampling is a survey technique for estimating the abundance or density of wild animal populations. Detection probabilities of animals inherently differ by species, age class, habitats, or sex. By incorporating the change in an observer's ability to detect a particular class of animals as a function of distance, distance...

Author(s): Stephen T. Buckland, Robin E. Russell, Brett G. Dickson, Victoria A. Saab, Donal N.

Gorman, William M. Block

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Assessing the performance of sampling designs for measuring abundance of understory plants after forest restoration

www.nrfirescience.org/resource/13353

Accurate estimation of the responses of understory plants to natural and anthropogenic disturbance is essential for understanding efficacy and non-target effects of management and restoration activities. However, ability to assess changes in abundance of understory plants that result from disturbance may be hampered...

Author(s): Ilana L. Abrahamson

Year Published: 2009

Type: Document

Dissertation or Thesis

The national fire and fire surrogate study: effects of fuel reduction methods on forest vegetation structure and fuels

www.nrfirescience.org/resource/13351

Changes in vegetation and fuels were evaluated from measurements taken before and after fuel reduction treatments (prescribed fire, mechanical treatments, and the combination of the two) at 12 Fire and Fire Surrogate (FFS) sites located in forests with a surface fire regime across the conterminous United States. To test the relative...

Author(s): Dylan W. Schwilk, Jon E. Keeley, Eric E. Knapp, James D. McIver, John D. Bailey, Christopher J. Fettig, Carl E. Fiedler, Richy J. Harrod, Jason J. Moghaddas, Kenneth W. Outcalt, Carl N. Skinner, Scott L. Stephens, Thomas A. Waldrop, Daniel A. Yaussy, Andrew P. Youngblood

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Lubrecht State Experimental Forest prescribed fire effects study 1973-2006

www.nrfirescience.org/resource/11134

This data product contains pre and post fires stand and fuels data collected over a 33 year period. Rod Norum as part of his PhD dissertation work, began this study in 1973. He laid out 32 small (25 by 25 meter) plots in a Douglas fir/western larch stand on the University of Montana's Lubrecht Experimental Forest. Twenty of the...

Author(s): Elizabeth D. Reinhardt

Year Published: 2009

Type: Document

Technical Report or White Paper

Breakthrough at the Missouri River Breaks: a quick tool for comparing burned and unburned sites

www.nrfirescience.org/resource/11085

A quantitative understanding of how forests work, both before and after (prescribed and wild) fire, is essential to management. Yet acquiring the kind of broad yet detailed information needed for many management decisions can be costly, tedious, and time-consuming. After two sweeping wildfires in the Missouri River Breaks area of...

Author(s): Rachel Clark

Year Published: 2009

Type: Document

Research Brief or Fact Sheet

Implementation of National Fire Plan fuel treatments near the wildland-urban interface in the western United States

www.nrfirescience.org/resource/8225

Because of increasing concern about the effects of catastrophic wildland fires throughout the western United States, federal land managers have been engaged in efforts to restore historical fire behavior and mitigate wildfire risk. During the last 5 years (2004-2008), 44,000 fuels treatments were implemented across the western...

Author(s): Tania L. Schoennagel, Cara R. Nelson, David M. Theobald, Gunnar C. Carnwath, Teresa B. Chapman

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Bark beetle responses to vegetation management treatments

www.nrfirescience.org/resource/11070

Native tree-killing bark beetles (Coleoptera: Curculionidae, Scolytinae) are a natural component of forest ecosystems. Eradication is neither possible nor desirable and periodic outbreaks will occur as long as susceptible forests and favorable climatic conditions co-exist. Recent changes in forest structure and tree composition by...

Author(s): Joel D. McMillin, Christopher J. Fettig

Year Published: 2009

Type: Document

Conference Proceedings, Technical Report or White Paper

Equations to convert compacted crown ratio to uncompacted crown ratio for trees in the Interior West

www.nrfirescience.org/resource/8368

Crown ratio is the proportion of total tree length supporting live foliage. Inventory programs of the US Forest Service generally define crown ratio in terms of compacted or uncompacted measurements. Measurement of compacted crown ratio (CCR) involves envisioning the transfer of lower branches of trees with asymmetric crowns to fill...

Author(s): Chris Toney, Matthew C. Reeves

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Guide for quantifying fuels in the sagebrush steppe and juniper woodlands of the Great Basin

www.nrfirescience.org/resource/11107

Prescribed fire is increasingly used for fuels management and ecosystem restoration. Managers and fuels specialists of the Great Basin are often required to estimate fuel loadings to predict fire behavior, recommend fuel treatments, or restore an area to its natural fire regime. Because of invasive species and woodland encroachment...

Author(s): Andrea Stebleton, Stephen C. Bunting

Year Published: 2009

Type: Document

Research Brief or Fact Sheet

Rx-CADRE (Prescribed Fire Combustion-Atmospheric Dynamics Research Experiments) collaborative research in the core fire sciences

www.nrfirescience.org/resource/16939

The Rx-CADRE project was the combination of local and national fire expertise in the field of core fire research. The project brought together approximately 30 fire scientists from six geographic regions and seven different agencies. The project objectives were to demonstrate the capacity for collaborative research by bringing...

Author(s): Daniel M. Jimenez, J. Kevin Hiers, Roger D. Ottmar, Matthew B. Dickinson, Robert L. Kremens, Joseph J. O'Brien, Andrew T. Hudak, C. Clements

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

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

A multi-disciplinary approach to fire management strategy, suppression costs, community interaction and organizational performance

www.nrfirescience.org/resource/17806

Over the past several fire seasons, there has been increasing emphasis on strategies to achieve fire management objectives using less than full perimeter control, such as more prescribed burning and focused point and area protection. While the strategies and tactics themselves are not new, wider use by Federal agencies, particularly...

Author(s): Anne E. Black, Krista M. Gebert, Sarah M. McCaffrey, Toddi A. Steelman, Janie Canton-Thompson

Year Published: 2009

Type: Document

Book or Chapter or Journal Article

Biophysical controls on surface fuel litterfall and decomposition in the Northern Rocky Mountains, USA

www.nrfirescience.org/resource/8161

Litterfall and decomposition rates of the organic matter that comprise forest fuels are important to fire management, because they define fuel treatment longevity and provide parameters to design, test, and validate ecosystem models. This study explores the environmental factors that control litterfall and decomposition in the...

Author(s): Robert E. Keane

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Surface fuel litterfall and decomposition in the Northern Rocky Mountains, U.S.A.

www.nrfirescience.org/resource/11125

Surface fuel deposition and decomposition rates are important to fire management and research because they can define the longevity of fuel treatments in time and space and they can be used to design, build, test, and validate complex fire and ecosystem models useful in evaluating management

alternatives. We determined rates of...

Author(s): Robert E. Keane

Year Published: 2008

Type: Document

Technical Report or White Paper

Using bark char codes to predict post-fire cambium mortality

www.nrfirescience.org/resource/8171

Cambium injury is an important factor in post-fire tree survival. Measurements that quantify the degree of bark charring on tree stems after fire are often used as surrogates for direct cambium injury because they are relatively easy to assign and are non-destructive. However, bark char codes based on these measurements have been...

Author(s): Sharon M. Hood, Danny R. Cluck, Sheri L. Smith, Kevin C. Ryan

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Forest harvest can increase subsequent forest fire severity

www.nrfirescience.org/resource/11054

The USDA Forest Service is progressing from a land management strategy oriented around timber extraction towards one oriented around maintaining healthy forested lands. The healthy Forest Initiative promotes the idea of broadscale forest thinning and fuel treatments as an effective means for mitigating hazardous fuel conditions and...

Author(s): Carter Stone, Andrew T. Hudak, Penelope Morgan

Year Published: 2008

Type: Document

Conference Proceedings, Technical Report or White Paper

Spatial-endogenous fire risk and efficient fuel management and timber harvest

www.nrfirescience.org/resource/8277

This paper integrates a spatial fire-behavior model and a stochastic dynamic-optimization model to determine the optimal spatial pattern of fuel management and timber harvest. Each year's fire season causes the loss of forest values and lives in the western United States. We use a multi-plot analysis and incorporate uncertainty...

Author(s): Masashi Konoshima, Claire A. Montgomery, Heidi J. Albers, Jeffrey L. Arthur

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Restoration of northern Rocky Mountain moist forests: integrating fuel treatments from the site to the landscape

www.nrfirescience.org/resource/11991

Restoration and fuel treatments in the moist forests of the northern Rocky Mountains are complex and far different from those applicable to the dry ponderosa pine forests. In the moist forests, clearcuts are the favored method to use for growing early-seral western white pine and western larch. Nevertheless, clearcuts and their...

Author(s): Theresa B. Jain, Russell T. Graham, Robert Denner, Jonathan Sandquist, Jeffrey S. Evans, Matthew Butler, Karen Brockus, David Cobb, Daniel Frigard, Han-Sup Han, Jeff Halbrook

Year Published: 2008

Type: Document

Conference Proceedings, Technical Report or White Paper

The effects of hazardous fuel reduction treatments in the wildland urban interface on the activity of bark beetles infesting ponderosa pine

www.nrfirescience.org/resource/11479

Selective logging, fire suppression, forest succession, and climatic changes have resulted in high fire hazards over large areas of the western United States. Federal and state hazardous fuel reduction programs have increased accordingly to reduce the risk, extent and severity of these events, particularly in the wildland urban...

Author(s): Christopher J. Fettig, Joel D. McMillin, John A. Anhold, Shakeeb M. Hamud, Steven J. Seybold

Year Published: 2008

Type: Document

Conference Proceedings

Objectives and considerations for wildland fuel treatment in forested ecosystems of the interior western United States

www.nrfirescience.org/resource/8194

Many natural resource agencies and organizations recognize the importance of fuel treatments as tools for reducing fire hazards and restoring ecosystems. However, there continues to be confusion and misconception about fuel treatments and their implementation and effects in fire-prone landscapes across the United States. This paper...

Author(s): Elizabeth D. Reinhardt, Robert E. Keane, David E. Calkin, Jack D. Cohen

Year Published: 2008

Type: Document

Book or Chapter or Journal Article, Synthesis

Reproductive output of ponderosa pine in response to thinning and prescribed burning in western Montana

www.nrfirescience.org/resource/8230

Thinning and thinning followed by prescribed fire are common management practices intended to restore historic conditions in low-elevation ponderosa pine (*Pinus ponderosa* Dougl. ex P....

Author(s): Gregory D. Peters, Anna Sala

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Managing fire risk in the forests of the U.S. inland Northwest: a classic "wicked problem" in public land policy

www.nrfirescience.org/resource/11066

In their classic article published in the *Journal of Forestry* in 1986, Gerald Allen and Ernest Gould stated that the most daunting problems associated with public forest management have a "wicked" element: "Wicked problems share characteristics. Each can be considered as simply a symptom of some higher order problem-The definition...

Author(s): Matthew S. Carroll, Keith A. Blatner, Patricia J. Cohn, Charles E. Keegan, Todd A. Morgan

Year Published: 2008

Type: Document

Conference Proceedings, Synthesis, Technical Report or White Paper

Forests at risk: integrating risk science into fuel management strategies

www.nrfirescience.org/resource/11089

The threat from wildland fire continues to grow across many regions of the Western United States. Drought, urbanization, and a buildup of fuels over the last century have contributed to increasing wildfire risk to property and highly valued natural resources. Fuel treatments, including thinning overly dense forests to reduce fuel...

Author(s): Jonathan Thompson

Year Published: 2008

Type: Document

Research Brief or Fact Sheet

Market impacts of a multiyear mechanical fuel treatment program in the U.S.

www.nrfirescience.org/resource/8125

We describe a two-stage model of global log and chip markets that evaluates the spatial and temporal economic effects of government- subsidized fire-related mechanical fuel treatment programs in the U.S. West and South. The first stage is a goal program that allocates subsidies according to fire risk and location priorities, given a...

Author(s): Jeffrey P. Prestemon, Karen L. Abt, Robert J. Huggett

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

A comparison of five sampling techniques to estimate surface fuel loading in montane forests

www.nrfirescience.org/resource/8164

Designing a fuel-sampling program that accurately and efficiently assesses fuel load at relevant spatial scales requires knowledge of each sample method's strengths and weaknesses. We obtained loading values for six fuel components using five fuel load sampling techniques at five locations in western Montana, USA. The techniques...

Author(s): Pamela G. Sikkink, Robert E. Keane

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Contingent valuation of fuel hazard reduction treatments

www.nrfirescience.org/resource/11988

This chapter presents a stated preference technique for estimating the public benefits of reducing wildfires to residents of California, Florida, and Montana from two alternative fuel reduction programs: prescribed burning, and mechanical fuels reduction. The two fuel reduction programs under study are quite relevant to people...

Author(s): John B. Loomis, Armando Gonzalez-Caban

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Burn and they will come! The western regional birds and burns study examines bird responses to prescribed fire

www.nrfirescience.org/resource/11088

Although prescribed fire is increasingly being used in ponderosa pine forests as a management tool to reduce the risk of future high-severity wildfire, its effects on wildlife habitat have rarely been examined. The Birds and Burns Network was created to assist managers in planning prescribed fire projects that will reduce fuels and...

Author(s): Jonathan Thompson

Year Published: 2008

Type: Document
Research Brief or Fact Sheet

Maintaining soil productivity during forest or biomass-to-energy thinning harvests in the western United States

www.nrfirescience.org/resource/11018

ANNOTATION: Forest biomass thinnings can potentially impact soil resources by altering soil physical, chemical, and/or biological properties. This paper provides basic recommendations and findings derived from stand-removal studies to guide biomass thinnings for forest health, fuel reduction, or energy production. The focus of these...

Author(s): Marcia Patton-Mallory, Richard Nelson, Kenneth E. Skog, Bryan Jenkins, Nathan Parker, Peter Tittman, Quinn Hart, Ed Gray, Anneliese Schmidt, Gayle Gordon

Year Published: 2008

Type: Document

Conference Proceedings, Synthesis

Estimating harvest costs for fuel treatments in the west

www.nrfirescience.org/resource/8172

ANNOTATION: The costs for harvesting timber for forest fire fuel reduction purposes were estimated for 12 states in the West. These simulation inputs were used to estimate average costs for 12,039 Forest inventory and Analysis plots in the West, and then that FRCS output was used develop regression equations that estimated costs as...

Author(s): Rodrigo Arriagada, Fred W. Cabbage, Karen L. Abt, Robert J. Huggett

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

The homeowner view of thinning methods for fire hazard reduction: more positive than many think

www.nrfirescience.org/resource/11486

With the focus of the National Fire Plan on decreasing fire risk in the wildland-urban interface, fire managers are increasingly tasked with reducing the fuel load in areas where mixed public and private ownership and a growing number of homes can make most fuel reduction methods problematic at best. In many of these intermix areas...

Author(s): Sarah M. McCaffrey

Year Published: 2008

Type: Document

Conference Proceedings, Technical Report or White Paper

A synthesis of biomass utilization for bioenergy production in the western United States

www.nrfirescience.org/resource/8179

This study examines the use of woody residues, primarily from forest harvesting or wood products manufacturing operations as a feedstock for direct-combustion bioenergy systems for electrical or thermal power applications. Opportunities for utilizing biomass for energy at several scales, with an emphasis on larger scale electrical...

Author(s): David L. Nicholls, Robert A. Monserud, Dennis P. Dykstra

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

Influence of coarse wood and pine saplings on nitrogen mineralization and microbial communities in young post-fire *Pinus contorta*

www.nrfirescience.org/resource/18459

Nitrogen (N) limits productivity in many coniferous forests of the western US, but the influence of post-fire structure on N cycling rates in early successional stands is not well understood. We asked if the heterogeneity created by downed wood and regenerating pine saplings affected N mineralization and microbial community...

Author(s): Kristine L. Metzger, Erica A. H. Smithwick, Daniel B. Tinker, William H. Romme, Teri C. Balsler, Monica G. Turner

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Fire probability, fuel treatment effectiveness and ecological tradeoffs in Western U.S. public forests

www.nrfirescience.org/resource/12724

Fuel treatment effectiveness and non-treatment risks can be estimated from the probability of fire occurrence. Using extensive fire records for western US Forest Service lands, we estimate fuel treatments have a mean probability of 2.0-7.9% of encountering moderate- or high-severity fire during an assumed 20-year period of...

Author(s): Jonathan J. Rhodes, William L. Baker

Year Published: 2008

Type: Document

Book or Chapter or Journal Article

Paying our way: thinking strategically to offset the cost of reducing fire hazard in western forests

www.nrfirescience.org/resource/11087

The fire hazard in many western forests is unacceptably high, posing risks to human health and property, wildlife habitat, and air and water quality. Cost is an inhibiting factor for reducing hazardous fuel, given the amount of acreage needing treatment. Thinning overly dense forests is one way to reduce fuel loads. Much of the...

Author(s): Rhonda L. Mazza

Year Published: 2008

Type: Document

Research Brief or Fact Sheet

Synthesis of knowledge from woody biomass removal case studies

www.nrfirescience.org/resource/12631

Woody biomass-usually logging slash, tops and limbs, or trees that cannot be sold as timber-is the

lowest valued material removed from the forest and presents economic and logistical challenges. This report brings together 45 case studies of how biomass is removed from forests and used across the country to demonstrate the wide...

Author(s): Alexander M. Evans

Year Published: 2008

Type: Document

Synthesis, Technical Report or White Paper

The relation between tree burn severity and forest structure in the Rocky Mountains

www.nrfirescience.org/resource/11987

Many wildfire events have burned thousands of hectares across the western United States, such as the Bitterroot (Montana), Rodeo-Chediski (Arizona), Hayman (Colorado), and Biscuit (Oregon) fires. These events led to Congress enacting the Healthy Forest Restoration Act of 2003, which, with other policies, encourages federal and state...

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

Year Published: 2007

Type: Document

Conference Proceedings, Technical Report or White Paper

Social science informing forest management — bringing new knowledge to fuels managers

www.nrfirescience.org/resource/15006

To improve access, interpretability, and use of the full body of research, a pilot project was initiated by the USDA Forest Service to synthesize relevant scientific information and develop publications and decision support tools that managers can use to inform fuels treatment plans. This article provides an overview of the work of...

Author(s): Pamela J. Jakes

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

Assessing accuracy of point fire intervals across landscapes with simulation modeling

www.nrfirescience.org/resource/16896

We assessed accuracy in point fire intervals using a simulation model that sampled four spatially explicit simulated fire histories. These histories varied in fire frequency and size and were simulated on a flat landscape with two forest types (dry versus mesic). We used three sampling designs (random, systematic grids, and...

Author(s): Russell A. Parsons, Emily K. Heyerdahl, Robert E. Keane, Brigitte Dorner, Joseph Fall

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

Treatments that enhance the decomposition of forest fuels for use in partially harvested stands in the moist forests of the Northern Rocky Mountains - Final report to the Joint Fire Science Program

www.nrfirescience.org/resource/13115

The moist forests of the Rocky Mountains typically support late seral western hemlock, moist grand fir, or western redcedar forests. In addition to these species, Douglas-fir, western white pine, western larch, ponderosa pine, and lodgepole pine can occur creating a multitude of species compositions, structures, and successional...

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

Year Published: 2007

Type: Document
Technical Report or White Paper

Rapid assessment of postfire plant invasions in coniferous forests of the western United States

www.nrfirescience.org/resource/18957

Fire is a natural part of most forest ecosystems in the western United States, but its effects on nonnative plant invasion have only recently been studied. Also, forest managers are engaging in fuel reduction projects to lessen fire severity, often without considering potential negative ecological consequences such as nonnative...

Author(s): Jonathan P. Freeman, Thomas J. Stohlgren, Molly E. Hunter, Philip N. Omi, Erik J. Martinson, Geneva W. Chong, Cynthia S. Brown

Year Published: 2007

Type: Document
Book or Chapter or Journal Article

Free selection: a silvicultural option

www.nrfirescience.org/resource/12133

Forest management objectives continue to evolve as the desires and needs of society change. The practice of silviculture has risen to the challenge by supplying silvicultural methods and systems to produce desired stand and forest structures and compositions to meet these changing objectives. For the most part, the practice of...

Author(s): Russell T. Graham, Theresa B. Jain, Jonathan Sandquist

Year Published: 2007

Type: Document
Conference Proceedings, Technical Report or White Paper

Delayed Conifer Tree Mortality Following Fire in California

www.nrfirescience.org/resource/16311

Fire injury was characterized and survival monitored for 5,246 trees from five wildfires in California that occurred between 1999 and 2002. Logistic regression models for predicting the probability of mortality were developed for incense-cedar, Jeffrey pine, ponderosa pine, red fir and white fir. Two-year post-fire preliminary...

Author(s): Sharon M. Hood, Sheri L. Smith, Danny R. Cluck

Year Published: 2007

Type: Document
Technical Report or White Paper

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

Understanding the influence of local and landscape conditions on the occurrence and

abundance of Black-backed Woodpeckers in burned forest patches

www.nrfirescience.org/resource/15635

Wildfire is the predominant disturbance agent in the Northern Rockies. The nearly annual occurrence of wildfire at some point in a larger landscape has served as the environmental backdrop against which our native wildlife species have evolved. A number of native species have, in fact, become dependent on wildfires or wildfire-...

Author(s): Richard L. Hutto, Deborah Austin, Sallie Hejl

Year Published: 2007

Type: Document

Technical Report or White Paper

The photoload sampling technique: estimating surface fuel loadings from downward-looking photographs of synthetic fuelbeds

www.nrfirescience.org/resource/11128

Fire managers need better estimates of fuel loading so they can more accurately predict the potential fire behavior and effects of alternative fuel and ecosystem restoration treatments. This report presents a new fuel sampling method, called the photoload sampling technique, to quickly and accurately estimate loadings for six common...

Author(s): Robert E. Keane, Laura J. Dickinson

Year Published: 2007

Type: Document

Technical Report or White Paper

Ten-year responses of ponderosa pine growth, vigor, and recruitment to restoration treatments in the Bitterroot Mountains, Montana, USA

www.nrfirescience.org/resource/13370

Little is known about ponderosa pine forest ecosystem responses to restoration practices in the Northern Rocky Mountains, USA. In this study, restoration treatments aimed at approximating historical forest structure and disturbances included modified single-tree selection cutting, with and without prescribed burning. We compared the...

Author(s): Alex Fajardo, Jon Graham, John M. Goodburn, Carl E. Fiedler

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

A report on conceptual advances in roll on/off technology in forestry

www.nrfirescience.org/resource/8173

ANNOTATION: This study looks into increasingly severe fire seasons over the last two decades that have led policymakers to recognize the need for thinning overgrown stands of trees. Thinning presents a financial challenge and the problem is that hazardous fuel reduction projects-especially projects in the Wildland/Urban Interface-...

Author(s): Dave Atkins, Robert B. Rummer, Beth Dodson, Craig E. Thomas, Andy Horcher, Ed Messerlie, Craig Rawlings, David Haston

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

Science-based strategic planning for hazardous fuel treatment

www.nrfirescience.org/resource/15017

A scientific foundation coupled with technical support is needed to develop long-term strategic plans for fuel and vegetation treatments on public lands. These plans are developed at several spatial scales and

are typically a component of fire management plans and other types of resource management plans. Such plans need to be...

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

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

Whitebark pine diameter growth response to removal of competition

www.nrfirescience.org/resource/19319

Silvicultural cutting treatments may be needed to restore whitebark pine (*Pinus albicaulis*) forests, but little is known of the response of this species to removal of competition through prescribed burning or silvicultural cuttings. We analyzed stem cross-sections from 48 whitebark pine trees in Montana around which most of the...

Author(s): Robert E. Keane, Kathy L. Gray, Laura J. Dickinson

Year Published: 2007

Type: Document

Technical Report or White Paper

Stand and fuel treatments for restoring old-growth ponderosa pine forests in the interior west (Boise Basin Experimental Forest) - Final report to the Joint Fire Science Program

www.nrfirescience.org/resource/13105

Fire exclusion, especially in the dry forests (i.e. those dominated or potentially dominated by ponderosa pine) has most often altered tree and shrub composition and structure and, though often overlooked in many locales, the forest floor from conditions that occurred historically (pre-1900). When fires are excluded...

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

Year Published: 2007

Type: Document

Technical Report or White Paper

Development and evaluation of the photoload sampling technique

www.nrfirescience.org/resource/11204

Wildland fire managers need better estimates of fuel loading so they can accurately predict potential fire behavior and effects of alternative fuel and ecosystem restoration treatments. This report presents the development and evaluation of a new fuel sampling method, called the photoload sampling technique, to quickly and...

Author(s): Robert E. Keane, Laura J. Dickinson

Year Published: 2007

Type: Document

The fire environment--innovations, management, and policy; conference proceedings

www.nrfirescience.org/resource/18398

The International Association of Wildland Fire sponsored the second Fire Behavior and Fuels conference in Destin, Florida. The conference theme was 'Fire Environment--Innovations, Management, and Policy.' Over 450 attendees participated in presentations on the latest innovations in wildland fire management, examples of successful...

Author(s): Wayne A. Cook, Bret W. Butler

Year Published: 2007

Type: Document

Conference Proceedings

Effects of alternative treatments on canopy fuel characteristics in five conifer stands

www.nrfirescience.org/resource/11129

A detailed study of canopy fuel characteristics in five different forest types provided a unique dataset for simulating the effects of various stand manipulation treatments on canopy fuels. Low thinning, low thinning with commercial dbh limit, and crown thinning had similar effects on canopy bulk density (CBD) and canopy fuel load (...)

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

Year Published: 2007

Type: Document

Conference Proceedings, Technical Report or White Paper

Do high-density patches of coarse wood and regenerating saplings create browsing refugia for aspen (*Populus tremuloides*) in Yellowstone National Park (USA)?

www.nrfirescience.org/resource/13546

Following the extensive 1988 fires in Yellowstone, a mosaic of high-density patches of fallen logs and regenerating lodgepole pine (*Pinus contorta* var. *latifolia* Engelm. ex Wats.) saplings developed in the landscape. Such patches could potentially provide browsing refugia for post-fire aspen (*Populus tremuloides* Michx.)...

Author(s): James D. Forester, Dean P. Anderson, Monica G. Turner

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

Stereo photo series for quantifying natural fuels. Volume X: sagebrush with grass and ponderosa pine-juniper types in central Montana

www.nrfirescience.org/resource/11191

A series of single and stereo photographs displaying a range of natural conditions and fuel loadings in sagebrush with grass and ponderosa pine-juniper types in central Montana. Each group of photos includes inventory data summarizing vegetation composition, structure, and loading: woody material loading and density by size class;...

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

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

www.nrfirescience.org/resource/17717

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 real wildfire conditions in...

Author(s): Jason J. Moghaddas, Larry Craggs

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

Managing forest structure and fire hazard - A tool for planners

www.nrfirescience.org/resource/8404

Fire planners and other resource managers need to examine a range of potential fuel and vegetation treatments to select options that will lead to desired outcomes for fire hazard and natural resource conditions. A new approach to this issue integrates concepts and tools from silviculture and fuel science to quantify outcomes for a...

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

Year Published: 2007

Type: Document

Book or Chapter or Journal Article

Birds and burns of the Interior West: descriptions, habitats, and management in western forests

www.nrfirescience.org/resource/11123

This publication provides information about prescribed fire effects on habitats and populations of birds of the interior West and a synthesis of existing information on bird responses to fire across North America. Our literature synthesis indicated that aerial, ground, and bark insectivores favored recently burned habitats, whereas...

Author(s): Victoria A. Saab, William M. Block, Robin E. Russell, John F. Lehmkuhl, Lisa Bate, Rachel White

Year Published: 2007

Type: Document

Synthesis, Technical Report or White Paper

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

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

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

www.nrfirescience.org/resource/17705

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

Assessing post-fire Douglas-fir mortality and Douglas-fir beetle attacks in the Northern Rocky Mountains

www.nrfirescience.org/resource/11126

Douglas-fir has life history traits that greatly enhance resistance to injury from fire, thereby increasing post-fire survival rates. Tools for predicting the probability of tree mortality following fire are important components of both pre-fire planning and post-fire management efforts. Using data from mixed-severity wildfire in...

Author(s): Sharon M. Hood, Barbara J. Bentz, Ken E. Gibson, Kevin C. Ryan, Gregg DeNitto

Year Published: 2007

Type: Document

Technical Report or White Paper

Science information for informing forest fuel management in dry forests of the western United States

www.nrfirescience.org/resource/7929

Land managers need timely and straightforward access to the best scientific information available for informing decisions on how to treat forest fuels in the dry forests of the western United States. However, although there is a tremendous amount of information available for informing fuels management decisions, often, it is in a...

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

Year Published: 2007

Type: Document

Book or Chapter or Journal Article, Synthesis

Regression modeling and mapping of coniferous forest basal area and tree density from discrete-return lidar and multispectral satellite data

www.nrfirescience.org/resource/13131

We compared the utility of discrete-return light detection and ranging (lidar) data and multispectral satellite imagery, and their integration, for modeling and mapping basal area and tree density across two diverse coniferous forest landscapes in north-central Idaho. We applied multiple linear regression models subset from a suite...

Author(s): Andrew T. Hudak, Nicholas L. Crookston, Jeffrey S. Evans, Michael J. Falkowski, Alistair M. S. Smith, Paul E. Gessler, Penelope Morgan

Year Published: 2006

Type: Document
Book or Chapter or Journal Article

Estimating timber harvesting costs for fuel treatment in the West: preliminary results

www.nrfirescience.org/resource/8427

Preliminary estimates of harvesting costs for forest fuel reduction treatments in the West are presented. Cost estimates were made for typical stands based on Forest Inventory and Analysis (FIA) plots that represented forest stands in 12 western states, using the ST Harvest spreadsheet system. Costs were estimated for a range of...

Author(s): Rodrigo Arriagada, Fred W. Cabbage, Karen L. Abt

Year Published: 2006

Type: Document

Conference Proceedings

Fuels Management - How to Measure Success: Conference Proceedings

www.nrfirescience.org/resource/18399

Fuels management programs are designed to reduce risks to communities and to improve and maintain ecosystem health. The International Association of Wildland Fire initiated the 1st Fire Behavior and Fuels Conference to address development, implementation, and evaluation of these programs. The focus was on how to measure success....

Author(s): Patricia L. Andrews, Bret W. Butler

Year Published: 2006

Type: Document

Conference Proceedings

Accuracy and precision of two indirect methods for estimating canopy fuels

www.nrfirescience.org/resource/11036

We compared the accuracy and precision of digital hemispherical photography and the LI-COR LAI-2000 plant canopy analyzer as predictors of canopy fuels. We collected data on 12 plots in western Montana under a variety of lighting and sky conditions, and used a variety of processing methods to compute estimates. Repeated measurements...

Author(s): Abran Steele-Feldman, Elizabeth D. Reinhardt, Russell A. Parsons

Year Published: 2006

Type: Document

Conference Proceedings

Design and objectives of FTM-West model

www.nrfirescience.org/resource/10975

The FTM-West ('fuel treatment market' model for U.S. West) is a dynamic partial market equilibrium model of regional softwood timber and wood product markets, designed to project future market impacts of expanded fuel treatment programs that remove trees to reduce fire hazard on forestlands in the U.S. West. The model solves...

Author(s): Peter J. Ince, Henry Spelter

Year Published: 2006

Type: Document

Conference Proceedings

Ecological science relevant to management policies for fire-prone forests of the western United States, Society for Conservation Biology scientific panel of fire in western U.S. forests

www.nrfirescience.org/resource/11190

Fire is a primary natural disturbance in most forests of western North America and has shaped their plant and animal communities for millions of years. Native species and fundamental ecological processes are dependent on conditions created by fire. However, many western forests have experienced shifts in wildfire regimes and forest...

Author(s): Reed F. Noss, Jerry F. Franklin, William L. Baker, Tania L. Schoennagel, Peter B. Moyle

Year Published: 2006

Type: Document

Technical Report or White Paper

Intermountain region wood utilization and wood energy application program

www.nrfirescience.org/resource/8180

ANNOTATION: In 1978 the U.S. Forest Service initiated a National Wood Utilization and Wood Energy Application Program to focus attention on application of existing and developing technology. In this paper, the mission and goals of this program are discussed. Additionally, problems such as access, economic feasibility, and long-term...

Author(s): Dan R. Loeffler, David E. Calkin, Robin P. Silverstein

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

Ponderosa pine ecosystems

www.nrfirescience.org/resource/11142

Ponderosa pine is one of the most widely distributed tree species in western North America. It is highly-valued as a source of lumber, but also is key to the health and social value western forests, whether growing in pure stands or in mixture with other conifer and hardwood species. In recent years, management objectives for...

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

Year Published: 2006

Type: Document

Synthesis, Technical Report or White Paper

Biomass utilization modeling on the Bitterroot National Forest

www.nrfirescience.org/resource/11008

ANNOTATION: The potential for biomass utilization to enhance the economics of treating hazardous forest fuels was examined on the Bitterroot National Forest and surrounding areas. Initial forest stand conditions were identified from Forest Inventory and Analysis (FIA) data and the Forest Vegetation Simulator (FVS) was used to...

Author(s): Robin P. Silverstein, Dan R. Loeffler, J. Greg Jones, David E. Calkin, Hans R. Zuuring, Martin Twer

Year Published: 2006

Type: Document

Conference Proceedings

Effects of fire exclusion on forest structure and composition in unlogged ponderosa pine/Douglas-fir forests

www.nrfirescience.org/resource/7928

Research to date on effects of fire exclusion in ponderosa pine (*Pinus ponderosa*) forests has been limited by narrow geographical focus, by confounding effects due to prior logging at research sites, and by uncertainty from using reconstructions of past conditions to infer changes. For the work presented here, reference stands in...

Author(s): Eric G. Keeling, Anna Sala, Thomas H. DeLuca

Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Prescribed fire: what influences public approval?

www.nrfirescience.org/resource/8440

Except in remote areas, most prescribed fires will have some effect on members of the public. It is therefore important for land managers to work with the public before, during, and after a prescribed burn. To do this effectively, managers need to have an accurate idea of what people do and do not think about prescribed fire and...

Author(s): Sarah M. McCaffrey
Year Published: 2006
Type: Document
Technical Report or White Paper

The use of silviculture and prescribed fire to manage stand structure and fuel profiles in a multi-aged lodgepole pine forest

www.nrfirescience.org/resource/10964

This paper presents several components of a multi-disciplinary project designed to evaluate the ecological and biological effects of two innovative silvicultural treatments coupled with prescribed fire in an attempt to both manage fuel profiles and create two-aged stand structures in lodgepole pine. Two shelterwood silvicultural...

Author(s): Colin C. Hardy, Helen Y. Smith, Ward W. McCaughey
Year Published: 2006
Type: Document
Conference Proceedings

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

An analytical framework for quantifying wildland fire risk and fuel treatment benefit

www.nrfirescience.org/resource/12720

Federal wildland fire management programs have readily embraced the practice of fuel treatment. Wildland fire risk is quantified as expected annual loss (\$ yr⁻¹ or \$ yr⁻¹ ac⁻¹). Fire risk at a point on the landscape is a function of the probability of burning at that point, the relative frequency of fire behaviors expected if the...

Author(s): Joe H. Scott
Year Published: 2006
Type: Document
Conference Proceedings

Broad-scale assessment of fuel treatment opportunities

www.nrfirescience.org/resource/10992

The Forest Inventory and Analysis (FIA) program has produced estimates of the extent and composition of the Nation's forests for several decades. FIA data have been used with a flexible silvicultural thinning option, a fire hazard model for preharvest and postharvest fire hazard assessment, a harvest economics model, and geospatial...

Author(s): Patrick D. Miles, Kenneth E. Skog, Wayne D. Shepperd, Elizabeth D. Reinhardt, Roger D. Fight

Year Published: 2006

Type: Document

Conference Proceedings, 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

Interactions among fire, insects, and pathogens in coniferous forests of the interior western United States and Canada

www.nrfirescience.org/resource/8120

Natural and recurring disturbances caused by fire, native forest insects and pathogens have interacted for millennia to create and maintain forests dominated by seral or pioneering species of conifers in the interior regions of the western United States and Canada. Changes in fire suppression and other factors in the last century...

Author(s): Thomas J. Parker, Karen M. Clancy, Robert L. Mathiasen

Year Published: 2006

Type: Document

Book or Chapter or Journal Article, Synthesis

Mastication: a fuel reduction and site preparation alternative

www.nrfirescience.org/resource/10959

During the fall of 2005, a study was conducted at Priest River Experimental Forest (PREF) in northern Idaho to investigate the economics of mastication used to treat activity and standing live fuels. In this study, a rotary head masticator was used to crush and chop activity fuels within harvest units on 37.07 acres. Production...

Author(s): Jeff Halbrook, Han-Sup Han, Russell T. Graham, Theresa B. Jain, Robert Denner

Year Published: 2006

Type: Document

Conference Proceedings

Wildlife and invertebrate response to fuel reduction treatments in dry coniferous forests of the Western United States: a synthesis

www.nrfirescience.org/resource/11192

This paper synthesizes available information on the effects of hazardous fuel reduction treatments on terrestrial wildlife and invertebrates in dry coniferous forest types in the West. We focused on thinning

and/or prescribed fire studies in ponderosa pine (*Pinus ponderosa*) and dry-type Douglas-fir (*Pseudotsuga menziesii*), lodgepole...

Author(s): David S. Pilliod, Evelyn L. Bull, Jane L. Hayes, Barbara C. Wales

Year Published: 2006

Type: Document

Synthesis, Technical Report or White Paper

Snow accumulation in thinned lodgepole pine stands, Montana, USA

www.nrfirescience.org/resource/8192

Alternative silvicultural treatments such as thinning can be used to restore forested watersheds and reduce wildfire hazards, but the hydrologic effects of these treatments are not well defined. We evaluated the effect of two shelterwood-with-reserve silvicultural prescriptions, one leaving residual trees evenly distributed (SE) and...

Author(s): Scott W. Woods, Robert S. Ahl, Jason Sappington, Ward W. McCaughey

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

Restoration treatment effects on the understory of ponderosa pine/Douglas-fir forests in western Montana, USA

www.nrfirescience.org/resource/7900

Fire exclusion and high-grade logging have altered the structure and function of ponderosa pine (*Pinus ponderosa*) forests across the American West. Restoration treatments are increasingly being used in these forests to move stand density, structure, and species composition toward more historically sustainable conditions. Yet little...

Author(s): Kerry L. Metlen, Carl E. Fiedler

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

Social science to improve fuels management: a synthesis of research relevant to communicating with homeowners about fuels management

www.nrfirescience.org/resource/15007

A series of syntheses were commissioned by the USDA Forest Service to aid in fuels mitigation project planning. This synthesis focuses on how managers can most effectively communicate with the public about fuels management efforts. It summarizes what is known about the techniques of persuasive communication programs and provides an...

Author(s): Martha C. Monroe, Lisa Pennisi, Sarah M. McCaffrey, Dennis Mileti

Year Published: 2006

Type: Document

Synthesis, Technical Report or White Paper

Estimation of biophysical characteristics for highly variable mixed-conifer stands using small-footprint lidar

www.nrfirescience.org/resource/8254

Although lidar data are widely available from commercial contractors, operational use in North America is still limited by both cost and the uncertainty of large-scale application and associated model accuracy issues. We analyzed whether small-footprint lidar data obtained from five noncontiguous geographic areas with varying...

Author(s): Jennifer L. Rooker Jensen, Karen S. Humes, Tamara Conner, Christopher Jason Williams, John DeGroot

Year Published: 2006
Type: Document
Book or Chapter or Journal Article

Developing statistical wildlife habitat relationships for assessing cumulative effects of fuels treatments - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11160

The primary weakness in our current ability to evaluate future landscapes in terms of wildlife lies in the lack of quantitative models linking wildlife to forest stand conditions, including fuels treatments. This project focuses on 1) developing statistical wildlife habitat relationships models (WHR) utilizing Forest Inventory and...

Author(s): Samuel A. Cushman, Kevin S. McKelvey

Year Published: 2006

Type: Document

Technical Report or White Paper

Wilderness fire management in a changing world

www.nrfirescience.org/resource/7963

Several strategies are available for reducing accumulated forest fuels and their associated risks, including naturally or accidentally ignited wildland fires, management ignited prescribed fires, and a variety of mechanical and chemical methods (Omi 1996). However, a combination of policy, law, philosophy, and logistics suggest...

Author(s): Carol Miller

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

Foliar moisture contents of North American conifers

www.nrfirescience.org/resource/11014

Foliar moisture content (FMC) is a primary factor in the canopy ignition process as surface fire transitions to crown fire. In combination with measured stand data and assumed environmental conditions, reasonable estimates of foliar moisture content are necessary to determine and justify silvicultural targets for canopy fuels...

Author(s): Christopher R. Keyes

Year Published: 2006

Type: Document

Conference Proceedings, Synthesis

FTM-West: fuel treatment market model for US West

www.nrfirescience.org/resource/10974

This paper presents FTM-West, a partial market equilibrium model designed to project future wood market impacts of significantly expanded fuel treatment programs that could remove trees to reduce fire hazard on forestlands in the U.S. West. FTM-West was designed to account for structural complexities in marketing and utilization...

Author(s): Peter J. Ince, Andrew Kramp, Henry Spelter, Kenneth E. Skog, Dennis P. Dykstra

Year Published: 2006

Type: Document

Conference Proceedings

Amount, position, and age of coarse wood influence litter decomposition in postfire Pinus

contorta stands

www.nrfirescience.org/resource/8222

Spatial variation in vegetation and coarse wood is a major source of forest heterogeneity, yet little is known about how this affects ecosystem processes. In 15-year-old postfire lodgepole pine (*Pinus contorta* var. *latifolia* Englem.) stands in Yellowstone National Park, Wyoming, we investigated how the decomposition rate varies with...

Author(s): Alysa J. Remsburg, Monica G. Turner

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

FTM-West model results for selected fuel treatment scenarios

www.nrfirescience.org/resource/10985

This paper evaluated potential forest product market impacts in the U.S. West of increases in the supply of wood from thinnings to reduce fire hazard. Evaluations are done using the Fuel Treatment Market-West model for a set of hypothetical fuel treatment scenarios, which include stand-density-index (SDI) and thin-from-below (TFB)...

Author(s): Andrew Kramp, Peter J. Ince

Year Published: 2006

Type: Document

Conference Proceedings

Financial analysis of fuel treatments on national forests in the Western United States

www.nrfirescience.org/resource/12020

The purpose of this note is to provide a starting point for discussion of fire hazard reduction treatments that meet the full range of management objectives, including budget priorities. Thoughtful design requires an understanding not only of the physical and biological outcomes, but also the costs and potential revenues of applying...

Author(s): Roger D. Fight, R. James Barbour

Year Published: 2006

Type: Document

Research Brief or Fact Sheet

Paying for hazardous fuel treatments with revenue from removed biomass

www.nrfirescience.org/resource/11079

We use Fuel Treatment Evaluator (FTE) 3.0 to estimate how many acres might be treated near three western communities (Pagosa Springs, Colorado; Hamilton, Montana; Colville, Washington) for which the value of biomass removed covers the treatment cost.

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

Year Published: 2006

Type: Document

Research Brief or Fact Sheet

Integrating fuel treatments into comprehensive ecosystem management

www.nrfirescience.org/resource/10973

To plan fuel treatments in the context of comprehensive ecosystem management, forest managers must meet multiple-use and environmental objectives, address administrative and budget constraints, and reconcile performance measures from multiple policy directives. We demonstrate a multiple criteria approach to measuring success of fuel...

Author(s): Kevin D. Hyde, J. Greg Jones, Robin P. Silverstein, Keith Stockmann, Dan R. Loeffler

Year Published: 2006

Type: Document
Conference Proceedings

Effects of slash, machine passes, and soil moisture on penetration resistance in a cut-to-length harvesting

www.nrfirescience.org/resource/7936

Multiple entries into forest stands are often needed for fire hazard reduction and ecosystem restoration treatments in the Inland Northwest U.S.A. region. However, soil compaction occurring from mechanized harvesting operations often remains for many years and may contribute to a decline in long-term site productivity. A controlled...

Author(s): Han-Sup Han, Deborah S. Page-Dumroese, S-K Han, Joanne M. Tirocke

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

Changes in downed wood and forest structure after prescribed fire in ponderosa pine forests

www.nrfirescience.org/resource/11002

Most prescribed fire plans focus on reducing wildfire hazards with little consideration given to effects on wildlife populations and their habitats. To evaluate effectiveness of prescribed burning in reducing fuels and to assess effects of fuels reduction on wildlife, we began a large-scale study known as the Birds and Burns Network...

Author(s): Victoria A. Saab, Lisa Bate, John F. Lehmkuhl, Brett G. Dickson, Scott Story, Stephanie Jentsch, William M. Block

Year Published: 2006

Type: Document

Conference Proceedings

Organizational characteristics that contribute to success in engaging the public to accomplish fuels management at the wilderness/non-wilderness interface

www.nrfirescience.org/resource/10984

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

Carbon storage on landscapes with stand-replacing fires

www.nrfirescience.org/resource/18456

Many conifer forests experience stand-replacing wildfires, and these fires and subsequent recovery can change the amount of carbon released to the atmosphere because conifer forests contain large carbon stores. Stand-replacing fires switch ecosystems to being a net source of carbon as decomposition exceeds photosynthesis—short...

Author(s): Daniel M. Kashian, William H. Romme, Daniel B. Tinker, Monica G. Turner, Michael G. Ryan

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

Snag longevity in relation to wildfire and postfire salvage logging

www.nrfirescience.org/resource/8142

Snags create nesting, foraging, and roosting habitat for a variety of wildlife species. Removal of snags through postfire salvage logging reduces the densities and size classes of snags remaining after wildfire. We determined important variables associated with annual persistence rates (the probability a snag remains standing from 1...

Author(s): Robin E. Russell, Victoria A. Saab, Jonathan G. Dudley, Jay J. Rotella

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

Estimating woody biomass supply from thinning treatments to reduce fire hazard in the US West

www.nrfirescience.org/resource/10995

This paper identifies timberland areas in 12 western states where thinning treatments (1) are judged to be needed to reduce fire hazard and (2) may 'pay for themselves' at a scale to make investment in forest product processing a realistic option. A web-based tool - Fuel Treatment Evaluator 3.0 - is used to select high-fire-hazard...

Author(s): Kenneth E. Skog, R. James Barbour

Year Published: 2006

Type: Document

Conference Proceedings

Estimating canopy fuel characteristics in five conifer stands in the western United States using tree and stand measurements

www.nrfirescience.org/resource/8128

Assessment of crown fire potential requires quantification of canopy fuels. In this study, canopy fuels were measured destructively on plots in five Interior West conifer stands. Observed canopy bulk density, canopy fuel load, and vertical profiles of canopy fuels are compared with those estimated from stand data using several...

Author(s): Elizabeth D. Reinhardt, Joe H. Scott, Kathy L. Gray, Robert E. Keane

Year Published: 2006

Type: Document

Book or Chapter or Journal Article

Two-aged silvicultural treatments in lodgepole pine stands can be economically viable

www.nrfirescience.org/resource/11103

Economically viable silvicultural options are critical for management activities that provide wood products, reduce forest fuels, improve forest health, and enhance wildlife habitat. The Tenderfoot Research Project was developed in the late 1990s to evaluate and quantify ecological and biological effects of two-aged silvicultural...

Author(s): Ward W. McCaughey, Steven J. Martin, Dean A. Blomquist

Year Published: 2006

Type: Document

Research Brief or Fact Sheet

Timber markets and fuel treatments in the western U.S.

www.nrfirescience.org/resource/7905

ANNOTATION: This paper presents a model of interrelated timber markets in the U.S. West to assess the impacts of large-scale fuel reduction programs on these markets, and concomitant effects of the market on the fuel reduction programs. The model maximizes area treated, given fire regime-condition

class priorities, maximum increases...

Author(s): Karen L. Abt, Jeffrey P. Prestemon

Year Published: 2006

Type: Document

Book or Chapter or Journal Article, Synthesis

Predicting cumulative watershed effects of fuel management with improved WEPP technology

www.nrfirescience.org/resource/8436

The increase in severe wildfires in recent years is due in part to an abundance of fuels in forests. In an effort to protect values at risk, and decrease the severity of wildfires, forest managers have embarked on a major program of fuel reduction. Past research has shown that such fuel reduction may have minimal impact at a...

Author(s): William J. Elliot, Joan Q. Wu

Year Published: 2005

Type: Document

Conference Proceedings

Predicting seasonal fuel moisture in the western United States using endmember fractions at multiple spatial and spectral resolutions

www.nrfirescience.org/resource/10998

Fuel moisture is one of the major components of fire risk assessment in the western United States. Regional and landscape fuel moisture estimates are currently derived from coarse resolution remotely sensed imagery without ground measurements to validate the estimates. Additionally, these estimates are determined using the...

Author(s): Jennifer L. Rechel, Seth H. Peterson, Dar A. Roberts, Jan W. van Wagtendonk

Year Published: 2005

Type: Document

Conference Proceedings

Stereo photo guide for estimating canopy fuel characteristics in conifer stands

www.nrfirescience.org/resource/11199

Stereo photographs, hemispherical photographs, and stand data are presented with associated biomass and canopy fuel characteristics for five Interior West conifer stands. Canopy bulk density, canopy base height, canopy biomass by component, available canopy fuel load, and vertical distribution of canopy fuel are presented for each...

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

Year Published: 2005

Type: Document

Technical Report or White Paper

Root diseases in coniferous forests of the Inland Northwest: potential implications of fuels treatments

www.nrfirescience.org/resource/11172

After nearly 100 years of fire exclusion, introduced pests, and selective harvesting, a change in forest composition has occurred in many Inland West forests of North America. This change in forest structure has frequently been accompanied by increases in root diseases and/or an unprecedented buildup of fuels. Consequently, many...

Author(s): Raini C. Rippey, Jane E. Stewart, Paul J. Zambino, Ned B. Klopfenstein, Joanne M. Tirocke, Mee-Sook Kim, Walter G. Thies

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

Testing transferability of willingness to pay for forest fire prevention among three states of California, Florida, and Montana

www.nrfirescience.org/resource/7960

The equivalency of willingness to pay between the states of California, Florida and Montana is tested. Residents in California, Florida and Montana have an average willingness to pay of \$417, \$305, and \$382 for prescribed burning program, and \$403, \$230, and \$208 for mechanical fire fuel reduction program, respectively. Due to wide...

Author(s): John B. Loomis, Le Trong Hung, Armando Gonzalez-Caban

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

Economics research unit explores biomass utilization opportunities on the Bitterroot National Forest

www.nrfirescience.org/resource/11100

Almost a million tons of biomass left over after thinning designed to reduce hazardous fuels and increase tree vigor, thus decreasing susceptibility to insects and disease, could provide significant small business opportunities in the Bitterroot Valley. Researchers with the Forest Service Economics Research Work Unit and the...

Author(s): David E. Calkin

Year Published: 2005

Type: Document

Research Brief or Fact Sheet

A strategic assessment of forest biomass and fuel reduction treatments in Western States

www.nrfirescience.org/resource/11197

This assessment characterizes, at a regional scale, forest biomass that can potentially be removed to implement the fuel reduction and ecosystem restoration objectives of the National Fire Plan for the Western United States. The assessment area covers forests on both public and private ownerships in the region and describes all...

Author(s): Robert B. Rummer, Jeffrey P. Prestemon, Dennis May, Patrick D. Miles, John Vissage, Ronald E. McRoberts, Greg C. Liknes, Wayne D. Shepperd, Dennis E. Ferguson, William J. Elliot, I. Sue Miller, Stephen E. Reutebuch, R. James Barbour, Jeremy S. Fried, Bryce J. Stokes, Edward M. Bilek, Kenneth E. Skog

Year Published: 2005

Type: Document

Technical Report or White Paper

The role of fire in structuring sagebrush habitats and bird communities

www.nrfirescience.org/resource/15408

Fire is a dominant and highly visible disturbance in sagebrush (*Artemisia* spp.) ecosystems. In lower elevation, xeric sagebrush communities, the role of fire has changed in recent decades from an infrequent disturbance maintaining a landscape mosaic and facilitating community processes to frequent events that alter sagebrush...

Author(s): Steve Knick, Aaron L. Holmes, Richard F. Miller

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

Characterizing and mapping forest fire fuels using ASTER imagery and gradient modeling

www.nrfirescience.org/resource/7925

Land managers need cost-effective methods for mapping and characterizing forest fuels quickly and accurately. The launch of satellite sensors with increased spatial resolution may improve the accuracy and reduce the cost of fuels mapping. The objective of this research is to evaluate the accuracy and utility of imagery from the...

Author(s): Michael J. Falkowski, Paul E. Gessler, Penelope Morgan, Andrew T. Hudak, Alistair M. S. Smith

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

Forest structure and fire hazard in dry forests of the Western United States

www.nrfirescience.org/resource/11163

ANNOTATION: This document synthesizes the relevant scientific knowledge that can assist fuel-treatment projects on national forests and other public lands and contribute to National Environmental Policy Act (NEPA) analyses and other assessments. It is intended to support science-based decision making for fuel management in dry...

Author(s): David L. Peterson, Morris C. Johnson, James K. Agee, Theresa B. Jain, Donald McKenzie, Elizabeth D. Reinhardt

Year Published: 2005

Type: Document

Synthesis, Technical Report or White Paper

Effect of alternative silvicultural treatments on snow accumulation in lodgepole pine stands, Montana, U.S.A.

www.nrfirescience.org/resource/8413

Alternative silvicultural treatments such as thinning can restore the productivity and diversity of forested watersheds and reduce wildfire hazards, but the hydrologic effects of these treatments are not well defined. We evaluated the effect of even thinning (SE) and group-retention thinning (SG), both with ~ 60 % basal area removal...

Author(s): Scott W. Woods, Ward W. McCaughey, Robert S. Ahl, Jason Sappington

Year Published: 2005

Type: Document

Conference Proceedings

Quantitative comparison of spectral indices and transformations of multi-resolution remotely sensed data using ground measurements: implications for fire severity modeling - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11156

The primary factor in estimating fire danger is fuel moisture. Fuel moisture varies seasonally and should be measured over an entire fire season using remote sensing technologies and verified using ground measurements. Recent advances in spaceborne and airborne imaging systems can potentially significantly improve the ability to...

Author(s): Jennifer L. Rechel, Dar A. Roberts

Year Published: 2005

Type: Document

Technical Report or White Paper

When to prescribe

www.nrfirescience.org/resource/11500

Prescribed fire can be the most practical and affordable way to reduce dangerous accumulations of combustible fuels. At the same time, prescribed fire can help restore the ecological process of fire to fire-adapted ecosystems through its influence on soil nutrients, growth and mortality of plants, seedling establishment and...

Author(s): Carol Miller

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

Social science to improve fuels management: a synthesis of research on assessing social acceptability of fuels treatments

www.nrfirescience.org/resource/15014

A series of syntheses were commissioned by the USDA Forest Service to aid in fuels mitigation project planning. This synthesis focuses on research for assessing the social acceptability of fuels treatments. The synthesis is structured around six important considerations for any social acceptability assessment: defining the fuels...

Author(s): Terry C. Daniel, Michael Valdiserri, Carrie R. Daniel, Susan C. Barro, Pamela J. Jakes

Year Published: 2005

Type: Document

Synthesis, Technical Report or White Paper

Photo series for major natural fuel types of the United States - Phase II -- Progress Report

www.nrfirescience.org/resource/11170

The natural fuels stereo photo series is a collection of geo-referenced data and photographs that display a range of natural conditions, fuel loadings, and other fuelbed characteristics in a wide variety of forest-, woodland-, shrub-, and grass-dominated ecosystem types. The photo series are useful tools for quickly and...

Author(s): Roger D. Ottmar

Year Published: 2005

Type: Document

Technical Report or White Paper

Basic principles of forest fuel reduction treatments

www.nrfirescience.org/resource/18976

Successful fire exclusion in the 20th century has created severe fire problems across the West. Not every forest is at risk of uncharacteristically severe wildfire, but drier forests are in need of active management to mitigate fire hazard. We summarize a set of simple principles important to address in fuel reduction treatments:...

Author(s): James K. Agee, Carl N. Skinner

Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Acceptability of smoke from prescribed forest burning in the northern inland west: a focus group approach

www.nrfirescience.org/resource/8393

Focus groups were used to gauge tolerance of smoke from broadcast prescribed forest burning in the wildland-urban interface of the northern Inland West. Focus group participants worked through issues surrounding prescribed burning as a management tool to determine if the origin of smoke made a difference in the acceptance of that...

Author(s): Brad R. Weisshaupt, Matthew S. Carroll, Keith A. Blatner, William D. Robinson, Pamela J. Jakes

Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Distribution of bark beetle attacks after whitebark pine restoration treatments: a case study

www.nrfirescience.org/resource/8366

Whitebark pine (*Pinus albicaulis* Engelm.), an important component of high elevation ecosystems in the western United States and Canada, is declining due to fire exclusion, white pine blister rust (*Cronartium ribicola* J.C. Fisch.), and mountain pine beetle (*Dendroctonus ponderosae* Hopkins). This study was conducted to evaluate the...

Author(s): Kristen M. Waring, Diana L. Six

Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Forest fuel management: a spatial decision-support system developed by RMRS provides forest managers with the tools to effectively remove a build-up of fuels while adhering to principles of ecological multiple-use...

www.nrfirescience.org/resource/8240

Forest fuel management: a spatial decision-support system developed by Rocky Mountain Research Station provides forest managers with the tools to effectively remove a build-up of fuels while adhering to principles of ecological multiple-use forest management and responding to public interests. Twentieth-century forest management...

Author(s): Judy M. Troutwine

Year Published: 2005
Type: Document
Book or Chapter or Journal Article

Stand establishment and tending in the inland northwest

www.nrfirescience.org/resource/11141

The moist, cold, and dry forests of the Inland Northwest occupy approximately 144 million acres. Ponderosa pine, lodgepole pine, western white pine, western larch, and Douglas-fir are usually the preferred commercial species of the area. These early-seral species are relatively resistant to endemic levels of insects and diseases....

Author(s): Russell T. Graham, Theresa B. Jain, Phil Cannon

Year Published: 2005
Type: Document
Technical Report or White Paper

Fire ecology of ponderosa pine and the rebuilding of fire-resilient ponderosa pine ecosystems

www.nrfirescience.org/resource/11074

The ponderosa pine ecosystems of the West have change dramatically since Euro-American settlement 140 years ago due to past land uses and the curtailment of natural fire. Today, ponderosa pine forests contain overabundance of fuel, and stand densities have increased from a range of 49-124 trees ha-1 (20-50 trees acre-1) to a range...

Author(s): Stephen A. Fitzgerald

Year Published: 2005

Type: Document

Conference Proceedings, Synthesis

Prescribed fire strategies to restore wildlife habitat in ponderosa pine forests of the intermountain west (birds and burns network) - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11400

The goal of this project was to help evaluate the effectiveness of prescribed fire in reducing fuels, and to assess the effects of fuel reduction on habitats and populations of birds in ponderosa pine forests throughout the Interior West. Known as the Birds and Burns Network, we have study areas located on National Forest and The...

Author(s): Victoria A. Saab, William M. Block

Year Published: 2005

Type: Document

Technical Report or White Paper

Application of free selection in mixed forests of the inland northwestern United States

www.nrfirescience.org/resource/7933

Forest management objectives continue to evolve as the desires and needs of society change. The practice of silviculture has risen to the challenge by supplying silvicultural methods and systems to produce desired stand and forest structures and compositions to meet these changing objectives. For the most part, the practice of...

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

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

Landscape fragmentation and forest fuel accumulation: effects of fragment size, age, and climate - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/12115

Landscape fragmentation can affect fuel accumulation, increase the spatial variability of fuel loads, and affect the susceptibility of forests to fire. Fragmentation creates a complex environment in which to manage forests in the United States and Puerto Rico and few studies have related the combined effects of fragmentation,...

Author(s): William A. Gould, Grizelle Gonzalez, Andrew T. Hudak

Year Published: 2005

Type: Document

Technical Report or White Paper

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

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

Estimating forest canopy bulk density using six indirect methods

www.nrfirescience.org/resource/7952

Canopy bulk density (CBD) is an important crown characteristic needed to predict crown fire spread, yet it is difficult to measure in the field. Presented here is a comprehensive research effort to evaluate six indirect sampling techniques for estimating CBD. As reference data, detailed crown fuel biomass measurements were taken on...

Author(s): Robert E. Keane, Elizabeth D. Reinhardt, Joe H. Scott, Kathy L. Gray, James J. Reardon

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

Prescribed fire for fuel reduction in northern mixed-grass prairie: influence on habitat and population dynamics of indigenous wildlife - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11171

Prescribed fire is used increasingly to reduce accumulated fuels on National Wildlife Refuges (NWRs) and other reserves in the mixed-grass prairie region of the northern Great Plains. There is sparse documentation, however, on effects of prescribed fire on habitat and population dynamics of wildlife in the region. This multi...

Author(s): Robert K. Murphy, Todd A. Grant, Elizabeth M. Madden

Year Published: 2005

Type: Document

Technical Report or White Paper

Social science to improve fuels management: a synthesis of research on collaboration

www.nrfirescience.org/resource/15016

A series of syntheses were commissioned by the USDA Forest Service to aid in fuels mitigation project planning. This synthesis focuses on collaboration research, and offers knowledge and tools to improve collaboration in the planning and implementation of wildland fire and fuels management projects. It covers a variety of topics...

Author(s): Victoria Sturtevant, Margaret Ann Moote, Pamela J. Jakes, Anthony S. Cheng

Year Published: 2005
Type: Document
Synthesis, Technical Report or White Paper

Changes in bird abundance after wildfire: importance of fire severity and time since fire

www.nrfirescience.org/resource/8256

Fire can cause profound changes in the composition and abundance of plant and animal species, but logistics, unpredictability of weather, and inherent danger make it nearly impossible to study high-severity fire effects experimentally. We took advantage of a unique opportunity to use a before-after/control-impact (BACI) approach to...

Author(s): Kristina M. Smucker, Richard L. Hutto, Brian M. Steele

Year Published: 2005

Type: Document

Book or Chapter or Journal Article

The use of Landsat 7 (ETM+) and AVIRIS data to map fuel characteristic classes in western ecosystems - Final Report to the Joint Fire Science Program

www.nrfirescience.org/resource/11174

Summary of Findings: (1) Satellite imagery has the potential to map fuel models at the national and local levels: (a) Landsat. The Landfire project has shown that Landsat 7 (ETM+) data are useful for mapping fuels at the national level. Critical to developing accurate maps are data collected in the field on fuels and vegetation. At...

Author(s): Jan W. van Wagendonk, Ralph Root, Carl H. Key

Year Published: 2005

Type: Document

Technical Report or White Paper

Social science to improve fuels management: a synthesis of research on aesthetics and fuels management

www.nrfirescience.org/resource/15009

A series of syntheses were commissioned by the USDA Forest Service to aid in fuels mitigation project planning. This synthesis focuses on research addressing aesthetic considerations of fuels management. A general finding is that fuels management activities can contribute to the visual quality of a landscape. Topics covered in the...

Author(s): Robert L. Ryan

Year Published: 2005

Type: Document

Synthesis, Technical Report or White Paper

Fuels planning: science synthesis and integration; economic uses fact sheet 1: mastication treatments and costs

www.nrfirescience.org/resource/14937

Mastication, or mulching, is a mechanical fuel treatment that changes the structure and size of fuels in the stand. This fact sheet describes the kinds of equipment available, where mastication should be used, and treatment factors affecting cost.

Author(s): Robert B. Rummer

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Thinning and prescribed fire and projected trends in wood product potential, financial return, and fire hazard in Montana

www.nrfirescience.org/resource/11177

This work was undertaken under a joint fire science project 'Assessing the need, costs, and potential benefits of prescribed fire and mechanical treatments to reduce fire hazard.' This paper compares the future mix of timber products under two treatment scenarios for the state of Montana. We developed and demonstrated an analytical...

Author(s): R. James Barbour, Roger D. Fight, Glenn A. Christensen, Guy L. Pinjuv, Rao V. Nagubadi

Year Published: 2004

Type: Document

Technical Report or White Paper

Fuels planning: science synthesis and integration; forest structure and fire hazard fact sheet 4: role of silviculture in fuel treatments

www.nrfirescience.org/resource/14955

The principal goals of fuel treatments are to reduce fireline intensities, reduce the potential for crown fires, improve opportunities for successful fire suppression, and improve forest resilience to forest fires. This fact sheet discusses thinning, and surface fuel treatments, as well as challenges associated with those treatments...

Author(s): Morris C. Johnson

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Evaluating the ASTER sensor for mapping and characterizing forest fire fuels in northern Idaho

www.nrfirescience.org/resource/8437

Land managers need cost-effective methods for mapping and characterizing fire fuels quickly and accurately. The advent of sensors with increased spatial resolution may improve the accuracy and reduce the cost of fuels mapping. The objective of this research is to evaluate the accuracy and utility of imagery from the Advanced...

Author(s): Michael J. Falkowski, Paul E. Gessler, Penelope Morgan, Alistair M. S. Smith, Andrew T. Hudak

Year Published: 2004

Type: Document

Conference Proceedings

Fuels planning: science synthesis and integration; forest structure and fire hazard fact sheet 1: forest structure and fire hazard overview

www.nrfirescience.org/resource/14953

Many managers and policy makers guided by the National Environmental Policy Act process want to understand the scientific principles on which they can base fuel treatments for reducing the size and severity of wildfires. These Forest Structure and Fire Hazard fact sheets discuss how to estimate fire hazard, how to visualize fuel...

Author(s): Kelly O'Brian

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Fuels planning: science synthesis and integration; social issues fact sheet 3: developing personal responsibility for fuels reduction: more ways to catch and hold people's attention

www.nrfirescience.org/resource/14950

Other fact sheets discuss the different types of information that are useful in explaining to property owners the importance of taking personal responsibility for fuels management on their land. However, for some property owners, new information is not enough-they may need more information in order to understand that change is...

Author(s): Martha C. Monroe, Lisa Pennisi

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Effectiveness of thinning and prescribed fire in reducing wildfire severity

www.nrfirescience.org/resource/11072

The severity of recent fire seasons in the US has provided dramatic evidence for the increasing complexity of wildfire problems. A wide variety of indicators suggest worsening dilemmas: area burned, funds expended, homes destroyed or evacuated, ecosystems at risk, and human fatalities/injuries all seem to be on the increase or have...

Author(s): Philip N. Omi, Erik J. Martinson

Year Published: 2004

Type: Document

Conference Proceedings, Synthesis, Technical Report or White Paper

Fuels planning: science synthesis and integration; environmental consequences fact sheet 8: evaluating sedimentation risks associated with fuel management

www.nrfirescience.org/resource/14946

This fact sheet describes the sources of sediment in upland forest watersheds in the context of fuel management activities. It presents the dominant forest soil erosion processes, and the principles behind the new sediment delivery interface developed to aid in erosion analysis of fuel management projects.

Author(s): William J. Elliot, Peter R. Robichaud

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Fuels planning: science synthesis and integration; environmental consequences fact sheet 6: wildland fire use: the 'other' treatment option

www.nrfirescience.org/resource/14944

Fire suppression has reduced acres burned to an average of 2 million acres a year. An unfortunate result of this has been the accumulation of even more above-normal fuel loads in many areas. This paper discusses (1) the important ecological role of fire, (2) using fire as a fuels treatment, and (2) the benefits and risks of fire.

Author(s): Anne E. Black

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Red Lodge, Montana: steps to improve community preparedness for wildfire

www.nrfirescience.org/resource/11104

This is a government publication outlining the steps to wildfire preparedness in Red Lodge, MT. The key features include homeowners' associations, which lead in fuel reduction around properties; USFS recreation residences, which conduct fuel reduction projects; evacuation plans and fuel breaks; regulations; and relationships, which...

Author(s): Victoria Sturtevant, Linda E. Kruger

Year Published: 2004

Type: Document
Research Brief or Fact Sheet

Restoring vigor and reducing hazard in an old growth western larch stand (Montana)

www.nrfirescience.org/resource/7926

Description not entered

Author(s): Carl E. Fiedler, Michael G. Harrington

Year Published: 2004

Type: Document

Book or Chapter or Journal Article

Fuels planning: science synthesis and integration; environmental consequences fact sheet 4: wildlife responses to fuels treatments: key considerations

www.nrfirescience.org/resource/14942

Managers face a difficult task in predicting the effects of fuels treatments on wildlife populations, mostly because information on how animals respond to fuels treatments is scarce or does not exist. This paper discusses key considerations-aspects of an animal's ecology and available information-that, despite the scarcity of...

Author(s): David S. Pilliod

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Fuels planning: science synthesis and integration; economic uses fact sheet 3: economic impacts of fuel treatments

www.nrfirescience.org/resource/14940

With increased interest in reducing hazardous fuels in dry inland forests of the American West, agencies and the public will want to know the economic impacts of fuel reduction treatments. This fact sheet discusses the economic impact tool, a component of My Fuel Treatment Planner, for evaluating economic impacts.

Author(s): Michael J. Niccolucci, Greg Alward

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Mapping relative fire regime condition class for the western United States

www.nrfirescience.org/resource/10991

In 1999, a coarse-scale map of Fire Regime Condition Classes (FRCC) was developed for the conterminous United States (US) to help address contemporary fire management issues and to quantify changes in fuels from historical conditions. This map and its associated data have been incorporated into national policies (National Fire Plan...

Author(s): James P. Menakis, Melanie Miller, Thomas Thompson

Year Published: 2004

Type: Document

Conference Proceedings

Fuels planning: science synthesis and integration; forest structure and fire hazard fact sheet 5: fuel treatment principles for complex landscapes

www.nrfirescience.org/resource/14956

Appropriate types of thinning and surface fuel treatments are clearly useful in reducing surface and

crown fire hazards under a wide range of fuels and topographic situations. This paper provides well-established scientific principles and simulation tools that can be used to adjust fuel treatments to attain specific risk levels.

Author(s): David L. Peterson, Sarah M. McCaffrey

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Analysis of algorithms for predicting canopy fuel

www.nrfirescience.org/resource/10958

We compared observed canopy fuel characteristics with those predicted by existing biomass algorithms. We specifically examined the accuracy of the biomass equations developed by Brown (1978). We used destructively sampled data obtained at 5 different study areas. We compared predicted and observed quantities of foliage and crown...

Author(s): Kathy L. Gray, Elizabeth D. Reinhardt

Year Published: 2004

Type: Document

Conference Proceedings

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

Mountains, fire, fire suppression, and the carbon cycle in the western United States

www.nrfirescience.org/resource/11044

Most mountain regions in the western United States are covered by forests, which are for the most part recovering from historical harvesting and have been experiencing active fire suppression over approximately the past 100 years (Tilman and others 2000). Whereas many western landscapes are currently perceived as pristine natural...

Author(s): David S. Schimel

Year Published: 2004

Type: Document

Technical Report or White Paper

Fuels planning: science synthesis and integration; social issues fact sheet 4: three critical topics to cover when talking about hazards

www.nrfirescience.org/resource/14952

The amount of science applicable to the management of wildfire hazards is increasing daily. In addition, the attitudes of landowners and policymakers about fire and fuels management are changing. This fact sheet discusses three critical keys to communicating about wildfire hazards.

Author(s): Dennis Mileti

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Fuels planning: science synthesis and integration; social issues fact sheet 2: developing personal responsibility for fuels reduction: types of information to encourage proactive behavior

www.nrfirescience.org/resource/14949

Fuels management responsibilities may include providing local property owners with the information for taking responsibility for reducing fuels on their land. This fact sheet discusses three different types of information that may be useful in programs to engage property owners in fuel reduction activities.

Author(s): Martha C. Monroe, Lisa Pennisi

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

A strategic assessment of crown fire hazard in Montana: potential effectiveness and costs of hazard reduction treatments

www.nrfirescience.org/resource/11181

Estimates of crown fire hazard are presented for existing forest conditions in Montana by density class, structural class, forest type, and landownership. Three hazard reduction treatments were evaluated for their effectiveness in treating historically fire-adapted forests (ponderosa pine (*Pinus ponderosa* Dougl. ex Laws.), Douglas-...

Author(s): Carl E. Fiedler, Charles E. Keegan, Christopher W. Woodall, Todd A. Morgan

Year Published: 2004

Type: Document

Technical Report or White Paper

Fuels planning: science synthesis and integration; environmental consequences fact sheet 2: First Order Fire Effects Model (FOFEM)

www.nrfirescience.org/resource/11098

FOFEM 5.2 is a simple, yet versatile computer program that predicts first order fire effects using text and graphic outputs. It can be used in a variety of situations including: determining acceptable upper and lower fuel moistures for conducting prescribed burns, determining the number of acres that may be burned on a given day...

Author(s): Steve Sutherland

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Fuels planning: science synthesis and integration; environmental consequences fact sheet 7: fire and weeds

www.nrfirescience.org/resource/14945

Weed infestations cause an economic loss of \$13 billion per year even though \$9.5 billion per year is spent on weed control measures. In addition to these economic costs, weeds are replacing native species, altering native plant and animal communities, affecting ecosystem health and function, threatening biodiversity and Threatened...

Author(s): Steve Sutherland

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

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

Strategic assessment of biofuels potential for the western U.S.

www.nrfirescience.org/resource/11210

ANNOTATION: This is a short summary of an effort addressing the technical feasibility of producing biofuels in the western United States is described using spatially explicit biomass resource supply curves, a detailed transportation network model for the region, and costs for converting biomass to refined biofuels. This paper...

Author(s): Craig Rawlings, Robert B. Rummer, Chuck Seeley, Craig E. Thomas, Dave Morrison, Han-Sup Han, Levi Cheff, Dave Atkins, Dean Graham, Keith Windell

Year Published: 2004

Type: Document

Technical Report or White Paper

Evaluating ASTER imagery and gradient modeling for mapping wildland fire fuels

www.nrfirescience.org/resource/11280

Land managers need cost-effective methods for mapping and characterizing fire fuels quickly and accurately. The advent of sensors with increased spatial resolution may improve the accuracy and reduce the cost of fuels mapping. The objective of this research is to evaluate the accuracy and utility of imagery from the Advanced...

Author(s): Michael J. Falkowski

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Fuels planning: science synthesis and integration; environmental consequences fact sheet 5: prescriptions and fire effects

www.nrfirescience.org/resource/14943

While our understanding of the causes for variation in postfire effects is increasing, burn prescriptions may not always include parameters that control the long-term heat pulse from fire. This paper discusses (1) fuel consumption and fire effects, (2) prescription design considerations, and (3) planning a prescribed fire.

Author(s): Melanie Miller

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Snags and Coarse Woody Debris: An Important Legacy of Forests in the Greater Yellowstone Ecosystem

www.nrfirescience.org/resource/18453

This chapter describes the snags and coarse woody debris (CWD) in the Greater Yellowstone Ecosystem. Severe forest fires, such as those that occurred in the Greater Yellowstone Ecosystem of 1988, create ephemeral forests of dead trees. For many people the trees are both an eyesore and a

waste of salvageable wood. Harvesting the wood...

Author(s): Daniel B. Tinker, Dennis H. Knight

Year Published: 2004

Type: Document

Book or Chapter or Journal Article

Fuels planning: science synthesis and integration; economic uses fact sheet 8: prescribed fire costs

www.nrfirescience.org/resource/14941

Although the use of prescribed fire as a management tool is widespread, there is great variability and uncertainty in the treatment costs. Given specific site variables and management objectives, how much will it cost to use prescribed fire? This paper describes the FASTRACS database, a tool that has been developed to aid managers...

Author(s): Geoffrey H. Donovan

Year Published: 2004

Type: Document

Research Brief or Fact Sheet

Research on stand management options for reducing fuels and restoring two-aged lodgepole pine communities on the Tenderfoot Creek Experimental Forest

www.nrfirescience.org/resource/11028

Fire-dependent lodgepole pine stands comprise significant acreages of mid and upper-elevation forests in the Northern Rockies, providing wood products, wildlife habitat, livestock forage, water, recreational opportunities, and expansive viewsheds. Many lodgepole pine stands are in late-successional stages and at risk to pests and...

Author(s): Ward W. McCaughey

Year Published: 2003

Type: Document

Conference Proceedings

Comparing potential fuel treatment trade-off models: initial results

www.nrfirescience.org/resource/8412

Understanding the trade-offs between short-term and long-term consequences of fire impacts on ecosystems is needed before a comprehensive fuels management program can be implemented nationally. We are evaluating 3 potential trade-off models at 8 locations in major U.S. fuel types. We present results of the initial testing of the 3...

Author(s): David R. Weise, Richard A. Kimberlin, Michael J. Arbaugh, Jimmie D. Chew, J. Greg Jones, James Merzenich, Marc R. Wiitala, Robert E. Keane, Mark D. Schaaf, Jan W. van Wagendonk

Year Published: 2003

Type: Document

Conference Proceedings

Establishment and growth of conifer regeneration following harvest and residue treatments in a western larch-Douglas-fir forest

www.nrfirescience.org/resource/13144

Forest managers often choose prescriptions that promote natural regeneration of various species that differ in relative shade tolerance. Assessing the response of forest vegetation to alternative treatments in the Inland Northwest is challenging, given that the process takes decades to unfold. In this study, conifer regeneration was...

Author(s): Sarah Jane Pierce

Year Published: 2003

Type: Document
Dissertation or Thesis

Performance of fuel treatments subjected to wildfires

www.nrfirescience.org/resource/11038

Fire severity was evaluated in eight recent wildfires with standardized methods in adjacent treated and untreated stands. Sampled sites occurred in a variety of conifer forests throughout the Western United States. Treatments included reduction of surface fuels and crown fuels, both in isolation and in combination. Synthesis of our...

Author(s): Erik J. Martinson, Philip N. Omi

Year Published: 2003

Type: Document

Conference Proceedings

Estimating live fuels for shrubs and herbs with BIOPAK

www.nrfirescience.org/resource/8175

ABSTRACT: This paper describes use of BIOPAK to calculate size classes of live fuels for shrubs and herbs. A library of equations to estimate such fuels in the Pacific Northwest and northern Rocky Mountains is presented and used in an example. These methods can be used in other regions if the user first enters fuel size-class...

Author(s): Carl E. Fiedler, Charles E. Keegan, Todd A. Morgan, Christopher W. Woodall

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

Combining simulation and optimization for evaluating the effectiveness of fuel treatments for four different fuel conditions at landscape scales

www.nrfirescience.org/resource/8431

The effectiveness of applying landscape level fuel treatments is analysed for four different landscape conditions by using both simulation and optimization. The four landscape conditions in the Bitterroot National Forest, Montana, represent a gradient of fuel conditions ranging from light, scattered, to heavy concentrated fuels....

Author(s): Jimmie D. Chew, J. Greg Jones, Christine Stalling, Janet Sullivan, Steve Slack

Year Published: 2003

Type: Document

Conference Proceedings

Using airborne laser altimetry to determine fuel models for estimating fire behavior

www.nrfirescience.org/resource/8348

Airborne laser altimetry provides an unprecedented view of the forest floor in timber fuel types and is a promising new tool for fuels assessments. It can be used to resolve two fuel models under closed canopies and may be effective for estimating coarse woody debris loads. A simple metric-obstacle density-provides the necessary...

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

Year Published: 2003

Type: Document

Book or Chapter or Journal Article

A collaborative fire hazard reduction/ecosystem restoration stewardship project in a Montana mixed ponderosa pine/Douglas-fir/western larch wildland-urban interface

www.nrfirescience.org/resource/11009

Forest Service managers and researchers designed and evaluated alternative disturbance-based fire hazard reduction/ecosystem restoration treatments in a greatly altered low-elevation ponderosa pine/Douglas-fir/western larch wildland urban interface. Collaboratively planned improvement cutting and prescribed fire treatment...

Author(s): Steve Slaughter, Laura Ward, Michael Hillis, Jimmie D. Chew, Becky McFarlan

Year Published: 2003

Type: Document

Conference Proceedings

Simulating fire hazard reduction, wood flows, and economics of fuel treatments with FVS, FEEMA, and FIA data

www.nrfirescience.org/resource/8432

This paper demonstrates protocols to analyze and illustrate trends in the long-term effects of repeated fire hazard reduction entries at broad state-level scales. The objectives of this analysis are to determine the effectiveness of two stand treatment options designed to immediately reduce and maintain lower wildfire hazards. Long-...

Author(s): Glenn A. Christensen, Roger D. Fight, R. James Barbour

Year Published: 2002

Type: Document

Conference Proceedings

Use of fire and silvicultural techniques for whitebark pine restoration successes, caveats, and assessment techniques

www.nrfirescience.org/resource/10982

Whitebark pine (*Pinus albicaulis*) is a keystone species in upper subalpine forests of many parts of the northern Rocky Mountains and Cascades in the United States and Canada. These diverse ecosystems have been declining in parts of its range because of recent mountain pine beetle (*Dendroctonus ponderosae*) and blister rust (...)

Author(s): Robert E. Keane, Katherine Kendall, Robert Crabtree

Year Published: 2002

Type: Document

Conference Proceedings

Effect of thinning and prescribed burning on crown fire severity in ponderosa pine forests

www.nrfirescience.org/resource/8121

Fire exclusion policies have affected stand structure and wildfire hazard in north American ponderosa pine forests. Wildfires are becoming more severe in stands where trees are densely stocked with shade-tolerant understory trees. Although forest managers have been employing fuel treatment techniques to reduce wildfire hazard for...

Author(s): Jolie Pollet, Philip N. Omi

Year Published: 2002

Type: Document

Book or Chapter or Journal Article

Bird counts of burned versus unburned big sagebrush sites

www.nrfirescience.org/resource/11090

Burned-over big sagebrush sites dominated by perennial grasses supported fewer species of birds and fewer total number of birds than sites of unburned big sagebrush sites.

Author(s): Bruce L. Welch

Year Published: 2002

Type: Document
Research Brief or Fact Sheet

Estimating canopy fuels in conifer forests

www.nrfirescience.org/resource/8403

Crown fires occur in a variety of coniferous forest types (Agee 1993), including some that are not historically prone to crown fire, such as ponderosa pine (Mutch and others 1993). The head fire spread rate of a crown fire is usually several times faster than that of a surface fire burning under the same conditions, which leads to a...

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

Year Published: 2002

Type: Document

Book or Chapter or Journal Article

Assessment of the line transect method: an examination of the spatial patterns of down and standing dead wood

www.nrfirescience.org/resource/13159

The line transect method, its underlying assumptions, and the spatial patterning of down and standing pieces of dead wood were examined at the Tenderfoot Creek Experimental Forest in central Montana. The accuracy of the line transect method was not determined due to conflicting results of t-tests and ordinary least squares...

Author(s): Duncan C. Lutes

Year Published: 2002

Type: Document

Conference Proceedings

Effects of disturbance and management of forest health on fish and fish habitat in eastern Oregon and Washington

www.nrfirescience.org/resource/18562

Effects of fire, forest insects and diseases, grazing, and forest health treatments on fish populations and habitat are reviewed. Fire, insects, and disease affect fish habitat by their influence on the rate and volume of woody debris recruitment to streams, canopy cover and water temperature, stream flow, channel erosion,...

Author(s): Phil Howell

Year Published: 2001

Type: Document

Book or Chapter or Journal Article

Manipulations to regenerate aspen ecosystems

www.nrfirescience.org/resource/11882

Vegetative regeneration of aspen can be initiated through manipulations that provide hormonal stimulation, proper growth environment, and sucker protection - the three elements of the aspen regeneration triangle. The correct course of action depends upon a careful evaluation of the size, vigor, age, and successional status of the...

Author(s): Wayne D. Shepperd

Year Published: 2001

Type: Document

Conference Proceedings

Can the fire-dependent whitebark pine be saved?

www.nrfirescience.org/resource/7927

In recent decades, whitebark pine has been declining due to epidemics and fire exclusion (Keane and Arno 1993; Kendall and Arno 1990). In the northern Rocky Mountains, a project is underway to explore the feasibility of using fire and silviculture to restore the tree's high-elevation habitat.

Author(s): Robert E. Keane

Year Published: 2001

Type: Document

Book or Chapter or Journal Article, Synthesis

Temporal and spatial dynamics of coarse woody debris in harvested and unharvested lodgepole pine forests

www.nrfirescience.org/resource/18452

Coarse woody debris (CWD) biomass was measured and mapped in burned, clearcut, and intact lodgepole pine forests in two areas of the Rocky Mountains of Wyoming: the Medicine Bow National Forest (MBNF) and Yellowstone National Park (YNP). In addition, the amount of CWD consumed or converted to charcoal by fire was estimated in a...

Author(s): Daniel B. Tinker, Dennis H. Knight

Year Published: 2001

Type: Document

Book or Chapter or Journal Article

Large woody debris in a headwater stream: long-term legacies of forest disturbance

www.nrfirescience.org/resource/18689

We excluded litter (leaves and wood) inputs to an Appalachian headwater stream for 5 years. Leaves disappeared from the streambed very rapidly (<1 year) following litter exclusion, however, a large residual mass of woody debris remained. After excluding inputs of leaf litter and wood to the stream for 3 years we removed all small...

Author(s): J. Bruce Wallace, Jackson R. Webster, Sue L. Eggert, Judy L. Meyer, Edward R. Siler

Year Published: 2001

Type: Document

Book or Chapter or Journal Article

The role of postfire coarse woody debris in aspen regeneration

www.nrfirescience.org/resource/18643

The paucity of aspen (*Populus tremuloides*) regeneration in the western United States and on Yellowstone National Park's (YNP) northern range has been of concern to managers and scientists for much of the 20th century, with the effects of ungulate browsing, climate fluctuation, and fire suppression being vigorously debated. We...

Author(s): William J. Ripple, Eric J. Larsen

Year Published: 2001

Type: Document

Book or Chapter or Journal Article

Alternative ponderosa pine restoration treatments in the western United States

www.nrfirescience.org/resource/8409

Compared to presettlement times, many ponderosa pine forest of the United States are now more dense and have greater quantities of fuels. Widespread treatments are needed in these forests to restore ecological integrity and to reduce the risk of uncharacteristically severe fires. Among possible restorative treatments, however, the...

Author(s): James D. Mclver, Charles P. Weatherspoon, Carleton B. Edminster

Year Published: 2001

Type: Document
Conference Proceedings

Post-fire runoff and erosion from rainfall simulation: contrasting forests with shrublands and grasslands

www.nrfirescience.org/resource/18566

Rainfall simulations allow for controlled comparisons of runoff and erosion among ecosystems and land cover conditions. Runoff and erosion can increase greatly following fire, yet there are few rainfall simulation studies for post-fire plots, particularly after severe fire in semiarid forest. We conducted rainfall simulations...

Author(s): Matthew P. Johansen, Thomas E. Hakonson, David D. Breshears

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

Coarse woody debris following fire and logging in Wyoming lodgepole pine forests

www.nrfirescience.org/resource/18451

The accumulation and decomposition of coarse woody debris (CWD) are processes that affect habitat, soil structure and organic matter inputs, and energy and nutrient flows in forest ecosystems. Natural disturbances such as fires typically produce large quantities of CWD as trees fall and break, whereas human disturbances such as...

Author(s): Daniel B. Tinker, Dennis H. Knight

Year Published: 2000

Type: Document

Book or Chapter or Journal Article

Silvicultural treatments

www.nrfirescience.org/resource/11891

Sustainable, ecologically-based management of pine/fir forests requires silviculturists to integrate several treatments that emulate historic disturbance processes. Restoration prescriptions typically include cleaning or heavy understory thinning, improvement cutting to reduce the proportion of firs, and modified selection cutting...

Author(s): Carl E. Fiedler

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

Associated riparian communities

www.nrfirescience.org/resource/10962

Some 100 years of fire exclusion in the Interior Northwest has resulted in riparian areas dominated by dense thickets of shade-tolerant trees. If former, more open conditions could be restored, these habitats could once more support a more diverse bird community. Efforts toward this at two study sites are described.

Author(s): Colin C. Hardy, Robert E. Keane, Michael G. Harrington

Year Published: 2000

Type: Document

Conference Proceedings

Ecosystem-based management in the lodgepole pine zone

www.nrfirescience.org/resource/10963

The significant geographic extent of lodgepole pine (*Pinus contorta*) in the interior West and the large proportion within the mixed-severity fire regime has led to efforts for more ecologically based management of lodgepole pine. New research and demonstration activities are presented that may provide knowledge and techniques to...

Author(s): Colin C. Hardy, Robert E. Keane, Catherine A. Stewart

Year Published: 2000

Type: Document

Conference Proceedings

Mixed-severity fire regimes in the Northern Rocky Mountains: consequences of fire exclusion and options for the future

www.nrfirescience.org/resource/8426

Findings from fire history studies have increasingly indicated that many forest ecosystems in the northern Rocky Mountains were shaped by mixed-severity fire regimes, characterized by fires of variable severities at intervals averaging between about 30 and 100 years. Perhaps because mixed-severity fire regimes and their resulting...

Author(s): Stephen F. Arno, David J. Parsons, Robert E. Keane

Year Published: 2000

Type: Document

Conference Proceedings, Synthesis

The Bitterroot Ecosystem Management Research Project: what we have learned, symposium proceedings; May 18-20, 1999; Missoula, MT

www.nrfirescience.org/resource/11890

The varied topics presented in these symposium proceedings represent the diverse nature of the Bitterroot Ecosystem Management Research Project (BEMRP). Separated into six sections, the papers cover the different themes researched by BEMRP collaborators as well as brief overviews of five other

ecosystem management projects. The...

Author(s): Helen Y. Smith

Year Published: 2000

Type: Document

Conference Proceedings

Effects of selection harvest and prescribed fire on the soil nitrogen status of ponderosa pine forests

www.nrfirescience.org/resource/8272

One hundred years of timber harvest and reduced fire frequency have resulted in the conversion of once open stands of ponderosa pine (*Pinus ponderosa*) forests to dense forests dominated by Douglas-fir (*Pseudotsuga menziesii*). Selection harvest and harvest with prescribed fire have been identified as possible tools to restore...

Author(s): Thomas H. DeLuca, Kristin L. Zouhar

Year Published: 2000

Type: Document

Book or Chapter or Journal Article

Ecosystem-based management in the whitebark pine zone

www.nrfirescience.org/resource/11892

Declining whitebark pine (*Pinus albicaulis*) forests have necessitated development of innovative methods to restore these ecologically valuable, high elevation ecosystems. We have begun an extensive restoration study using prescribed fire and silvicultural cuttings to return native ecological processes to degenerating whitebark pine...

Author(s): Robert E. Keane, Stephen F. Arno, Catherine A. Stewart

Year Published: 2000

Type: Document

Conference Proceedings

Ecosystem-based management at lower elevations

www.nrfirescience.org/resource/8423

Our experience testing ecosystem-based management (EM) treatments in ponderosa pine (*Pinus ponderosa*)/fir (*Abies* spp.) is summarized here. Topics covered include silvicultural treatments, fire application, soils and nutrient considerations, wildlife habitat considerations, associated riparian communities, and treatment of invasive...

Author(s): Stephen F. Arno

Year Published: 2000

Type: Document

Conference Proceedings

Synergy between ecological needs and economic aspects of ecosystem restoration

www.nrfirescience.org/resource/11050

The implementation of properly designed treatments to restore and sustain desired forest conditions in the Inland Northwest, besides moving forest stands more rapidly to an ecologically desirable and sustainable condition, can generate positive revenues from the timber to be removed. These treatments also have potential to increase...

Author(s): Charles E. Keegan, Carl E. Fiedler

Year Published: 2000

Type: Document

Technical Report or White Paper

An overview of the fire and fuels extension to the forest vegetation simulator

www.nrfirescience.org/resource/11037

The Fire and Fuels Extension (FFE) to the Forest Vegetation Simulator (FVS) has been developed to assess the risk, behavior, and impact of fire in forest ecosystems. This extension to the widely-used stand-dynamics model FVS simulates the dynamics of snags and surface fuels as they are affected by stand management (of trees or fuels...

Author(s): Sarah J. Beukema, Elizabeth D. Reinhardt, Werner A. Kurz, Nicholas L. Crookston

Year Published: 2000

Type: Document

Conference Proceedings

The Fire and Fire Surrogates Study: providing guidelines for fire in future forest watershed management decisions

www.nrfirescience.org/resource/8434

As part of the 1998 Joint USDA/USDI Fire Science Program, the Fire and Fire Surrogates Study was proposed to establish and evaluate cross-comparisons of fuels treatment practices and techniques to reduce wildfire risk. This study evaluates prescribed fire, thinning, and various mechanical treatment methods for treating, removing, or...

Author(s): Carleton B. Edminster, Charles P. Weatherspoon, Daniel G. Neary

Year Published: 2000

Type: Document

Conference Proceedings

Fire applications in ecosystem management

www.nrfirescience.org/resource/10965

Decades of fire absence from ponderosa pine/Douglas fir forests has resulted in overstocked, unhealthy, and severe fireprone stands requiring management attention. Prescribed fire can be used in three general situations during restoration management. First is when fuel loadings are excessive from either natural accumulation or...

Author(s): Michael G. Harrington

Year Published: 2000

Type: Document

Conference Proceedings

Prefire heterogeneity, fire severity and plant reestablishment in subalpine forests of Yellowstone National Park, Wyoming

www.nrfirescience.org/resource/18423

The 1988 fires in Yellowstone National Park provided an opportunity to study effects of a large infrequent disturbance on a natural community. This study addressed two questions: (1) How does prefire heterogeneity of the landscape affect postfire patterns of fire severity? and (2) How do postfire patterns of burn severity influence...

Author(s): Monica G. Turner, William H. Romme, Robert H. Gardner

Year Published: 1999

Type: Document

Book or Chapter or Journal Article

Fire hazard and potential treatment effectiveness: a statewide assessment in Montana

www.nrfirescience.org/resource/8174

This assessment of Montana used data collected from Forest Inventory and Analysis (FIA) plots across Montana and summarized by forest type, density, and structure. The focus of the analysis was on

ponderosa pine/Douglas fir/ dry mixed conifer forests that had historically seen low-intensity fires.

Applying the Fire and Fuels...

Author(s): Carl E. Fiedler, Charles E. Keegan, Daniel P. Wichman, Stephen F. Arno

Year Published: 1999

Type: Document

Book or Chapter or Journal Article

Use of the helitorch to enhance diversity on riparian corridors in mature pinyon-juniper communities: a conceptual approach

www.nrfirescience.org/resource/12109

As pinyon-juniper have increased their dominance throughout the Great Basin, other perennial plants have declined in abundance. Riparian areas traditionally have the greatest biodiversity found in the region. The increase of pinyon-juniper can generally be attributed to a change in the disturbance regime. To increase the plant...

Author(s): G. Allen Rasmussen, Robin J. Tausch, Stephen C. Bunting

Year Published: 1999

Type: Document

Conference Proceedings

Applying simulation and optimization to plan fuel treatments at landscape scales

www.nrfirescience.org/resource/11067

Fuel treatment activities are analyzed at the landscape scale by using both simulation and optimization. Simulating vegetative patterns and processes at landscape scales (SIMPPLLE), a stochastic simulation modeling system, is initially applied to assess wildfire risks on the current landscape without management treatments but with...

Author(s): J. Greg Jones, Jimmie D. Chew, Hans R. Zuuring

Year Published: 1999

Type: Document

Conference Proceedings, 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

Miller Creek Demonstration Forest - A forest born of fire: a field guide

www.nrfirescience.org/resource/11239

Miller Creek, on the Flathead National Forest in northwest Montana, is a demonstration forest, showing up to 30 years of forest change after clearcutting and a wide range of fire treatments in 1967 and 1968. Differences in tree regeneration and vegetation development are explained for units that were clearcut and prescribed burned,...

Author(s): Penelope A. Latham, Raymond C. Shearer, Kevin L. O'Hara

Year Published: 1998

Type: Document

Technical Report or White Paper

Modeling effects of prescribed fire on wildlife habitat: stand structure, snag recruitment and coarse woody debris

www.nrfirescience.org/resource/11027

Tenderfoot Creek Experimental Forest is used as a case study to model the effects of prescribed fire and silvicultural treatments on stand structure, snag recruitment, and coarse woody debris. The Forest Vegetation Simulator (FVS) and the Fire and Fuels Extension simulate the effects of the following treatment prescriptions:...

Author(s): Colin C. Hardy, Elizabeth D. Reinhardt

Year Published: 1998

Type: Document

Conference Proceedings

Fuel reduction in residential and scenic forests: a comparison of three treatments in a western Montana ponderosa pine stand

www.nrfirescience.org/resource/11242

Three contrasting thinning treatments to reduce fire hazard were implemented in a 100-year-old ponderosa pine/Douglas-fir (*Pinus ponderosa*/*Pseudotsuga menziesii*) stand on the Lolo National Forest, MT. All treatments included a commercial thinning designed to reduce crown fuels and provide revenue to offset costs. The treatments are...

Author(s): Joe H. Scott

Year Published: 1998

Type: Document

Technical Report or White Paper

Appendix A - Biological assessment, TCEF research project for Lewis and Clark National Forest

www.nrfirescience.org/resource/11505

An environmental analysis has been prepared which describes and evaluates the management alternatives for the timber harvest and burning within the Tenderfoot Creek Experimental Forest (TCEF) project area. The project area lies within the headwaters of the Tenderfoot drainage of the Lewis and Clark National Forest. The purpose of...

Author(s): Donald Godtel

Year Published: 1998

Type: Document

Management or Planning Document

Effects of slash pile burning on the physical and chemical soil properties of Vassar soils

www.nrfirescience.org/resource/13125

To determine the initial effects of slash pile burning on chemical and physical properties in the Vassar soil series, mineral soil samples from two depths (2.5 cm and 12.5 cm) were collected before and after burning slash piles of four fuel loadings (0.5 m, 1 m, 2 m and 3 m) over wet and dry soils, as well as from burned and...

Author(s): Brian P. Oswald, Douglas Davenport, Leon F. Neuenschwander

Year Published: 1998

Type: Document

Book or Chapter or Journal Article

Reduce fire hazards in ponderosa pine by thinning

www.nrfirescience.org/resource/8148

Forest stands of fire-dependent ponderosa pine cover about 40 million acres (16 million ha) in the

Western United States. Ponderosa pine is commonly found in pure stands on dry sites, but in more moist conditions, it is associated with Douglas-fir, lodgepole pine, western larch, and others.

Historically, these were often widely...

Author(s): Joe H. Scott

Year Published: 1998

Type: Document

Book or Chapter or Journal Article

Environmental assessment: Tenderfoot Creek Experimental Forest - Vegetative treatment research project, Kings Hill Ranger District, Lewis and Clark National Forest, Meagher County, Montana

www.nrfirescience.org/resource/11513

Environmental assessment of the Tenderfoot Research Project. This research project proposes to harvest timber in two treatment subwatersheds, Spring Park Creek and Sun Creek. The silvicultural system proposed is a two-aged system termed 'shelterwood with reserves,' that uses even distribution of single or small groups and uneven...

Author(s): Gloria E. Flora, Ward W. McCaughey

Year Published: 1998

Type: Document

Management or Planning Document

Methods for the quantification of coarse woody debris and an examination of its spatial patterning: a study from the Tenderfoot Creek Experimental Forest, MT.

www.nrfirescience.org/resource/13157

Methods for the quantification of coarse woody debris volume and the description of spatial patterning were studied in the Tenderfoot Creek Experimental Forest, Montana. The line transect method was found to be an accurate, unbiased estimator of down debris volume (>10cm diameter) on ½ hectare fixed area plots, when...

Author(s): Paul B. Alaback, Duncan C. Lutes

Year Published: 1997

Type: Document

Technical Report or White Paper

Restoring fire in lodgepole pine forests of the Intermountain West

www.nrfirescience.org/resource/8347

We are developing new management treatments for regenerating and sustaining lodgepole pine (*Pinus contorta*) forests through emulation of natural disturbance processes. Lodgepole pine is the principal forest cover on over 26 million hectares in western North America. While infrequent, stand replacing fires following mountain pine...

Author(s): Colin C. Hardy, Ward W. McCaughey

Year Published: 1997

Type: Document

Book or Chapter or Journal Article

Managerial and institutional factors affect prescribed burning costs

www.nrfirescience.org/resource/7931

Prescribed burning costs are extremely variable, even if conditions are similar. This variability complicates planning and evaluation of prescribed burning programs and budgets, resulting in imprecise projections of their economic benefits. Evaluating the worth of prescribed burning efforts in objective terms is difficult, but the...

Author(s): Armando Gonzalez-Caban

Year Published: 1997
Type: Document
Book or Chapter or Journal Article

Silvicultural applications: restoring ecological structure and process in ponderosa pine forests

www.nrfirescience.org/resource/11246

A primary goal of restoration treatments in ponderosa pine (*Pinus ponderosa*)/fir forests is to create more open stand structures, thereby improving tree vigor and reducing vulnerability to insects, disease, and severe fire. An additional goal in some stands is to manipulate existing species composition and site conditions to favor...

Author(s): Carl E. Fiedler
Year Published: 1996
Type: Document
Technical Report or White Paper

Harvesting cost model for small trees in natural stands in the interior northwest

www.nrfirescience.org/resource/11209

Data from numerous published studies were combined to estimate the costs of harvesting small trees in natural stands in the Interior Northwest of North America. This article discusses cost estimates for harvesting small trees in natural stands in the Interior Northwest of North America. The cost relationships for six harvesting...

Author(s): Colin C. Hardy
Year Published: 1996
Type: Document
Technical Report or White Paper

Prescribed fire applications: restoring ecological structure and process in ponderosa pine forests

www.nrfirescience.org/resource/11247

The decision to include the fire process as part of a restoration treatment for a particular forest site is most logically made in conjunction with the decision for a silvicultural treatment. In other words, forest managers do not typically wait to visually or quantitatively evaluate the post harvest site before deciding whether or...

Author(s): Michael G. Harrington
Year Published: 1996
Type: Document
Technical Report or White Paper

The role of fire in Research Natural Areas in the Northern Rockies and Pacific Northwest

www.nrfirescience.org/resource/11244

Forest Service Research Natural Areas are established to preserve examples of all significant natural ecosystems for comparison with those influenced and/or managed by humans, to provide educational and research areas for ecological and environmental studies, and to preserve gene pools for typical and rare and endangered species....

Author(s): Sarah E. Greene, Angela Evenden
Year Published: 1996
Type: Document
Technical Report or White Paper

Wildfire and salvage logging: recommendations for ecologically sound post-fire salvage logging

and other post-fire treatments on federal lands in the West

www.nrfirescience.org/resource/18495

From the text: 'This paper offers a scientific framework of principles and practices that are provided to guide development of federal policy concerning wildfire and salvage logging and other post-fire treatments. A common thread throughout the -recommendations is that most native species are adapted to natural patterns and...

Author(s): R.L. Beschta, Christopher A. Frissell, R. Gresswell, R. Hauer, James R. Karr, G. Wayne Minshall, David A. Perry, Jonathan J. Rhodes

Year Published: 1995

Type: Document

Technical Report or White Paper

Restoring fire-dependent ponderosa pine forests in western Montana

www.nrfirescience.org/resource/13364

Many foresters and ecologists recognize that disruption of the historic pattern of frequent fires in ponderosa pine forests has resulted in major ecological changes, including increasingly severe wildfires and insect and disease epidemics (Weaver, 1943; Covington and Moore, 1992; Mutch and others, 1993; Everett, 1994). In response...

Author(s): Stephen F. Arno, Michael G. Harrington, Carl E. Fiedler, Clinton E. Carlson

Year Published: 1995

Type: Document

Book or Chapter or Journal Article

Movement and characteristics of stream-borne coarse woody debris in adjacent burned and undisturbed watersheds in Wyoming

www.nrfirescience.org/resource/18694

Following fire, changes in streamflow and bank stability in burned watersheds can mobilize coarse woody debris. In 1990 and 1991, I measured characteristics of coarse woody debris and standing riparian trees and snags in Jones Creek, a watershed burned in 1988, and in Crow Creek, an unburned watershed. The mean diameter of riparian...

Author(s): Michael K. Young

Year Published: 1994

Type: Document

Book or Chapter or Journal Article

Prescribed burning considerations in sagebrush annual grassland communities

www.nrfirescience.org/resource/12152

Prescribed burning can be an effective tool to manage sagebrush grasslands. However, burning prescriptions for sagebrush grasslands vary depending on the management objectives, species composition of the community, and location. To develop successful fire prescriptions in these communities, consideration must first be given to the...

Author(s): G. Allen Rasmussen

Year Published: 1994

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

Natural revegetation of burned and unburned clearcuts in western larch forests of northwest Montana

www.nrfirescience.org/resource/12028

In 1967 and 1968, seven south- and east-facing units, averaging 4-ha each, in a western larch forest of northwest Montana were (1) clearcut and burned by prescribed fire or wildfire, (2) clearcut and unburned, or (3) uncut and burned by wildfire. More than 20 years of forest succession data from permanent transects show that fire...

Author(s): Raymond C. Shearer, Peter F. Stickney

Year Published: 1991

Type: Document

Technical Report or White Paper

User's guide to version 2 of the Regeneration Establishment Model: part of the Prognosis Model

www.nrfirescience.org/resource/11148

Version 2 of the Regeneration Establishment Model is part of version 6 of the Prognosis Model for Stand Development. The regeneration model predicts results of regeneration harvests for most site and stand conditions found in the Northern Rocky Mountains. The model is based on analysis of 12,128 1/300-acre plots sampled in forests...

Author(s): Dennis E. Ferguson, Nicholas L. Crookston

Year Published: 1991

Type: Document

Technical Report or White Paper

Woody fuel and duff consumption by prescribed fire in northern Idaho mixed conifer logging slash

www.nrfirescience.org/resource/11966

Describes results of prescribed burning 36 plots in northern Idaho mixed conifer logging slash. Fuel characteristics and methods for predicting duff and woody fuel consumption are reported. Guidelines are included for developing fire prescriptions.

Author(s): Elizabeth D. Reinhardt

Year Published: 1991

Type: Document

Technical Report or White Paper

Twenty-year natural regeneration following five silvicultural prescriptions in spruce-fir forests of the intermountain west

www.nrfirescience.org/resource/11965

No single combination of five cutting-site preparation treatments resulted in superior natural regeneration in spruce-fir stands in Wyoming, Utah, and Idaho. Best results were generally obtained by partial cutting, with minimal disturbance of litter and organic matter, especially on harsh, high-elevation sites. Most sites remained...

Author(s): Ward W. McCaughey, Carl E. Fiedler, Wyman C. Schmidt

Year Published: 1991

Type: Document

Technical Report or White Paper

Role of refugia in recovery from disturbances: modern fragmented and disconnected river systems

www.nrfirescience.org/resource/18661

Habitats or environmental factors that convey spatial and temporal resistance and/or resilience to biotic communities that have been impacted by biophysical disturbances may be called refugia. Most refugia in rivers are characterized by extensive coupling of the main channel with adjacent streamside forests, floodplain features, and...

Author(s): James R. Sedell, Gordon H. Reeves, F. Richard Hauer, Jack A. Stanford

Year Published: 1990

Type: Document

Book or Chapter or Journal Article

Silvicultural management alternatives for whitebark pine

www.nrfirescience.org/resource/19287

Whitebark pine (*Pinus albicaulis*) has received little management emphasis except in the past 10 years. Silvicultural treatment of whitebark pine is starting to draw increased interest as attention is focused on the species and its potential management. The objective of this paper is to summarize what is currently known about the...

Author(s): Douglas E. Eggers

Year Published: 1990

Type: Document

Conference Proceedings

Predicting equilibrium moisture content of some foliar forest litter in the northern Rocky Mountains

www.nrfirescience.org/resource/11964

Forest foliage that comprises much of the forest floor litter has higher equilibrium moisture content, EMC, than woody components. The EMC's at 300 °K were found to increase as follows: grasses...

Author(s): Hal E. Anderson

Year Published: 1990

Type: Document

Technical Report or White Paper

Streamflow and water quality responses to preharvest prescribed burning in an undisturbed ponderosa pine watershed

www.nrfirescience.org/resource/18551

[from the text] Forest history studies (Arno 1980, Dieterich 1983) indicate that before fire suppression was initiated at the start of this century, most forest fires were surface fires. These fires reduced fire hazards and improved stand conditions by preparing seedbeds, thinning advance regeneration, and retarding the invasion of...

Author(s): Gerald J. Gottfried, Leonard F. DeBano

Year Published: 1990

Type: Document

Conference Proceedings

Vegetation response to helicopter logging and broadcast burning in Douglas-fir habitat types at Silver Creek, central Idaho

www.nrfirescience.org/resource/11963

Shrub frequency, cover, and height, and herb frequency and cover were measured on plots from two

Douglas-fir habitat types in three cutting units. The plots were measured prior to helicopter yarding and broadcast burning and then 1, 2, 5, and 10 years later. The broadcast burning was more severe on one cutting unit than the other...

Author(s): Kathy Geier-Hayes

Year Published: 1989

Type: Document

Technical Report or White Paper

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

Effects of fire in the northern Great Plains

www.nrfirescience.org/resource/11184

Fire has been used inconsistently to manage native and tame grasslands in the Northern Great Plains (NGP) of the north-central U.S. and south-central Canada, particularly the grasslands found in prairies, plains, agricultural land retirement programs, and moist soil sites. This has happened for three primary reasons: (1) the...

Author(s): Kenneth F. Higgins, Arnold D. Kruse, James L. Piehl

Year Published: 1989

Type: Document

Synthesis, Technical Report or White Paper

Protecting people and homes from wildfire in the interior West: proceedings of the symposium and workshop

www.nrfirescience.org/resource/11968

Includes 25 invited papers and panel discussions, 6 workshop reports, and 15 poster papers that focus on the escalating problem of wildfire in wildland residential areas throughout the western United States and Canada.

Author(s): William C. Fischer, Stephen F. Arno

Year Published: 1988

Type: Document

Conference Proceedings, Technical Report or White Paper

Guide to understory burning in ponderosa pine-larch-fir forests in the Intermountain West

www.nrfirescience.org/resource/11255

Summarizes the objectives, prescriptions, and techniques used in prescribed burning beneath the canopy of ponderosa pine stands, and stands of ponderosa pine mixed with western larch, Douglas-fir, and grand fir. Information was derived from 12 districts in two USDA Forest Service Regions and seven National Forests in Montana and...

Author(s): Bruce M. Kilgore, George A. Curtis

Year Published: 1987

Type: Document

Technical Report or White Paper

Use of prescribed burning in juniper and pinyon-juniper woodlands

www.nrfirescience.org/resource/12118

Postfire succession in juniper and pinyon-juniper is primarily dependent upon the potential of the site, the preburn plant community and the characteristics of the fire. The successful use of prescribed burning is dependent upon the appropriate selection of treatment sites. As juniper and pinyon become more dominant on a site, the...

Author(s): Stephen C. Bunting

Year Published: 1987

Type: Document

Conference Proceedings, Technical Report or White Paper

Using prescribed fire to reduce the risk of large wildfires: a break-even analysis

www.nrfirescience.org/resource/11397

Nearly all wildfires are extinguished when they are still small. The 3-5% that get out of control cause 95% of all wildfire-related costs and damages (Dodge 1972, Wilson 1985). There are two ways to deal with these problem fires. One practice is to limit fire by suppressing fires as soon as possible after they are detected....

Author(s): James M. Saveland

Year Published: 1987

Type: Document

Conference Proceedings

Guidelines for prescribed burning sagebrush-grass rangelands in the northern Great Basin

www.nrfirescience.org/resource/11256

Summarizes recent literature on the effects of fire on sagebrush-grass vegetation. Also outlines procedures and considerations for planning and conducting prescribed fires and monitoring effects. Includes a comprehensive annotated bibliography of the fire-sagebrush-grass literature published since 1980.

Author(s): Stephen C. Bunting, Bruce M. Kilgore, Charles L. Bushey

Year Published: 1987

Type: Document

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

Site treatments influence development of a young mixed-species western larch stand

www.nrfirescience.org/resource/13136

More intensive management could be applied to many young stands in conifer forests of the Northern Rockies. Vast areas are stocked with stands that contain a mixture of conifer species. An important mixed species cover type in this region is the western larch type (formerly called the larch-Douglas-fir type...

Author(s): Dennis M. Cole, Wyman C. Schmidt

Year Published: 1986

Type: Document

Technical Report or White Paper

Prescribed fire opportunities in grasslands invaded by Douglas-fir: state-of-the-art guidelines

www.nrfirescience.org/resource/11259

Provides information on use of prescribed fire to enhance productivity of bunchgrass ranges that have been invaded by Douglas-fir. Six vegetative "situations" representative of treatment opportunities most commonly encountered in Montana are discussed. Included are fire prescription considerations and identification of the resource...

Author(s): George E. Gruell, James K. Brown, Charles L. Bushey

Year Published: 1986

Type: Document

Technical Report or White Paper

Fire, logging, and white-tailed deer interrelationships in the Swan Valley, northwestern Montana

www.nrfirescience.org/resource/11056

The historical importance of fire was investigated on the upper Swan Valley winter white-tailed deer range in northwestern Montana. The relatively recent impacts of logging on winter range quality were also included in these studies. Fire exclusion has led to successional development of once open-canopied mature seral forests, and...

Author(s): June D. Freedman, James R. Habeck

Year Published: 1985

Type: Document

Conference Proceedings, Technical Report or White Paper

A summary of ponderosa pine (*Pinus ponderosa*) management activities in the Lick Creek Drainage of the Bitterroot National Forest

www.nrfirescience.org/resource/13371

The objective of thesis was to summarize 80 years of changes associated with several cutting regimes in the Lick Creek Drainage. The Lick Creek Drainage was first selectively cut in 1906, followed by several commercial and precommercial thinnings occurring in the late 1950's through the early 1980's. Permanent...

Author(s): James P. Menakis

Year Published: 1985

Type: Document

Dissertation or Thesis

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

Photo guide for appraising downed woody fuels in Montana forests: lodgepole pine and Engelmann spruce - subalpine fir cover types

www.nrfirescience.org/resource/11262

Two series of color photographs show different levels of downed woody material resulting from natural processes in two forest cover types in Montana. Each photo is supplemented by fuel inventory data and potential fire- behavior ratings.

Author(s): William C. Fischer

Year Published: 1981

Type: Document

Technical Report or White Paper

Intensive utilization with conventional harvesting systems

www.nrfirescience.org/resource/11130

ANNOTATION: Forest residues utilization research has included case studies of the efficiency of existing harvesting systems in achieving close fiber utilization. Field evaluations included the use of in-woods chipping systems in gentle terrain; crawler skidder systems in gentle terrain; and skyline systems in steep terrain. In each...

Author(s): Roland L. Barger, Robert E. Benson

Year Published: 1981

Type: Document

Conference Proceedings, Technical Report or White Paper

Photo guide for appraising downed woody fuels in Montana forests: Interior ponderosa pine, ponderosa pine - larch - Douglas-fir, larch - Douglas-fir, and interior Douglas-fir cover types

www.nrfirescience.org/resource/11263

Four series of color photographs show different levels of downed woody material resulting from natural processes in four forest cover types in Montana. Each photo is supplemented by fuel inventory data and potential fire behavior ratings.

Author(s): William C. Fischer

Year Published: 1981

Type: Document

Technical Report or White Paper

Residue characteristics in the Northern Rocky Mountains

www.nrfirescience.org/resource/11131

ANNOTATION: In the northern Rocky Mountains, 350-450 million cubic feet (9.9 to 12.7 million cubic meters) of logging residue is generated each year. Up to 60 percent of the residue material is technologically suitable for wood products, but condition, size and product potential vary among forest

types. Other factors which influence...

Author(s): Robert E. Benson, Joyce A. Schlieter

Year Published: 1981

Type: Document

Conference Proceedings, Technical Report or White Paper

Photo guides for appraising downed woody fuels in Montana forests: how they were made

www.nrfirescience.org/resource/11101

Eight series of color photographs have been published as three separate photo guides for appraising downed woody fuels in Montana forests. This note tells how these photo guides were constructed. The techniques used to determine the weight and size class distribution of downed woody fuels are given.

The procedure used to rate...

Author(s): William C. Fischer

Year Published: 1981

Type: Document

Research Brief or Fact Sheet

Photo guide for appraising downed woody fuels in Montana forests: Grand fir - larch - Douglas-fir, western hemlock, western redcedar - western hemlock, and western redcedar cover types

www.nrfirescience.org/resource/11264

Four series of color photographs show different levels of downed woody material resulting from natural processes in four forest cover types in Montana. Each photo is supplemented by fuel inventory data and potential fire behavior ratings.

Author(s): William C. Fischer

Year Published: 1981

Type: Document

Technical Report or White Paper

Downed and dead woody fuel and biomass in the northern Rocky Mountains

www.nrfirescience.org/resource/11881

Weights and volumes of downed woody material in diameter classes of one-fourth to 1, 1 to 3, and greater than 3 inches and forest floor duff depths were summarized from extensive inventories in northern Idaho and Montana. Biomass loadings are shown by cover types and habitat types within National Forests. Total downed woody biomass...

Author(s): James K. Brown, Thomas E. See

Year Published: 1981

Type: Document

Technical Report or White Paper

Postharvest residue burning under alternative silvicultural practices

www.nrfirescience.org/resource/11927

Prescribed burning of logging slash was done in clearcut, overstory removal, and understory cutting units in a Douglas-fir stand on the Lubrecht Experimental Forest near Missoula, Mont. The burning prescriptions and actual burning conditions are described. Data on preharvest, post-harvest, and postburn conditions are reported.

Author(s): Robert W. Steele

Year Published: 1980

Type: Document

Research Brief or Fact Sheet

Fire ecology and prescribed burning in the Great Plains: a research review

www.nrfirescience.org/resource/11912

Historical evidence indicates that fires were prevalent in grasslands. In the past, big prairie fires usually occurred during drought years that followed 1 to 3 years of above-average precipitation, which provided abundant and continuous fuel. Fire frequency probably varied from 5 to 10 years in level-to-rolling topography and from...

Author(s): Henry A. Wright, Arthur W. Bailey

Year Published: 1980

Type: Document

Technical Report or White Paper

Determining the moisture content of some dead forest fuels using a microwave oven

www.nrfirescience.org/resource/11926

This note describes tests conducted to evaluate performance of a standard kitchen-type microwave oven for determining moisture content of dead woody fuels. Procedures are suggested for using the microwave oven to obtain fuel moisture information. Examples are also provided of field use.

Author(s): Rodney A. Norum, William C. Fischer

Year Published: 1980

Type: Document

Research Brief or Fact Sheet

Damage from logging and prescribed burning in partially cut Douglas-fir stands

www.nrfirescience.org/resource/11928

Damage from tractor logging and slash burning in a Douglas-fir stand on gentle terrain was measured for three different types of timber harvesting. Logging damage was light in the selection-cut and understory-removal cutting units. In the overstory-removal unit, about 11 percent of the leave trees were killed by logging. Little...

Author(s): Robert E. Benson

Year Published: 1980

Type: Document

Research Brief or Fact Sheet

Fire frequency in subalpine forests of Yellowstone National Park

www.nrfirescience.org/resource/12042

Dead woody fuels were sampled in 16 upland forest stands representing a chronosequence of forest successional stages. Different fuel components show different temporal patterns, but adequate levels of all components necessary for an intense crown fire are not present simultaneously until stand age 300-400 yr. Therefore, the average...

Author(s): William H. Romme

Year Published: 1980

Type: Document

Conference Proceedings, Technical Report or White Paper

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

The role and use of fire in sagebrush-grass and pinyon-juniper plant communities: a state-of-the-art review

www.nrfirescience.org/resource/11908

Fire frequencies averaged 32 to 70 years in sagebrush-grass communities. Early spring and late fall fires are the least harmful to perennial grasses, although small plants and those with coarse stems are more tolerant of fire than large plants and those with leafy stems. Cheatgrass can be suppressed by burning in early summer, but...

Author(s): Henry A. Wright, Leon F. Neuenschwander, Carlton M. Britton

Year Published: 1979

Type: Document

Synthesis, Technical Report or White Paper

Fuel management opportunities on the Lolo National Forest: an economic analysis

www.nrfirescience.org/resource/11925

Examines economic feasibility of managing nonslash fuels in mature timber to reduce the costs and damages of wildfire. A 1.2-million-acre (496,000 hectare) study area is stratified by timber value, fire occurrence rate, and fuel hazard. Maximum potential fuel management benefits-based on the elimination of expected class E+ fires-...

Author(s): Donald Brent Wood

Year Published: 1979

Type: Document

Research Brief or Fact Sheet

A review of some interactions between harvesting, residue management, fire, and forest insects and diseases

www.nrfirescience.org/resource/13140

Many species of insects and diseases create residues that predispose forests to fire. Conversely, natural factors such as fire, wind-throw, and other agents create forest residues that predispose forests to diseases and insects, including bark and cambium beetles, wood borers, and others. Man-made residues also predispose forests to...

Author(s): David G. Fellin

Year Published: 1979

Type: Document

Technical Report or White Paper

Elk-aspen relationships on a prescribed burn

www.nrfirescience.org/resource/11924

Elk use of aspen alones was deterred only one winter following prescribed fire. Numbers of aspen suckers on the nine burned clones increased 178 percent in 3 years, but the response varied greatly among clones. Elk browsing the third winter after burning averaged 44 percent of current annual growth, and eliminated incremental height...

Author(s): Joseph V. Basile

Year Published: 1979

Type: Document

Research Brief or Fact Sheet

Effects of burning moist fuels on seedbed preparation in cutover western larch forests

www.nrfirescience.org/resource/11955

In early September 1975, two clearcuts (14 and 17 acres; 5.7 and 6.9 ha), two sets of 4 small clearcuts (1.5 acres; 0.6 ha each), and one shelterwood cutting (22 acres; 8.9 ha) were broadcast burned principally for seedbed preparation and fuel reduction on the Coram Experimental Forest. The objective was to develop a model for...

Author(s): Donald K. Artley, Raymond C. Shearer, Robert W. Steele

Year Published: 1978

Type: Document

Technical Report or White Paper

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 $y = ax$. Values of "...

Author(s): Frank A. Albini, James K. Brown

Year Published: 1978

Type: Document

Technical Report or White Paper

Weight and density of crowns of Rocky Mountain conifers

www.nrfirescience.org/resource/11205

ANNOTATION: Relationships between live and dead crown weight and DBH, crown length, tree height, and crown ratio are presented for 11 Rocky Mountain conifers. Also included are partitioned estimates of crown foliage and branchwood. This study shows a high correlation between DBH and crown weight.

Author(s): James K. Brown

Year Published: 1978

Type: Document

Technical Report or White Paper

A method for determining fire history in coniferous forests in the Mountain West

www.nrfirescience.org/resource/11176

An improved version is presented of a method previously used [see FA 40, 169]. Instructions are given for: laying out transects; gathering stand data, including documenting fire-scarred trees; sampling fire-scarred trees; laboratory analysis of tree cross-sections; correlating fire chronologies; and calculating fire frequency. The...

Author(s): Stephen F. Arno, Kathy M. Sneck

Year Published: 1977

Type: Document

Technical Report or White Paper

Pre-feasibility assessment: small diameter underutilized (SDU) wood feedstock for a 10 MW co-generation facility at the Milltown dam site

www.nrfirescience.org/resource/11206

ANNOTATION: A pre-feasibility assessment is an early stage and limited analysis of the probable risks and returns of an investment. Focused on gathering preliminary information, it helps decision makers determine if there is a basis for investing additional capital and time in the proposed project. This pre-feasibility assessment to...

Author(s): James K. Brown, J. A. Kendall Snell, David L. Bunnell

Year Published: 1977

Type: Document
Technical Report or White Paper

Preliminary guidelines for prescribed burning under standing timber in western larch/Douglas-fir forests

www.nrfirescience.org/resource/11113

Guidelines are offered for safe, effective fire treatments in western larch/Douglas-fir forests. Describes procedures for estimating and limiting the scorching of tree crowns. Provides a method for predicting percentage of the forest floor that will be burned down to mineral soil.

Author(s): Rodney A. Norum

Year Published: 1977

Type: Document

Research Brief or Fact Sheet

Intensive fiber utilization and prescribed fire: effects on the microbial ecology of forests

www.nrfirescience.org/resource/12150

Reviews current knowledge of the effects of intensive wood utilization, prescribed burning, or a combination of both treatments, on the microbial ecology of forest soils. Identifies additional research that must be done to fill voids in knowledge.

Author(s): Alan E. Harvey, Martin F. Jurgensen, Michael J. Larsen

Year Published: 1976

Type: Document

Synthesis, Technical Report or White Paper

Vegetal development on the Sleeping Child burn in western Montana, 1961 to 1973

www.nrfirescience.org/resource/11951

In the year following the 1961 Sleeping Child forest fire on the Bitterroot National Forest, Montana, 11 permanent transects were established within the burn. Vegetation development was recorded through 1973, but only four transects were considered indicative of seral forest succession independent of superimposed management...

Author(s): L. Jack Lyon

Year Published: 1976

Type: Document

Technical Report or White Paper

Estimating fuel weights of grasses, forbs, and small woody plants

www.nrfirescience.org/resource/11923

Equations were developed for estimating fuel loading (g/m²) of grasses, narrow-leaved forbs, broad-leaved forbs, and small woody plants common to western Montana and north Idaho. Independent variables were plant height and percentage of ground covered. R² for the equations ranged from 0.30 to 0.91. The equations provide reasonable...

Author(s): James K. Brown, Michael A. Marsden

Year Published: 1976

Type: Document

Research Brief or Fact Sheet

Erosional effects of wildfire and logging in Idaho

www.nrfirescience.org/resource/18602

The effects of wildfire and logging on erosion from two small catchments of the Pine Creek drainage in Idaho, USA, were investigated. One catchment was clearfelled in 1972 and a wildfire burned in the

study areas in 1973. The fire was more intense on the clear felled area (estimated fuels were 90 and 10 tons/acre on felled and...

Author(s): Walter F. Megahan, D. C. Molitor

Year Published: 1975

Type: Document

Conference Proceedings

Gain and loss of moisture in large forest fuels

www.nrfirescience.org/resource/11880

For many years there has been much interest in moisture studies of forest fuels. The study reported here was in its 17th year when the author became involved. The study was terminated 2 years later. All data were compiled, adjusted, and analyzed; a report was prepared but not published. Continued interest in moisture content of...

Author(s): Arthur P. Brackebusch

Year Published: 1975

Type: Document

Technical Report or White Paper

Clearcutting and burning slash alter quality of stream water in northern Idaho

www.nrfirescience.org/resource/11949

Three cutting units of varying size, soil, and aspect located along streams in the Priest River Experimental Forest in northern Idaho were chosen for evaluation of changes in water quality caused by clearcutting and subsequent burning of slash. Water sampling stations were established on each creek-upstream, downstream, and on the...

Author(s): Gordon G. Snyder, Harold F. Haupt, George H. Belt

Year Published: 1975

Type: Document

Technical Report or White Paper

Wildland fires and dwarf mistletoes: a literature review of ecology and prescribed burning

www.nrfirescience.org/resource/12412

Wildfires play a multiple role in the distribution of dwarf mistletoes - they may either inhibit or encourage these parasites depending primarily on the size and intensity of the burn. Many reports suggest that fire exclusion policies of the past half century have resulted in increased dwarf mistletoe levels as, well as increased...

Author(s): Martin E. Alexander, Frank G. Hawksworth

Year Published: 1975

Type: Document

Synthesis, Technical Report or White Paper

Inventory of slash fuels using 3P subsampling

www.nrfirescience.org/resource/11906

A recent large-scale study of prescribed broadcast burning in western Montana required the development of a system for inventory of clearcut logging slash furls before and after fire treatment. The system is best suited for inventorying material which tends to be oriented parallel to the ground. The inventory system uses line...

Author(s): William R. Beaufait, Michael A. Marsden, Rodney A. Norum

Year Published: 1974

Type: Document

Technical Report or White Paper

Lodgepole pine logging residues: management alternatives

www.nrfirescience.org/resource/12125

The dollar and nondollar effects of alternative levels of residue utilization in mature lodgepole pine are compared. Net dollar returns were greater in conventional logging (removal of green sawlogs to a 6-inch top, with slash piled and burned) than in near-complete harvesting (sawlog removal followed by field chipping of remaining...

Author(s): Robert E. Benson

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

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 trichocavya*) 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

Vertical distribution of fuel in spruce-fir logging slash

www.nrfirescience.org/resource/11941

About 70 percent of the volume and surface area of spruce-fir logging slash lies below the mid-depth of the slash. Material 0 to 1 centimeter in diameter was distributed vertically in the same proportions as all other material. Old slash in the first 20 centimeters above the ground contained a higher proportion of large material...

Author(s): James K. Brown

Year Published: 1970

Type: Document

Technical Report or White Paper

Physical fuel properties of ponderosa pine forest floors and cheatgrasses

www.nrfirescience.org/resource/11940

Physical fuel properties were determined utilizing measurements of volume, surface area, and weight for ponderosa pine forest floors and cheatgrass. Average values of these properties for ponderosa pine needle litter and cheatgrass were respectively: surface area-to-volume ratio (a), 57.6 and 144.0 cm.³/cc.; particle density, 0.51...

Author(s): James K. Brown
Year Published: 1970
Type: Document
Technical Report or White Paper

Porosity of cheatgrass fuel related to weight

www.nrfirescience.org/resource/11922

Porosity (expressed as the ratio of air space surrounding plant material to surface area of plant material) was determined for a low forage producing community of cheatgrass. Porosity averaged 12.5 cm.³/cm.²- and correlated closely with weight per square meter. Estimation of porosity from weight per unit of ground area is a...

Author(s): James K. Brown
Year Published: 1969
Type: Document
Research Brief or Fact Sheet

Prescribed fire planning in the Intermountain West

www.nrfirescience.org/resource/11936

Prescribed fire has been used in the forests of the Intermountain West since 1910. It is employed for site preparation for planting or seeding, hazard reduction, livestock range and wildlife habitat improvement, cover type conversion, and insect or disease control. The major advantage of fire for all these objectives is its low cost...

Author(s): William R. Beaufait
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

A new theory on the ignition criteria of live fuels

www.nrfirescience.org/resource/14261

This seminar focuses on how plants burn and where and under what conditions. It is a mixture of plant physiology and combustion characteristics, and understanding why plants burn at certain times. The talk was presented by W. Matt Jolly (USFS Missoula Fire Lab), and presented as part of the 2012 RMRS Fire Sciences Laboratory's...

Type: Media

Seminar

Why can't we just put all the fires out?

www.nrfirescience.org/resource/19122

This collection of 33 slides was presented at a 2017_Conference on Fire_Planning. It presents reasons

why fire should not be eliminated from a landscape when looking at management activities.

Type: Media

Webinar

Rx Fire and Fire Use Lessons Learned

www.nrfirescience.org/resource/16018

Listen to the experiences and lessons learned from seven veteran fire management officers.

Type: Media

Video

The ecology of dry mixed conifer forests—What makes them unique?

www.nrfirescience.org/resource/12809

This webinar is the first of a four-part series for managers and scientists to discuss up-to-date information regarding the benefits, challenges, opportunities, and trade-offs among the different strategies and tools related to fuel treatment applications within dry mixed conifer forests of the western United States. Presenters:...

Type: Media

Webinar

Do it yourself tinkering - Modifying LANDFIRE data for the Northern Rockies

www.nrfirescience.org/resource/15229

What do you do if you're a land manager who needs consistent, current, cross-boundary datasets, but the available data do not meet your needs? Modify the data. In this webinar, Kori Blankenship, Fire Ecologist with The Nature Conservancy, discusses how to adjust spatial data to meet your needs.

Type: Media

Webinar

Catching fire: prescribed burning in Northern California

www.nrfirescience.org/resource/205

Catching Fire tells a compelling story of how a small but committed group of local, tribal, state and federal land managers are bringing back the use of prescribed fire as a tool to protect communities and ecosystems across Northern California. It examines the use of fire by the Karuk Tribe of California, and the connection between...

Type: Media

Video

Effectiveness of wildfire mitigation activities in the wildland-urban interface (WUI)

www.nrfirescience.org/resource/14048

Each year wildfires damage homes, businesses, communities, watersheds, and forests on millions of acres across the U.S. However there are effective ways to reduce the impact of wildfire. A new report, Evaluating the Effectiveness of Wildfire Mitigation Activities in the Wildland-Urban Interface, shares lessons learned from...

Type: Media

Webinar

Understanding Fuels: Forest Fire Science

www.nrfirescience.org/resource/18968

Forest managers and wildland firefighters will often talk use the word "fuels." What are fuels? It's both the living and dead vegetation in a forest that can potentially burn in a wildfire. David Peterson, biologist

for the U.S. Forest Service Pacific Northwest Research Station, explains how reducing fuels helps to reduce the...

Type: Media

Video

Bridging the Divide - Video 3: Forest Management

www.nrfirescience.org/resource/15943

This video series is a compilation of post-fire interviews, workshops, and research presentations, highlighting the special conditions of the fire and the unique community outcomes. Through collaboration and partnerships, these mountain communities are learning to live with fire in the landscape. During the summer of 2013 over 1000...

Type: Media

Webinar

The economics of fuel treatments

www.nrfirescience.org/resource/12807

This webinar is the third of a four-part series for managers and scientists to discuss up-to-date information regarding the benefits, challenges, opportunities, and trade-offs among the different strategies and tools related to fuel treatment applications within dry mixed conifer forests of the western United States. Presenters-...

Type: Media

Webinar

Sage steppe resilience mapping in the Green River Basin

www.nrfirescience.org/resource/15507

In partnership with the Southern Rockies and Great Northern Landscape Conservation Cooperatives, we are pleased to announce several upcoming webinars for the Green River Basin Landscape Conservation Design (GRB LCD). The purpose of these webinars is to share several spatial data products developed by Conservation Science Partner and...

Type: Media

Webinar

Imputation of forest plot data for landscape-level wildfire analyses

www.nrfirescience.org/resource/14337

Maps of the number, size, and species of trees in forests across the western United States have utility for a number of research endeavors, ranging from estimation of terrestrial carbon resources to tree mortality following wildfires. For example, for landscape fire and forest simulations that use the Forest...

Type: Media

Webinar

Fire perceptions

www.nrfirescience.org/resource/14194

A discussion of the use of fire in stand management and the perceptions of the public on fire use. Presented by John Tuttle at the Prescribed Fire and Timber Quality Workshop, October 16 & 17, 2012 in Poplar Bluff, MO.

Type: Media

Video

Lessons in creating and maintaining successful prescribed burn associations

www.nrfirescience.org/resource/15919

A Southern Fire Exchange webinar with John Weir of Oklahoma State University and the Oklahoma Prescribed Burn Association. Are you involved in creating, developing, guiding, or supporting a prescribed burn association (PBA)? Are you interested learning how prescribed burn associations work or how they're successfully sustained?...

Type: Media

Webinar

Webinar: Techniques for Wildfire Detection and Monitoring Part 2

www.nrfirescience.org/resource/18088

This session will provide an overview of the Global Wildfire Information System (GWIS) and a hands-on demonstration on the use of the GWIS viewer. GWIS is an online web application that uses remotely sensed wildfire data. This data includes fire danger, wildfire locations, burned area extent, and burn severity. GWIS also focuses on...

Type: Media

Webinar

Virtual Reality Tool Used for Training

www.nrfirescience.org/resource/17605

Prevalence of commercially available Virtual Reality systems and platforms has triggered a serious assessment for use in the training environment. This interactive presentation is intended to demonstrate how Virtual Reality can be used in training to reduce exposure to hazards, communicate concepts in an immersive digital...

Type: Media

Seminar

LANDFIRE – All Lands Data from Vegetation to Fuels: Planning, Engagement, and Feedback

www.nrfirescience.org/resource/15499

This webinar, led by LANDFIRE Business Lead Henry Bastian, will cover more than a decade old program (LANDFIRE) at producing and updating land cover data products across all 50 United States and insular areas. Although many have thought of LANDFIRE as only a wildland fire data set, the rich array of data layers and databases (...)

Type: Media

Webinar

Quantification of canopy fuels in conifer forests - fact sheet

www.nrfirescience.org/resource/11096

The objectives of quantifying canopy fuels is to develop practical, validated methods for obtaining quantitative estimates of canopy fuel characteristics, notably bulk density, crown height, and fuel loading, all needed to predict fire behavior and fire effects.

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

Type: Document

Research Brief or Fact Sheet

Working across fence lines: multijurisdictional planning and prescribed fire

www.nrfirescience.org/resource/14308

Fire cuts across administrative boundaries and our restoration work needs to as well. Whether it is multijurisdictional planning or multiagency prescribed burning, working across boundaries presents a unique set of challenges. In this webinar, Eytan Krasilovsky discussed multijurisdictional NEPA planning in the Rio Trampas watershed...

Type: Media

Webinar

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

Integrating wildlife habitat and forest resilience with fuels reduction - Ecosystem management concepts for mixed-conifer forests

www.nrfirescience.org/resource/14125

This talk covers the background and motivation for creating the USFS General Technical Report 220 before explaining the justifications and applications of the treatment guidelines included in the report.

Type: Media

Webinar

Waste to wisdom: improving soil productivity while reducing fire risk

www.nrfirescience.org/resource/13049

Bioenergy production from forest biomass offers a solution to reduce wildfire hazard fuel levels, decrease insect and disease outbreaks, and reduce the incidence of invasive species while producing a useful source of renewable energy. However, on-site bioenergy production and the subsequent application of biochar to forest sites...

Type: Media

Webinar

Who's to blame? Fire management in mixed-ownership landscapes

www.nrfirescience.org/resource/15807

Fuels are the only component of the fire triangle that forest and fire managers can alter to change fire behavior. There have been numerous studies examining how fuel reduction treatments and salvage logging alter fire behavior, severity, and its' ecological impacts. However, less attention has been paid to how different forest...

Type: Media

Seminar

Evaluating effectiveness of multi-purpose fuel treatments in dry mixed-conifer forests

www.nrfirescience.org/resource/15100

This webinar was presented as part of the 2016-2017 RMRS Fire Sciences Laboratory's weekly seminar series.

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

Effects of burning piles

www.nrfirescience.org/resource/19245

Millions of acres of fuels reduction treatments are being implemented each year in the fire adapted forests of the US. Typical these fuel reduction treatments target small diameter trees for removal producing large amounts of unmerchantable woody material and elevating surface fuel loadings. Often this material has no market value...

Type: Media

Webinar

Navigating IFTDSS

www.nrfirescience.org/resource/17596

An introduction to the layout of the IFTDSS application. Part of a webinar series running through March of 2018.

Type: Media

Webinar

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

Policy barriers to prescribed fire: challenges and opportunities across the West - Findings from a JFSP Project on challenges and strategies on federal lands

www.nrfirescience.org/resource/18817

Prescribed fire is an essential management tool for restoring and maintaining fire-dependent ecosystems; however, land managers are unable to apply prescribed fire at the necessary levels. Past surveys have identified a range of policies and regulations that managers say limit their ability to conduct prescribed fire. We are...

Type: Media

Webinar

LANDFIRE

www.nrfirescience.org/resource/18009

LANDFIRE is an ongoing research project and database that contains geospatial data products that describe existing vegetation composition and structure, potential vegetation, surface and canopy fuel characteristics, historical fire regimes, and fire regime condition class. LANDFIRE provides fire and land managers with the...

Type: Website

Website

Evolution of unmanned aerial systems in fire

www.nrfirescience.org/resource/17213

This 55 minute talk was presented for the Firelab Seminar Series 2018. It covered the beginnings of a new research venture with the Fire Center at the University of Montana to utilize drones in fire research.

Type: Media

Seminar

Learning from the experts: building a 'Mac Truck' burn plan

www.nrfirescience.org/resource/14115

Ric Carlson describes how he develops the prescription window and uses a process of constant evaluation and updating that helps him avoid the traps always inherent with boundary selection. This video comes from the Wildland Fire Lessons Learned Center.

Type: Media

Video

Fuels reduction treatments in the coniferous forests of the Central Rockies

www.nrfirescience.org/resource/14295

This presentation at a NAU Forestry Department Seminar goes into detail about 3 projects. Battaglia begins with prescribed fire research in the Black Hills where he was using fire as a thinning agent in fuel treatments, then moves on to his post doc research in Colorado, which looks at the ecological impacts of mastication in a...

Type: Media

Seminar

Elizabeth Reinhardt - Beyond Hazardous Fuels: Restoring Fire (Opening Plenary)

www.nrfirescience.org/resource/16191

This 21 minute presentation was given at the 3rd SW Fire Ecology Conference & Applied Fire Science Workshop in Tucson, Arizona by Elizabeth Reinhardt, Retired US Forest Service.

Type: Media

Video

Prescribed fire: a multipurpose tool

www.nrfirescience.org/resource/13807

This video produced by the Northwest Fire Science Consortium illustrates the multiple uses of prescribed fire; whether for fuels reduction to reduce the risk of catastrophic wildfire or for habitat restoration, fire is a powerful tool.

Type: Media

Video

Can fuel treatments save money on suppression costs in the future?

www.nrfirescience.org/resource/14871

How fire suppression forces respond to an ignition may be determined by a number of factors (including proximity to values at risk and potential to improve habitat), which in essence amount to fire management personnel evaluating the fire's potential to have a net positive or negative effect. When using...

Type: Media

Webinar

ArcFuels

www.nrfirescience.org/resource/18006

ArcFuels is a library of ArcGIS macros developed to streamline fire behavior modeling and spatial analyses for fuel treatment planning. The macros link: 1) key wildfire behavior models; 2) fuels and vegetation data (e.g. Landfire, FVS databases); 3) MS Office, and 4) ArcGIS. ArcFuels is used to rapidly design and test fuel...

Type: Website

Website

Learning from experts: reflecting on a burn gone bad

www.nrfirescience.org/resource/14112

Riva Duncan shares her story of being involved in an escaped prescribed fire. Riva explains how, after this event, she changed her methods of writing and implementing prescription burn plans. The video comes from the Wildland Fire Lessons Learned Center.

Type: Media

Video

Characterizing fuels for fire and fuel management in the 21st Century

www.nrfirescience.org/resource/14285

Fuels are often defined based on the physical characteristics of live and dead biomass that contribute to wildland fire. Because these characteristics affect the character, size, intensity, and duration of fires, fuels are important to the understanding of fire behavior and effects by providing information for activities such as...

Type: Media

Video

Effects of fuel treatments on the spatial probabilities of burning and final size of recent wildfire across the United States

www.nrfirescience.org/resource/12860

Large wildfire frequency has increased several-fold in recent decades throughout the western United States. These changes have resulted from a combination of human land use practices, altered climates and shifting forest and fire management policies. These fires have had increasingly severe consequences for ecosystems, human health...

Type: Media

Webinar

From pixels to landscapes, leveraging LANDFIRE for land management

www.nrfirescience.org/resource/14857

LANDFIRE products have become the toolbox for large landscape management, way beyond obvious applications to do with fire and fuels. From mapping arbuscular fungi to modeling scary cryptic zooid habitat, from tracking grizzly bears to protecting butterflies, from developing full-scale state forest assessments to looking at climate...

Type: Media

Webinar

Prescribed fire policy barriers: Findings from a JFSP project on challenges and strategies on federal lands across the West

www.nrfirescience.org/resource/18765

Prescribed fire is an essential management tool for restoring and maintaining fire-dependent ecosystems; however, land managers are unable to apply prescribed fire at the necessary levels. Past

surveys have identified a range of policies and regulations that managers say limit their ability to conduct prescribed fire. We are...

Type: Media

Webinar

FuelCalc

www.nrfirescience.org/resource/17999

Ground, surface, and canopy fuel characteristics serve as essential inputs to computer models of fire behavior and fire effects. FuelCalc is a fuel characteristics simulation software application that calculates initial canopy fuel characteristics and quickly simulates the effects of thinning, pruning, piling and broadcast burning...

Type: Website

Website

Development of the interagency fuels treatment decision support system

www.nrfirescience.org/resource/14097

This webinar was not recorded. Media link below is to a pdf of the webinar slide show. The web-based Interagency Fuels Treatment Decision Support System (IFT-DSS) was designed to provide fire and fuels managers with a single software solution to manage the many data, software applications, and tools available for fuels treatment...

Type: Media

Webinar

Fire and Archaeology: working together to protect cultural resources during wildfire and prescribed fire

www.nrfirescience.org/resource/18375

Land managers are challenged to protect cultural resources within the context of reintroducing fire on the landscape. Positive relationships and partnerships are essential to effective management.

Type: Media

Video

LANDFIRE existing and potential vegetation: classification, mapping, and inventory at a national scale

www.nrfirescience.org/resource/14267

LANDFIRE fuel and fire regime products are based almost entirely on various combinations of existing and potential vegetation themes. Since LANDFIRE National's initial release in 2008, a number of revisions to these themes have been implemented both from a mapping and a classification standpoint. In addition, a large amount of...

Type: Media

Video

Fuel control treatments in the sagebrush steppe

www.nrfirescience.org/resource/16091

This presentation aired as part of the Great Basin LCC webinar series on November 29, 2017. The presentation was given by Bruce Roundy of Brigham Young University.

Type: Media

Webinar

The current state of vegetation mapping in Region 1: from SILC (1993) to VMap (2015), what

have we learned in the past 20 years

www.nrfirescience.org/resource/13764

This Fire Lab Seminar was presented by Steve Brown, R1 Remote Sensing Coordinator. It was presented as part of the 2014 RMRS Fire Sciences Laboratory's weekly seminar series.

Type: Media

Seminar

ArcFuels: an ArcGIS interface for fuel treatment planning and wildfire risk assessment

www.nrfirescience.org/resource/12853

Potential fire behavior metrics, including fire spread, intensity, likelihood, and ecological risk need to be analyzed for proposed fuel treatment alternatives. We built ArcFuels to streamline the fuel management planning process, and provide tools for quantitative wildfire risk assessment. ArcFuels integrated a number of fire...

Type: Media

Webinar

The ecological effects of thinning treatments to restore whitebark pine

www.nrfirescience.org/resource/14780

This presentation by Colin Maher, Ph.D. Candidate, Department of Ecosystem and Conservation Sciences University of Montana, was part of the 2016 Whitebark Pine Ecosystem Foundation Annual Science and Management Workshop - Successes and Challenges in Managing the Jewel in the Crown of the Continent that occurred September 16, 2016 in...

Type: Media

Webinar

Evidence for population differentiation among Jeffrey and Ponderosa pines in survival, growth and phenology

www.nrfirescience.org/resource/18740

Ecological restoration projects that include reforestation require that land managers select appropriate source of seeds for long-term persistence. In California, the standard approach for making this choice is based on seed zone and elevational band, both geographically-based measures. However, given the pace of contemporary...

Author(s): Alejandra Martínez-Berdeja, Jill A. Hamilton, Aurore Bontemps, Johanna Schmitt, Jessica W. Wright

Type: Document

Book or Chapter or Journal Article

Introduction to the Photoload Sampling Technique

www.nrfirescience.org/resource/17986

This video details the procedure for sampling fuel loading using the photoload technique.

Type: Media

Webinar

Using fire to increase the scale, benefits, and pace of forest management

www.nrfirescience.org/resource/14080

The current pace and scale of fuels treatment is a fraction of what's needed to effectively reduce fire hazard in California. With the Forest Service implementing a new planning rule and starting to revise plans for the 155 National Forests, new strategies need to be considered for fundamentally changing...

Type: Media

Webinar

Live fuel moisture: a new look at the combustion of living plants

www.nrfirescience.org/resource/14262

Live fuel moisture is measured frequently throughout the country as an indicator of potential fire behavior but little is known about the primary factors that drive their seasonal variations. Dr. Matt Jolly delves into the interactive factors that control live fuel moisture and discusses some of the potential implications of these...

Type: Media

Webinar

Fire behaviour: next gen Canadian Forest Fire Danger Rating System

www.nrfirescience.org/resource/16078

Mike Wotton from the Canadian Fire Service discussing the next generation Canadian Forest Fire Danger Rating System at the 2013 Fire Behaviour Symposium.

Type: Media

Video

Post-fire conifer regeneration in ponderosa pine forests of the southern Rocky Mountains, USA

www.nrfirescience.org/resource/18172

Wildfires in the southern Rocky Mountain region have increased in size, frequency, and severity over the past three decades, but forest recovery following high severity wildfire events is uncertain in this region. We studied conifer regeneration in 11 fires in Colorado, South Dakota, and Wyoming in unburned, low-to-moderately burned...

Type: Media

Webinar

The IMAGINE prescribed fire prioritization model: a logistical and ecological approach to management

www.nrfirescience.org/resource/12845

IMAGINE aims to solve the issue of technology overload confronting prescribed fire managers today. As the demand to prescribe burn more acres increase, so do the demands on fire management officers (FMOs) to prioritize treatment areas. Prescribed fires accomplish multiple objectives including reducing hazardous fuels, improving...

Type: Media

Webinar

Surface fuel changes after severe disturbance in Rocky Mountain ecosystems

www.nrfirescience.org/resource/15243

It is generally assumed that severe disturbances predispose damaged forests to high fire hazard by creating heavy fuel loading conditions. Of special concern is the perception that surface fuel loadings become high as killed trees deposit foliage and woody material on the ground. These high fuel loadings may result in abnormally...

Type: Media

Seminar

Mapping human or natural disturbance effects on coniferous forest canopies using field plot and Lidar data

www.nrfirescience.org/resource/13333

This Utah State University Learn and Lunch webinar featured information on using remote sensing,

particularly lidar, to create predictive models and maps of forest biomass following anthropogenic activities (i.e. timber harvest), and naturally occurring disturbances (i.e. bark beetle infestation).

Research Forester, Dr. Andrew Hudak...

Type: Media

Webinar

Mapping evidence of historical and potential wildfire for climate change and fuels mitigation in the montane forests of the Colorado Front Range

www.nrfirescience.org/resource/14067

Mapping evidence of historical and potential wildfire for climate change and fuels mitigation in the montane forests of the Colorado Front Range. Rosemary Sherriff, Associate Professor, Humboldt State University. Recorded talk from 2013 Restoring the West Conference at Utah State University. The conference focused on forest...

Type: Media

Video

Restoration in a fire forest: The benefits of burning

www.nrfirescience.org/resource/18434

Wildfire has historically played an important role in the health and structure of Oregon's dry forests. Prescribed fire is a valuable tool used to restore forest health, increase firefighter safety, and better protect nearby human resources in these fire-adapted landscapes.

Type: Media

Video

LANDFIRE - All Lands Data from Vegetation to Fuels: Planning, Engagement, and Feedback

www.nrfirescience.org/resource/15945

This webinar, led by LANDFIRE Business Lead Henry Bastian, will cover more than a decade old program (LANDFIRE) at producing and updating land cover data products across all 50 United States and insular areas. Although many have thought of LANDFIRE as only a wildland fire data set, the rich array of data layers and databases (...)

Type: Media

Webinar

The role of prescribed fire councils in restoring the West

www.nrfirescience.org/resource/13670

Speaker: J. Morgan Varner, Department of Forest Resources & Environmental Conservation, Virginia Tech. Event: Restoring the West Conference 2015 - Restoration and Fire in the Interior West.

Type: Media

Video

Prescribed fire—Unique situations concerning fuel treatments within mixed dry conifer forests

www.nrfirescience.org/resource/12808

This webinar is the second of a four-part series for managers and scientists to discuss up-to-date information regarding the benefits, challenges, opportunities, and trade-offs among the different strategies and tools related to fuel treatment applications within dry mixed conifer forests of the western United States. Presenters:...

Type: Media

Webinar

Exploring fine-grained variability using three-dimensional synthetic fuelbeds

www.nrfirescience.org/resource/14344

Understanding fine-scale variability in understory fuels is increasingly important as physics-based fire behavior models are driving needs for higher resolution data. Describing fuelbeds three dimensionally is critical in determining vertical and horizontal distributions of fuel elements and the mass, especially...

Type: Media

Webinar

The Science of Budgeting Fire Programs - Integrating Fuels and Preparedness at National and Landscape Levels

www.nrfirescience.org/resource/16367

Doug Rideout discusses STARfire - a spatial planning and budgeting system integrating fuels, preparedness, and risk assessment guided by ROI. Scaleable from planning unit to regional to national levels.

Type: Media

Webinar

The Nature Conservancy: Two decades of forest land conservation in western Montana

www.nrfirescience.org/resource/16766

Join The Nature Conservancy (TNC) in discussing new and exciting research and forest restoration opportunities across the Blackfoot watershed. Over the last two decades TNC has been involved in conserving over 525,000 acres of former industrial timberlands across western Montana. A majority of these lands have been transferred into...

Type: Media

Seminar

Prescribed Fire on Private Land - A WLA Practitioner Exchange

www.nrfirescience.org/resource/15928

As part of our effort to advance policies and practices that sustain working lands, connected landscapes, and native species, WLA is offering this interactive practitioner exchange focused on prescribed fire on private land. We are enlisting a panel of experts from across the West with experience in various aspects of prescribed...

Type: Media

Webinar

How do we minimize the risk of catastrophic fires?

www.nrfirescience.org/resource/18966

Fires that burn vegetation on the forest floor are important for forest health and are much easier to manage. Doug Grafe, fire protection chief for the Oregon Department of Forestry, explains how fuel reduction through active management and through prescribed fire can help with the prevention of catastrophic wildfires. This 1.5...

Type: Media

Video

FTEM Release Webinar for USFS

www.nrfirescience.org/resource/18093

A webinar presenting the new Fuels Treatment Effectiveness Monitoring (FTEM) system to USDA FS. (Duration 01:05)

Type: Media

Webinar

Fuel treatment for patch clear cuts on the Sloan-Venally timber sale

www.nrfirescience.org/resource/12797

The goal of this project is to ensure that post harvest 0-3 inch fuel loading, on the patch clear cuts within the Sloan-Kennally timber sale, will be in compliance with Forest Service Manual - 5100, Payette National Forest Supplement 5100-93-1, standards. In order to meet this goal the existing 0-3 inch fuel loading on the...

Author(s): Tyler Bentley

Type: Document

Management or Planning Document, Technical Report or White Paper

Modifying LANDFIRE data for local applications

www.nrfirescience.org/resource/14316

Looking at methodology involved in 'Modifying LANDFIRE Data for Local Conditions,' so as to adapt LANDFIRE data for specific needs in the Northwest.

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

Burn boss stories

www.nrfirescience.org/resource/14148

Veteran burn bosses share their stories and firsthand insights.

Type: Media

Video

These Once (and Future) Conflagrated Prairies

www.nrfirescience.org/resource/15848

A brief reconnaissance of the Great Plains and fire that will place its fire scene within the national narrative. From the onset of European contact, the grasslands were famous for their fires. They stimulated a debate about the relative roles of climate and humans. They prompted one of America's two national traditions of fire...

Type: Media

Webinar

Expert spotlight: Robert Keane

www.nrfirescience.org/resource/14666

Building ecological models to predict effects of climate change, wildland fuel science research -focused on fuel particles, and ecological restoration are just a few research areas of Dr. Bob Keane. In this video he discusses his current whitebark pine research project.

Type: Media

Video

Tracking forest and landscape change from space using the ForWarn System

www.nrfirescience.org/resource/14306

U.S. Forest Service Southern Research Station (SRS) Research Ecologists Steve Norman and William Hargrove with the SRS Eastern Forests Environmental Threat Assessment Center (EFETAC) presented a webinar on ForWarn, an online satellite-based change detection tool that maps disturbances and drought effects every 8 days. It includes...

Type: Media

Webinar

Fire and fuel management in a changing fire environment: Forest Service perspectives

www.nrfirescience.org/resource/13215

Discussion of fire and fuel management presented by Elizabeth Reinhardt at Northern Arizona University in February 2014.

Type: Media

Webinar

Global fire induced tree loss and its biophysical effects on surface temperature

www.nrfirescience.org/resource/17603

Although fire is ubiquitous in forest ecosystems, its role in driving forest cover change and climate feedbacks remains unclear at the global scale. Here we present an observation-driven assessment of fire-induced forest cover loss and its biophysical climate feedback. Our results show that fire-induced forest cover accounts for 14....

Type: Media

Seminar

Proceedings of the fourth fire behavior and fuels conference

www.nrfirescience.org/resource/18396

The Fourth Fire Behavior and Fuels Conference was held in Raleigh, North Carolina, USA, February 18-22, 2013. The theme for this conference was At The Crossroads: Looking Toward the Future in a Changing Environment. Joint sponsorship of the conference was by the International Association of Wildland Fire (IAWF) and the International...

Author(s): Dale D. Wade, Rebekah L. Fox

Type: Document

Conference Proceedings

Fire management, fuels, and climate change tipping points

www.nrfirescience.org/resource/13046

There will be dramatic changes to most landscapes of the western US over the next century, such as shifts in vegetation communities, changes in fire regimes, and increases in smoke emissions. These changes will result from complex interactions among vegetation, fuels, fire, and altered climate at the finest scales causing new and...

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

The Forest Inventory and Analysis tree-ring data base: applications and opportunities

www.nrfirescience.org/resource/17214

This 55 minute seminar was presented for the Firelab Seminar Series 2018. It covers how FIA data is created and used in research studies.

Type: Media

Seminar

Balancing forest ecosystem restoration and old-forest species conservation in the Sierra Nevada, CA

www.nrfirescience.org/resource/15091

Concern over the social, economic, and ecological consequences of increasingly frequent "megafires" in California's Sierra Nevada have led some to propose large-scale forest restoration to increase ecosystem resilience. However, restoration efforts (e.g., forest thinning) may have collateral impacts on declining old-forest species....

Type: Media

Webinar

Learning from the experts: know when to go home

www.nrfirescience.org/resource/14117

Diane Hutton tells how she and her crew filled in their knowledge gaps while conducting a multi-year burn plan. This video comes from the Wildland Fire Lessons Learned Center.

Type: Media

Video

Landscape treatment designer: a multicriteria optimization tool for fuel treatment planning

www.nrfirescience.org/resource/14296

The Landscape Treatment Designer (LTD) is a multicriteria spatial prioritization and optimization system to help design and explore landscape fuel treatment scenarios. The program fills a gap between fire model programs such as FlamMap, and planning systems such as ArcFuels, in the fuel treatment planning process. The LTD uses...

Type: Media

Webinar

2018 National Prescribed Fire Use Survey Report

www.nrfirescience.org/resource/19239

The National Association of State Foresters (NASF) and the Coalition of Prescribed Fire Councils (CPFC) worked collaboratively to produce the 2018 National Prescribed Fire Use Survey Report (.pdf). Since 2012, this report has been compiled every three years, and is unique among fire surveys. This year's survey results showed 11.3...

Type: Media

Webinar

A new age of wildland fuel science

www.nrfirescience.org/resource/12890

Wildland fuels may be the most important consideration in fire management, not just because they are important inputs for predicting fire behavior (i.e., how fast and intense a fire gets), but also because fuels are the only factor that can effectively be controlled by direct and indirect management manipulation. In this webinar, Bob...

Type: Media

Webinar

Post-outbreak fire risk and behavior: insect affected fuels profiles

www.nrfirescience.org/resource/13032

This talk provides a perspective on what fire managers need in relation to insect affected fuels. This webinar was hosted by the Southern Rockies Fire Science Network, and was presented by Paul Langowski.

Type: Media

Webinar

Effects of fuel treatments and previous fires on subsequent fire management costs

www.nrfirescience.org/resource/15732

This webinar highlights results from a study on the effects of fuel treatments and previously burned areas on subsequent fire management costs. Presenter Kevin Barnett and his colleagues, Helen Naughton, Sean Parks, and Carol Miller, built models explaining variation in daily fire management costs that captured the influences of...

Type: Media

Webinar

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

FEAT/FIREMON Integrated (FFI)

www.nrfirescience.org/resource/18007

FFI (FEAT/FIREMON Integrated) is a monitoring software tool designed to assist managers with collection, storage and analysis of ecological information. It was constructed through a complementary integration of the Fire Ecology Assessment Tool (FEAT) and FIREMON. FFI was funded by the National Interagency Fuels Coordination Group...

Type: Website

Website

The Berry Fire

www.nrfirescience.org/resource/17212

The 2016 lightning-caused Berry Fire was the largest fire on record for Grand Teton National Park. This video, by videographer Peri Sasnett, highlights the challenges managers face in balancing ecological benefits of fire with the human inconvenience fire can cause on public lands and in nearby communities. Dramatic footage of the...

Type: Media

Video

Learning from the experts: burning with optimism

www.nrfirescience.org/resource/14114

Ric Carlson relates one occurrence when his optimism in a burn plan colored his perspective. This video comes from the Wildland Fire Lessons Learned Center.

Type: Media

Video

Economics of ecological restoration and hazardous fuel reduction treatments

www.nrfirescience.org/resource/14290

What are the economic values of landscape-level ecological restoration and hazardous fuel treatments? The Ecological Restoration Institute at Northern Arizona University (ERI) assembled a team of wildland fire economists to conduct a rapid evidence-based assessment, as well as to design a timely and efficient way to answer the...

Type: Media

Webinar

Learning from escaped prescribed fire reviews: initial results

www.nrfirescience.org/resource/12861

Through a series of five dialogues sessions with fire managers from across the US (Denver, CO; Portland, OR; Salt Lake City, UT; Tallahassee, FL; and Tucson, AZ), we sought to understand and improve individual and organizational learning from reviews of escaped prescribed fires. Results have influenced the National Wildfire...

Type: Media

Webinar

Modeling and Mapping the Potential for High Severity Fire in the Western U.S.

www.nrfirescience.org/resource/18377

The ecological effects of wildland fire – also termed the fire severity – are often highly heterogeneous in space and time. This heterogeneity is a result of spatial variability in factors such as fuel, topography, and climate (e.g. a map of mean annual temperature). However, temporally variable factors such as daily weather and...

Type: Media

Webinar

How will forests affect mountain snow storage in a warming climate

www.nrfirescience.org/resource/14863

Forests strongly influence snow processes and affect the amount and duration of snow storage on a landscape. Therefore, forest changes, from management activities or natural disturbances, have important consequences for spring and summer soil moisture availability, aquatic habitat, and water supply. Accounting for these effects of...

Type: Media

Webinar

Fire and Fuels Extension to the Forest Vegetation Simulator

www.nrfirescience.org/resource/18005

The Fire and Fuels Extension (FFE) to the Forest Vegetation Simulator (FVS) simulates fuel dynamics and potential fire behaviour over time, in the context of stand development and management. The Fire

Effects Model Extension is a new extension to FVS and the PPE that allows users to simulate the effects of fire on a number of...

Type: Website

Website

Ecological impacts of mastication

www.nrfirescience.org/resource/14099

This webinar was not recorded, so the media link is to a pdf of the webinar slide show. Dr. Mike Battaglia presented results from the Joint Fire Science Project on the Ecological Impact of Mastication, related to the impact of mastication on the chemical and physical conditions of the forest floor, vegetation regrowth, and fuel...

Type: Media

Webinar

An overview of past, current, and future LANDFIRE data products and methods

www.nrfirescience.org/resource/14268

Since its inception in 2003, the LANDFIRE project has employed a wide range of nationally consistent methods in order to produce a large suite of vegetation and fuel and fire regime products for the fire management community. These products have also been found to be useful for many other applications. Over this time, a number of...

Type: Media

Video

Evaluation the performances and mapping of three fuel classification systems using Forest Inventory and Analysis surface fuel measurements

www.nrfirescience.org/resource/13776

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...

Type: Media

Webinar

Fuels management practices for ponderosa pine-dry mixed-conifer forests

www.nrfirescience.org/resource/12854

The focus of the synthesis is on dry mixed conifer forests that occur throughout the interior West, Utah, Cascade Range, Blue Mountains, Klamath Mountains, and Pacific Coast. There is substantial documentation on fire ecology and appropriate hazardous fuel management practices for pure ponderosa pine forests. The dry mixed conifer...

Type: Media

Webinar

Integrating community wildfire protection plans and natural hazard mitigation plans

www.nrfirescience.org/resource/15290

Natural Hazard Mitigation Plans (NHMP) and Community Wildfire Protection Plans (CWPP) both benefit communities striving to reduce risk to natural hazards. Though one plan is focused on the wildfire hazard and other is focused on multi-natural hazards, the requirements of what needs to be in the plans have a lot of similarities. As a...

Type: Media

Webinar

User guide to temporal changes in LANDFIRE vegetation, fuel, and fire regime products

www.nrfirescience.org/resource/14388

LANDFIRE produces a comprehensive, consistent, scientifically based suite of spatial layers and databases for the entire United States and territories. In 2009 the first wall to wall National data set was delivered for the fifty United States. Since this accomplishment, LANDFIRE has released a number of updates to the base...

Type: Media

Webinar

Aridity and competition drive fire resistance trait covariation in mountain trees

www.nrfirescience.org/resource/18745

Fire resistance traits drive tree species composition in surface?fire ecosystems, but how they covary at different scales of variation and with the environment is not well documented. We assessed the covariation of bark thickness (BT), tree height, and crown base?to?height ratio across Alpine forests, after accounting for the...

Author(s): Thibaut Fréjaville, Albert Vilà?Cabrera, Thomas Curt, Christopher Carcaillet

Type: Document

Book or Chapter or Journal Article

FIREMON: Fire Effects Monitoring and Inventory Protocol

www.nrfirescience.org/resource/17998

FIREMON: Fire Effects Monitoring and Inventory System is an agency independent plot level sampling system designed to characterize changes in ecosystem attributes over time. The system consists of: a sampling strategy manual, standardized sampling methods, field forms, Access database, and a data analysis program.,FIREMON is a...

Type: Website

Website

Fire regimes, stand structure, and fuel loads in current and reconstructed riparian and upland forests

www.nrfirescience.org/resource/14085

Fire history, stand structure, and fuel loads in adjacent riparian and upland forests were measured in the Sierra Nevada and southern Cascades. Historic stand structure and fuel loads were then reconstructed using fire history and current stand data. Current and reconstructed riparian and upland forests were compared to determine if...

Type: Media

Webinar

LANDFIRE fuel attributes layer development

www.nrfirescience.org/resource/14266

This presentation provides spatial fuel analysts an evolutionary assessment on the development of LANDFIRE (LF) fuel attributes. Reviewing the progression of LANDFIRE fuel data layers points out critical junctures, important user input, processing procedures, and the strengths and weaknesses of the current data suite. LANDFIRE has...

Type: Media

Video

Mid-succession fire effects and reburn potential in model sagebrush ecosystems

www.nrfirescience.org/resource/16090

Sagebrush steppe ecosystems evolved with periodic fire, but this relationship is altered across much of the arid west by invasive species, land use change, overgrazing, and climate change. While understanding the short-term impacts of fire on these systems, little is known about the longer-term trajectory of recovery. To fill this...

Type: Media

Webinar

We Bring Fire with Us: the Role of People in Changing Modern U.S. Fire Regimes

www.nrfirescience.org/resource/18173

There are three ingredients needed for fire: fuel to burn, hot & dry conditions, and an ignition source. People are changing all three. The area burned has increased over just the past several decades, in western U.S. forests by 1500%. Last year was the most expensive wildfire season ever in the U.S., costing \$18 Billion. We...

Type: Media

Webinar

Introduction to the Interagency Fuels Treatment Decision Support System (IFTDSS)

www.nrfirescience.org/resource/12849

The web-based Interagency Fuels Treatment Decision Support System (IFTDSS) was designed to provide fire and fuels managers with a single software solution to manage the many data types, software applications, and tools available for fuels treatment planning. The IFTDSS project was initiated in 2007 by the Joint Fire Science Program...

Type: Media

Webinar

Diggin' dirt: fuel reduction practices and their effects on soil health

www.nrfirescience.org/resource/12939

In this webinar presented by Matt Busse on March 31, 2015 he covers: (1) ecological consequences of prescribed fire on soil heating, water repellency, and soil nutrient release, (2) pile burning, (3) whole tree harvesting and nutrient removal, and (4) the evils of soil compaction. He argues that with thoughtful planning and...

Type: Media

Webinar

Whitebark pine on the Flathead Indian Reservation: re-evaluating the resource for the 21st century

www.nrfirescience.org/resource/14774

This presentation by Rick Everett, Program Director Wildland Fire Sciences, Department of Forestry, Salish Kootenai College was part of the 2016 Whitebark Pine Ecosystem Foundation Annual Science and Management Workshop - Successes and Challenges in Managing the Jewel in the Crown of the Continent that occurred September 16, 2016 in...

Type: Media

Webinar

From Rothermel's Models to 3D Scanners: Getting a Closer Look fuel Properties and their Role in Prescribed Fire Dynamics

www.nrfirescience.org/resource/17980

Traditional tools for predicting fire behavior have relied on generally defined vegetation characteristics to make broad scale predictions of wildfire behavior and fire danger. While these useful in wildfire suppression operations, they provide limited utility in the context of prescribed burns, which are planned

and intentionally...

Type: Media

Webinar

Effectiveness and longevity of fuel treatments in coniferous forests across California

www.nrfirescience.org/resource/14079

The longevity of fuel treatment effectiveness to alter potential fire behavior is a critical question for managers preparing plans for fuel reduction, prescribed burning, fire management, and forest thinning. The presenters share findings from a region-wide fuel treatment effectiveness monitoring study that was initiated in 2001...

Type: Media

Webinar

Prescribed fire is an emergency

www.nrfirescience.org/resource/18984

Every year, 600,000 Americans over 70 years old stop driving every year. In 1970, blue-collar jobs were 31.2 % of total nonfarm employment. By 2016, their share had fallen to 13.6%. The number of days reaching "Unhealthy for Sensitive Groups" Level or Above on the Air Quality Index (Among 35 Major U.S. Cities for Ozone and PM2.5...

Type: Media

Webinar