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

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

Do Post-Fire Mulching Treatments Affect Regeneration in Serotinous Lodgepole Pine?

Broadcast mulching is a widely implemented post-fire erosion control method, although it remains uncertain how it affects post-fire regeneration in serotinous conifers. We used field data and unbiased conditional inference trees with random effects to test if mulching affects lodgepole pine (Pinus contorta Dougl. ex Loud. var....

Author(s): Micah Wright, Monique E. Rocca

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

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

Are litter decomposition and fire linked through plant species traits?

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 a new method for reconstructing forest conditions from General Land Office survey records

Historical forest conditions are often used to inform contemporary management goals because

historical forests are considered to be resilient to ecological disturbances. The General Land Office (GLO) surveys of the late 19th and early 20th centuries provide regionally quasi-contiguous data sets of historical forests across much of...
Author(s): Carrie R. Levine, Charles V. Cogbill, Brandon M. Collins, Andrew J. Larson, James A. Lutz, Malcolm P. North, Christina M. Restaino, Hugh Safford, Scott L. Stephens, John J. Battles
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

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

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

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

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

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

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

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

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

Modifying LANDFIRE geospatial data for local applications

www.nrfirescience.org/resource/15167

LANDFIRE's suite of spatial data layers are a valuable resource for land managers because they stretch "wall-to-wall" across the US, are created with a consistent methodology and are updated over time. These data are designed to support broad-scale land management activities, and users are encouraged to critique and modify...

Author(s): Don Helmbrecht, Kori Blankenship

Year Published: 2016

Type: Document

Technical Report or White Paper

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

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

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

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

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

Development of the rangeland vegetation simulator: a module for FVS

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

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

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

Fuel moisture sensitivity to temperature and precipitation: climate change implications

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

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

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

Spatiotemporal variability of wildland fuels in US Northern Rocky Mountain forests

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

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

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

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

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

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

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

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

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

Automated integration of lidar into the LANDFIRE product suite

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

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

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

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

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

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

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

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

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

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

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

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

Landsat time series and lidar as predictors of live and dead basal area across five bark beetle-affected forests

www.nrfirescience.org/resource/13623

Bark beetle-caused tree mortality affects important forest ecosystem processes. Remote sensing methodologies that quantify live and dead basal area (BA) in bark beetle-affected forests can provide valuable information to forest managers and researchers. We compared the utility of light detection and ranging (lidar) and the Landsat-...

Author(s): Benjamin C. Bright, Andrew T. Hudak, Robert E. Kennedy, Arjan J. H. Meddens
Year Published: 2014
Type: Document
Book or Chapter or Journal Article

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
Synthesis, Book or Chapter or Journal Article

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

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

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

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

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

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

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

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

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

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

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

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

The role of experimental forests in science and management

www.nrfirescience.org/resource/12913

Happy 100 years to the Priest River Experimental Forest (PREF)! PREF, which is managed by the Research and Development Branch of the USDA Forest Service, celebrated its centennial in September 2011. It was established in northern Idaho to provide useful information that would improve forest management in the western part of District...

Author(s): Theresa B. Jain

Year Published: 2012

Type: Document

Book or Chapter or Journal Article

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

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

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

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

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

www.nrfirescience.org/resource/8320

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

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

Year Published: 2012

Type: Document

Book or Chapter or Journal Article, Synthesis

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

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

www.nrfirescience.org/resource/13340

Disturbance interactions have received growing interest in ecological research in the last decade. Fire and bark beetle outbreaks have recently increased in severity and extent across western North America, raising concerns about their possible interactions. Although it is often presumed that bark beetle outbreaks increase...
Author(s): Martin Simard, William H. Romme, Jacob M. Griffin, Monica G. Turner
Year Published: 2011
Type: Document
Book or Chapter or Journal Article

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

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

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

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

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

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 ef?cient ways to assess ?re 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 with...
Author(s): Rachel Clark
Year Published: 2009
Type: Document
Research Brief or Fact Sheet

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

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

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

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...

Author(s): Rachel Clark

Year Published: 2009

Type: Document

Research Brief or Fact Sheet

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

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

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

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

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

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

Development and evaluation of the photoload sampling technique

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
Technical Report or White Paper

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

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

Assessing post-fire Douglas-fir mortality and Douglas-fir beetle attacks in the Northern Rocky Mountains

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

The photoload sampling technique: estimating surface fuel loadings from downward-looking photographs of synthetic fuelbeds

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

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

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

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

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

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

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

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

Foliar moisture contents of North American conifers

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

Estimation of biophysical characteristics for highly variable mixed-conifer stands using small-footprint lidar

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

Biomass consumption during prescribed fires in big sagebrush ecosystems

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

Regression modeling and mapping of coniferous forest basal area and tree density from discrete-return lidar and multispectral satellite data

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

FTM-West: fuel treatment market model for US West

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

Interactions among fire, insects, and pathogens in coniferous forests of the interior western United States and Canada

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

Stereo photo guide for estimating canopy fuel characteristics in conifer stands

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

Characterizing and mapping forest fire fuels using ASTER imagery and gradient modeling

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

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

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 Wagtendonk, Ralph Root, Carl H. Key

Year Published: 2005

Type: Document

Technical Report or White Paper

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

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

Estimating forest canopy bulk density using six indirect methods

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

A strategic assessment of forest biomass and fuel reduction treatments in Western States

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

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

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

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

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

Evaluating the ASTER sensor for mapping and characterizing forest fire fuels in northern Idaho

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 2: fire hazard

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

Fuels planning: science synthesis and integration; social issues fact sheet 2: developing personal responsibility for fuels reduction: types of information to encourage proactive behavior

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

Mapping relative fire regime condition class for the western United States

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

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

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 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

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

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

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

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

www.nrfirescience.org/resource/7917

Application of crown fire behavior models in fire management decision-making have been limited by the difficulty of quantitatively describing fuel complexes, specifically characteristics of the canopy fuel stratum. To estimate canopy fuel stratum characteristics of four broad fuel types found in the western United States and...
Author(s): Martin E. Alexander, Ronald H. Wakimoto
Year Published: 2003
Type: Document
Book or Chapter or Journal Article

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

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

Comparing historic and modern forests on the Bitterroot Front

www.nrfirescience.org/resource/10967

A study was initiated in 1995 to measure landscape changes in forest structures between 1900 and 1995. A systematic sampling system was used to collect data on three forested faces on the Bitterroot Front. Over 1,200 tree cores were taken on 216 plots between the elevation range of 4,500 to 7,500 feet. Historic forests were...

Author(s): Michael G. Hartwell, Paul B. Alaback, Stephen F. Arno
Year Published: 2000
Type: Document
Conference Proceedings

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-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

Fuel moisture, forest type, and lightning-caused fire in Yellowstone National Park

www.nrfirescience.org/resource/13568

The occurrence and behavior of lightning-caused fires in Yellowstone National Park wer summarized for 17 years (1972-1988) during a prescribed natural fire program. Both ignition (occurrence) and spread (Stand replacing fire activity) of fires were strongly influenced by fuel mositure and forest covery type. Fuel moisture estimates...

Author(s): Roy A. Renkin, Don G. Despain
Year Published: 1992
Type: Document
Book or Chapter or Journal Article

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

Fine fuel moisture content, relative humidity, air temperature, and fire behavior were observed hourly for 48 hours on the North Fork Fire in Yellowstone National Park from August 25 to August 27, 1988. Fine fuel reached minimum moisture content of 3 to 5 percent late in the afternoon, remained below 8 percent until after midnight,...
Author(s): Roberta A. Hartford, Richard C. Rothermel
Year Published: 1991
Type: Document
Research Brief or Fact Sheet

Predicting equilibrium moisture content of some foliar forest litter in the northern Rocky Mountains

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

Guidelines for prescribed burning sagebrush-grass rangelands in the northern Great Basin

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

Sagebrush over time: A photographic study of rangeland change

This publication is not available online. It will have to be ordered from a library.
Author(s): Kendall L. Johnson
Year Published: 1986
Type: Document
Conference Proceedings

A summary of ponderosa pine (Pinus ponderosa) management activities in the Lick Creek Drainage of the Bitterroot National Forest

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

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

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

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

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 nothern 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

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

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

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

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

Predicting slash depth for fire modeling
www.nrfirescience.org/resource/11954
Development of equations for predicting fuel bed depth (called "bulk depth" herein) appropriate for modeling fire behavior in slash is described. Bulk depth (y) was correlated with the expected number of 1/4-to 1-inch-diameter particle intercepts per foot of vertical plane transect (x) by regressions of the form y = a\x. 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

Pre-feasibility assessment: small diameter underutilized (SDU) wood feedstock for a 10 MW co-generation facility at the Milltown dam site

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

Estimating fuel weights of grasses, forbs, and small woody plants

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

Gain and loss of moisture in large forest fuels

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

Inventory of slash fuels using 3P subsampling

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

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.^/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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Western Aspen Alliance
www.nrfirescience.org/resource/16370
WESTERN ASPEN ALLIANCE is a joint venture between Utah State University's College of Natural

Resources, USDI Bureau of Land Management, and the USDA Forest Service Rocky Mountain Research Station and National Forest Systems, whose purpose is to facilitate and coordinate research issues related to quaking aspen (Populus tremuloides...
Type: Website

Website

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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